HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN SELECTED HOSPITALS IN KENYA

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Healthcare Provider Patient Communication on Diabetes Mellitus Management Practices in Selected Hospitals in Kenya

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DECLARATION

This thesis is my original work, and has not been presented for a degree in any other university.

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DEDICATION

To my late mother, Roselyne Illamwenya for her immense support and had looked forward to seeing me graduate on completion of the studies; my late brother Boniface Shihemi Amusala, both who passed on in the course of pursuing this PhD. Also to all persons living with diabetes mellitus who day in and out are constantly faced with challenges in regard to the management of this chronic lifetime condition. Equally, dedication goes to the healthcare providers who take care of the persons living with diabetes mellitus by availing their due attention and time in ensuring they give the most appropriate and timely management whenever necessary and at all times. Not to forget, I extend this dedication to the families of the persons who live with diabetes mellitus for their unreserved availability and constant support. Finally, I dedicate this work to my son Brian and the mother Mirriam Iswan for their support and understanding for the time I was engaged in the studies as this enabled me to accomplish.

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LIST OF ABBREVATIONS

ADA	American Diabetic Association
A1C	Glycated Hemoglobin
AIDS	Aquired Immunodeficiency Sydrome
AKUH	Aga Khan University Hospital
AMPATH	Academic Model Providing Healthcare program
ATDM	Automated Diabetes Mellitus Treatment Outcomes
BPS	Board of Postgraduate Studies
CAD	Coronary Artery Disease
CAHPS	Consumer Assessment Healthcare Providers and Systems
CCRDA	Causal Comparative Research Design Analysis
CDC	Centre for Disease Control
CDCP	Centers for Disease Control and Prevention
CDL	**C**hronic diseases of lifestyle
CGM	Continuous Glucose Monitoring
CQHCA	Committee on Quality of Health Care in America
CV	Cardiovascular
CVs	Communication Variables
DAWN	Diabetes Attitudes, Wishes and Needs

DISTANCE Diabetes Study of Northern California

DM Diabetes Mellitus

DMI Diabetic Management and Information Center

DMMPs Diabetic Mellitus Management Practices

DSME Diabetes Self-Management Education

EASD European Association for the Study of Diabetes

EC Environmental Context

FUNA Follow-Up Non-Attendance

GDM Gestational diabetes mellitus

GPs General practitioners

HbA1C Glycated haemoglobin

HCF Healthcare facility

HCPPC Healthcare Providers Patient Communication

HCPs Healthcare Providers

HIV Human Immunodefficiency Virus

IDDM Insulin - Dependent Diabetes Mellitus

ILI Intensive lifestyle intervention

KAP Knowledge, Attitude and Practice

KNH Kenyatta National Hospital

KNTRH	Kenyatta National Teaching and Referral Hospitals
KP	Knowledge and Practices
LDL	Low Density Lipoprotein
LHL	Low Health Literacy
MNT	Medical Nutrition Therapy
MODY	Maturity-Onset Diabetes in Youth and Neonatal Diabetes
MPSH	Meghji Pethraj Shah Hospital
MTAC	Media Technology and Applied Communication
NACOSTI	National Council of Science and Technology Institute
NIDDM	Non-Insulin Dependent Diabetes Mellitus
NVC	Nonverbal Communication
NVCB	Nonverbal Communicative Behaviour
PA	Physical Activity
PCOM	Provider Communication
PCP	Primary Care Providers
PPC	Provider Patient Communication
PPIE	Patient-Practitioner Interview Encounter
QOL	Quality of Life
RACGPDA	Royal Australian College of General Practitioners and Diabetes Australia

RCTs	Randomized Controlled Trials
RD	Registered Dietitian
SDCs	Socio Demographic Characteristics
SDM	Self Diabetes Monitoring
SMBG	Self-Monitoring of Blood Glucose
T2DM	Type 2 Diabetes Mellitus
VLU	Verbal Language Use
WHO	World Health Organization

OPERATIONAL DEFINATION OF TERMS

Communication Communication is defined as the ordered transfer of meaning: social interaction through messages: reciprocal creation of meaning: sharing of information, ideas or attitudes between or among people; as an act by one or more persons of sending and receiving messages that are disturbed by 'noise', occur within a context, have some effect and provide some opportunity (Sherko, Sotiri & Lika, 2013). In regard to the current study this will be the exchange of information and the interactions between the healthcare providers and the patients.

Effective communication Effective communication is communication that is comprehended by both participants; it is usually bidirectional between participants, and enables both participants to clarify the intended message. In the absence of comprehension, effective communication does not occur; when effective communication is absent, the provision of health care ends or proceeds only with errors, poor quality, and risks to patient safety (Schyve, 2007). In the present study this will concern how well the communication between the healthcare providers and patients is carried out and enables optimal diabetes mellitus management practices.

Healthcare provider patient communication Health communication encompasses the study and use of communication strategies' to inform and influence individual and community decisions that enhance health. It links the domains of communication and health and is increasingly

recognized as a necessary element of efforts to improve personal and public health (Healthy People, 2010). For the purpose of this study, healthcare provider patient communication involved what took place in the consultative interaction between the patient and the healthcare provider as they communicated in regard to diabetes mellitus as a health condition.

Verbal Language Use Verbal behaviour can be defined as 'the spoken communication'. The verbal elements of communication can be divided into instrumental or task-focused verbal behaviour and affective or socio-emotional behaviour reflecting the distinction between cure and care (Verlinde et al, 2012). Verbal communication includes the arrangement of words into sentences, the content as well as context, the area where the conversation takes place which might include the time and the physical, social, emotional and cultural environment (Sherko, Sotiri & Lika, 2013). In the current study this was in regard to the type and manner/ways verbal language was spoken by both the healthcare provider and patient during interactions.

Nonverbal Communicative Behaviour Nonverbal communication is defined as the aspect of communication that information is exchanged through nonverbal cues which are not purely linguistic in content, such as gesture, touch, posture, facial expression, eye contact, clothing and hairstyle (Montague, Chen, Xu, Chewning & Barret, 2013). The symbolic communication mode is essentially passive, and messages emitted in this

way are very easily misinterpreted (Pfeiffer, 1973). Nonverbal communication mainly indicates the thoughts, needs or feelings of the client, mainly subconsciously (Sherko, Sotiri & Lik, 2013). For the purpose of this study, nonverbal communicative behaviour was in regard to what the patients observed or noted about the healthcare providers and viceversa in the course of their communication interactions.

Noise

Noise is anything that interferes with receiving a message. Just as messages may be auditory or visual, noise, too, comes in both auditory and visual forms. A useful concept in understanding noise and its importance in communication is signal-to-noise ratio (DeVito, 2013). As concerns this study, this was in regard to any form of disruption that came into the communication interactions between the patients and healthcare providers.

Cultural Competence

Cultural competence is defined by the American Medical Association as the knowledge and interpersonal skills that allow providers to understand, appreciate, and work with individuals from cultures other than their own. It involves an awareness and acceptance of cultural differences, self-awareness, knowledge of the patient's culture, and adaptation of skills (Caballero, 2007). In this study tis involved the ability of either patients or healthcare providers to recognise and respond to the cultural aspects/needs of either with respect.

Socioeconomic Status

Socioeconomic Status is a complex characteristic, generally understood to encompass not only income and education level, the measures most commonly used, but also a wide range of associated factors that may affect the quality of health care patients receive, including insurance status, access to care, patients' health beliefs, and many facets of the doctor patient relationship, such as trust and communication (Bernheim, Ros, Krumholz & Bradley,2008). In this study, socioeconomic status will comprise financial status, quality of life, level of assets and ability to save.

Healthcare Provider

A health care provider refers to anyone working in health care, whether in hospitals or in the community, who comes in contact with clients or whose work influences care (Ulrey & Amason, 2001). Healthcare practitioner is a qualified person who directly provides or helps in providing healthcare to patient s, whether in the form of diagnostic, curative, or rehabilitative services that affects health condition (Saudi Commission for Health Specialties, 2014). For the purpose of this research study, healthcare provider included physicians, General Doctors (GP's), clinical officers, nurses, and dieticians working at the diabetic clinic at Kenyatta National Hospital and MP Shah Hospital.

Dietary Therapy

In order to be effective, nutrition therapy should be individualized for each patient/client based on his or her individual health goals; personal and cultural preferences; health literacy and numeracy; access to

healthful choices; and readiness, willingness, and ability to change (Evert et al, 2014). In regard to the current study, dietary therapy would be in terms of what was explained to the patients by the healthcare providers at the diabetic clinics during their consultative interaction.

Medication

There is a need for regular appraisal of drug prescribing and better monitoring of patient adherence with prescribed anti diabetic drugs and other diabetes self-management practices (Wabe, Angamo, & Hussein, 2011). The ultimate aim of any prescribed medical therapy is to achieve certain desired outcomes in the patients concerned (Jin, Sklar, Sen Oh & Li, 2008). As regards this study medication would be taken to be the oral and injectable hyperglycemic medicines for diabetes mellitus as prescribed by healthcare provider.

Exercise / Physical Activity

The American Diabetes Association (ADA) recommends that individuals with diabetes strive to engage in at least 150 minutes of moderate-intensity activity every week (Mori et al, 2011). Low-level aerobic exercise like brisk walking for half an hour per day and physical resistance training improves glucose tolerance, energy expenditure, feeling of wellbeing and work capacity, and improves BP, lipid profiles and mood (The Royal Australian College of General Practitioners and Diabetes Australia, 2014). In this study, exercise / physical activity was considered in terms of whether the healthcare did or did not recommend and discuss the need and importance for the patients to engage in exercises/

physical activity and of what kind were explained to the patients by the healthcare provider at the time of clinic attendance.

Monitoring Glycaemic Control For diabetics, glycemic control is a primary goal (Leroux et al, 2002). Self-monitoring of blood glucose (SMBG) complements HbA1c by providing real-time blood glucose data. SMBG should be implemented for all patients as part of an overall diabetes management plan that includes specific instruction on how, when, and why to test (Renard, 2005). Glycemic control in this study was considered in terms of what the healthcare providers explained to and expected of the patients' as regards blood sugar measurement and monitoring during their clinic attendance and the day to day DM management.

Patient Clinic Follow-Up Attendance The need of regular follow-up can never be underestimated in a chronic illness like diabetes and therefore should be looked upon as an integral component of its long term management. The importance of regular follow-up of diabetic patients with the health care provider is of great significance in averting any long term complications (Shrivastava, Shrivastava & Ramasamy, 2013). Frequent follow-up that is every 3 months with a registered dietitian (RD) has been associated with better dietary adherence in type 2 diabetes mellitus (Dworatzek et al, 2013). In this study, clinic follow up attendance was taken as those specific appointments that were given and recorded by the clinic for the patient to be seen again as

recommended by the healthcare provider from time to time and whether this is adhered to by the patients.

ABSTRACT

Diabetes is one of the most significant and growing chronic health problems in the world and represents one of the leading causes of disability due to complications. The main objective was to examine the effect of healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya. The study was carried out at the outpatient diabetic clinics of Kenyatta National Hospital and MP Shah Hospital. The study was anchored on Uncertainty Reduction Theory and Communication Accommodation Theory. This was a causal comparative research design study, with application of quantitative and qualitative methodology. Systematic random sampling for patients and purposive sampling for healthcare providers was used sampling. The sample comprised 421 participants: 400 patients and 21 healthcare providers. Questionnaires administered on patients and self-administered research questionnaires for healthcare providers were used as study instruments. Using SPSS, data was analyzed by utilizing descriptive statistics (mean, median, and percentages) and inferential statistics (chi-square, independent t-test, regression analysis, and Analysis of Variance). First, on patients' outcome; it established those nonverbal communicative behaviours and environmental context had statistically significant effect on diabetes mellitus management practices overall and similarly observed at Kenyatta National Hospital while at MP. Shah Hospital, only the environmental context had statistically significant effect on diabetes mellitus management practices. According to patients as regards the healthcare providers demographic characteristics of age, gender and the patient's own socio economic status; only the female healthcare providers gender had statistically significant moderating effect in Kenya overall and at Kenyatta National Hospital and not at MP Shah Hospital. Secondly, on healthcare providers' outcome, the study established that verbal language use had statistically significant effect on diabetes mellitus management practices overall, at KNH and not at MP Shah Hospital. Nonverbal communicative behaviour had statistically significant effect on diabetes mellitus management practices at MP Shah Hospital and was not the case in Kenya overall and at Kenyatta National Hospital. Patients demographic characteristics of age, gender and the healthcare providers own socio-economic status had no statistically significant moderating effect on DMMPs overall, at KNH and MP Shah Hospital. In conclusion, nonverbal communicative behaviour, overall and at KNH; environmental context, overall, at both KNH and MP Shah Hospital and the female healthcare provider gender, overall and at KNH as per patients: On the other hand, verbal language use, overall and at KNH, nonverbal communicative behaviour at MP Shah Hospital as per the healthcare providers were responsible for improvement in diabetes mellitus management practices. It is thus recommended that healthcare provider patient communication be addressed in healthcare practice; encompass all cadres of the healthcare providers and in all kinds of healthcare settings, public and private as it is still not quite effective in fostering diabetes management practices. Introduce provider patient communication in academic curriculum in training institutions as a requirement in medical practice to train providers on communication skills in general, as well as patients who need to be aware of the core dimensions of patient-provider communication.

CHAPTER ONE

INTRODUCTION

1.1. Background of the Study

Diabetes mellitus is a complex disease that requires continuing medical care and life-long patient education. Survey results in western studies repeatedly reinforce this complexity and highlight treatment compliance challenges associated with behavioral changes and multiple medication regimens (Merz et al., 2002). Although considerable evidence supports the use of pharmacological interventions in diabetes care, the best way to improve health outcomes using non-pharmacological 'complex interventions' is often unclear. A number of complex interventions target improvements in patients, providers and organisational aspects of diabetes care (Borgermans et al., 2008). Since DM also requires lifestyle modifications, the patient needs to be clearly informed about the many different aspects of DM management. It is helpful for patients to understand why ongoing monitoring of such variables as glycated hemoglobin (A1C) levels and proper diet and exercise regimens are important (Campos, 2006). Diabetes is essentially a self-managed disease and therefore requires patients to have a degree of autonomy motivation to successfully perform optimal self-management. Diabetes health care providers know that if only their patients adhered to their treatment recommendations, they could do well and avoid diabetes related complications (Delamater et al., 2006).

There is much for patients to understand about diabetes, its long-term management, the prevention or management of complications, and how to maintain or improve their quality of life. As a result of patient empowerment and education, patient behaviors may change and lead to improved A1C, blood pressure, lipids, or weight, reduced medication needs, and lower use of health care services (Glasgow et al., 2008; Duncan et al., 2009). Today's patients want to be partners in health care decision making; they no longer want to be told what to do. They want reasoning and proof to replace a patient-physician relationship that was traditionally built on blind trust. If patients are included as fully informed partners in their care, there will be increased satisfaction and better compliance and retention rates. In the process, the

physician will discover more satisfaction in work, renewed motivation and increased productivity (Belzer, 1999).

A study to provide global estimates of diabetes prevalence for 2019 and projections for 2030 and 2045, a total of 255 high-quality data sources, published between 1990 and 2018 and representing 138 countries were identified. Findings showed that the global diabetes prevalence in 2019 was estimated to be 9.3% (463 million people), rising to 10.2% (578 million) by 2030 and to rise to 10.9% (700 million) by 2045. The prevalence was observed to be higher in urban (10.8%) than rural (7.2%) areas, and in high-income (10.4%) than low-income countries (4.0%). One in every two (50.1%) people living with diabetes do not know that they have diabetes. The global prevalence of impaired glucose tolerance was estimated to be 7.5% (374 million) in 2019 and projected to reach 8.0% (454 million) by 2030 and 8.6% (548 million) by 2045 (Saeedi et all, 2019).

The Centers for Disease Control and Prevention reported that 25.6 million, or 11.3%, of US adults aged 20 or older had diagnosed or undiagnosed diabetes and noted that instituting management programs with better communication between patients and physcians contributed to better adherence to medication and adjustment processes and that more personalised patient-centered interactions help patients and providers set behavioural and clinical goals(Stellefson et al., 2013).

In a study of 222 Chinese adults with type 2 diabetes, it was noted that better provider patient communication, in addition to social support and higher self-efficacy is associated with performing diabetes self-care behaviors that are directly linked to glycemic control (Gao et al., 2013). In India both patient factors and clinician related factors were noted as critical in the management of diabetes (Shrivastava, Shrivastava & Ramasamy, 2013). Accurate understanding of patient perceptions of diabetes impact and its seriousness is important in effective patient-physician communication and diabetes management as adherence to medication, especially insulin is a key contributor to diabetes treatment outcome and therefore poor adherence results in worse glucose control and increased hospital admissions of patients due to diabetes complications (Wangnoo et al., 2013).

In the Middle East, research pointed out the significance of effective communication and continuity of care as factors affecting quality of diabetic care in primary care. Patients prefer to see the same doctor/nurse during their regular visits because this increases patients' satisfaction, confidence and trust toward health professionals (Mochtar & Al-Monjed, 2015). Healthcare professionals in United Arab Emirates (UAE) revealed that communication skills such as encouraging patients to take part in consultations, keeping good eye contact and attentive listening helped to facilitate better interaction between themselves and their patients, hence resulted in increased level of motivation regarding the management of their patients (Alhyas et al., 2013).

It was shown in a Saudi Arabia study that patient dissatisfaction with health care given to them was related in most cases to the problem of poor doctor-patient communication (Elzubier, 2002). A study in Iran noted that patients with diabetes play an important role in the management of their illness and should be involved in the intervention program to be able to improve their quality of life (Moattari et al., 2012). Effective patient–physician communication may be particularly important, with evidence that patients practiced better self-management when their providers had superior communication skills (Kadirvelu, Sadasivan & Hui Ng, 2012). Shams and Barakat, (2010) in a study in Egypt did argue that further research studies should emphasize the importance of effective patient-healthcare provider communication in overcoming some of the barriers to therapeutic compliance.

Increasing urbanization and the accompanying changes in lifestyle are leading to a burgeoning epidemic of chronic noncommunicable diseases in sub-Saharan Africa (Hilawe et al., 2013). Studies in Africa, though few, have espoused the importance of healthcare provider patient communication. Communication is the key to a therapeutic relationship between the doctor and the patient especially when dealing with patients who have chronic conditions such as diabetes. This relationship has been shown to be one of the factors with the most influence on patient satisfaction, and, in turn, on adherence (Diab, 2012).

In South East Nigeria, people with diabetes have the responsibility to manage their condition on a day to day basis, communicate with their healthcare provider

periodically throughout the year and seek advice when necessary and that to effectively self-manage diabetes, those with the disease must identify symptoms of emerging health crises, adhere to complex medication schedules and modify long-standing lifestyle behaviors such as their diet and physical activity levels(Nwankwo, Nandy & Nwankwo, 2010). A study in south western Nigeria, showed that poor dietary adherence and self-management practice are possible indicators for diabetes primary care providers to always ensure active involvement of patients in diabetes treatment plans in order to consistently guarantee improved treatment adherence, and subsequently optimal glycemic outcome (Adisa & Fakeye, 2014).

Epidemiological surveys by the Nairobi-based Diabetic Management and Information Center (DMI) gave the estimated prevalence of diabetes mellitus in Kenya at 3% in 2003, and above 6% in 2007 (Stellefson et al., 2013). In kenya, though there are no studies specific on how communication affect diabetes management, local studies have focussed more on information for the patient through educational and couselling programs by the healthcare provider, and even though communication takes place during the interactions, it's effectiveness should be ascertained. A study noted that knowledge about diabetes mellitus is prerequisite for individuals to take action to control the disease, and diabetes education, with consequent improvements in knowledge, attitudes and skills, would lead to better control of the disease, and is widely accepted to be an integral part of comprehensive diabetes care. Information can help people assess their risk of diabetes, motivate them to seek proper treatment and care, and inspire them to take charge of their disease and it is equally important to design and implement suitable diagnostic, management and treatment protocols for people with diabetes (Kiberenge et al, 2010).

While a large body of research shows the part that poor communication plays in prompting patients to complain, little work has been done in considering the history of the doctor-patient relationship and the way that the nature of that historical relationship is projected into the modern medical milieu (Bylund, Peterson & Cameron, 2012). The quality of doctor patient interaction is therefore an important determinant of glycemic control and healthcare outcome for people with diabetes.

Thus, communication should be considerded a universal first-line therapy in any future guidelines made for the treatment of diabetes as communication and intrpersonal skills of physcians are at the heart and soul of the proffession of medical doctors (Alzaid, 2014).

Communication in the healthcare environment has multiple layers that both help and hinder the processes vital to its proper functioning (Mickel, McGuire & Gross-Gray, 2013). Interpersonal communications related to healthcare delivery between patients and healthcare providers does take up a considerable amount of time (Jirjis, et al, 2005) and the quality of interpersonal care processes is associated with patients' self-care behavior and health outcomes for a number of conditions, including diabetes (Schillinger et al., 2003). Communication problems between patient and provider can cause difficulties in the effective delivery of health care, hence a supportive consultation environment with a warm and caring physician and a good patient-physician interaction is particularly important in diabetes care (Teutsch, 2003).

Communication during medical interactions plays a central role in decisions about subsequent interventions that includes efforts to assist patients in reaching their personal health goals (Ngo-Metzger, 2006) as patients' involvement in their health care is likely to reduce errors, adverse events, and nonadherence to treatment (Lovel, 2010). Good communication is associated with patient adherence to treatment, control and resolution of symptoms; control of pain, patient satisfaction, emotional health, function and physiologic measures (Weir, 2012; Stewart, 1995) and it is also associated with better physical and functional health outcomes among patients with diabetes, likely because of links to patient adherence and improved chronic disease self-management (Haskard et al., 2008). Therefore, success in coping with diabetes mellitus demands and treatment depends on many factors, among which effective communication between patients and health workers stands out (Damasceno et al., 2012).

Two components of successful teamwork in healthcare are provider patient communication and shared decision-making, both of which have been shown to improve patient satisfaction, adherence to treatment plans, and health outcomes

(Beverly et al., 2014). Patients with diabetes are known to play a vital role in their individual care in that much of their success hinges on the daily self-management of their chronic illness. Providers of diabetes care can play a key role in understanding and addressing patient factors such as health literacy and focusing on improved patient communication and cultural competence (White, Beech, & Miller, 2009). Satisfaction with both the effectiveness of the provider's communication and participatory decision-making styles are important predictors of diabetes self-care behavior, an outcome that appears to be mediated by enhanced patient understanding of diabetes care and confidence in self-management skills and knowledge (Brown et al., 2004). Effective patient–physician communication can promote behaviors such as daily monitoring, which is an important part of the patient role in diabetes self-management (Quinn et al., 2011).

For there to be effective diabetes management; effective communication between patient and provider, where medical professionals address psychosocial issues and are concerned about the expectations and needs of the patients is critical (Cinar & Schou, 2014). Patient physician communication significantly affect patient decisions about their health practices and the behaviors that are associated with diabetes outcomes (Quinn et al., 2011). Clinician's attitude, beliefs and knowledge about diabetes also influence diabetes management and may further influence the patient's perception through effective communication skills (Nam et al., 2011). The manner in which a physician communicates information to a patient is as important as the information being communicated. Patients, who understand their doctors, are more likely to acknowledge health problems, understand their treatment options, modify their behavior accordingly, and follow their medication schedules. Effective patient-physician communication can improve a patient's health as quantifiably as many drugs, perhaps providing a partial explanation for the powerful placebo effect seen in clinical trials (Travaline, Ruchinskas & D'Alonzo Jr., 2005).

Therefore, the purpose of the current study is to examine and demonstrate how the nature of communication between the healthcare provider and the patient has affected the management of diabetes mellitus and how the outcome of the study will subsequently bridge any communication gaps inherent and thereby enrich and

improve on the diabetes mellitus management practices. Thus, the incorporation of well structured healthcare provider patient communication aspects during medical encounters could have immense and positive impact on the diabetic management practices.

1.2. Statement of the Problem

Diabetes is a growing epidemic that threatens to overwhelm health services and undermine economies, especially in developing countries. Diabetes mellitus currently affects more than 250 million people worldwide, and is expected to affect over 380 million by 2025 (stellefson et al, 2013). 14.7 million adults in the African Region of the World Health Organization (WHO) were estimated to be living with diabetes mellitus is expected to have the largest proportional increase (90.5%) in the number of adult diabetics by 2030 (Hilawe, et al. 2013).

The communication process among patients, nurses and other health workers is still not considered to be very effective as difficulties are observed in clinical practice between professionals and patients, which strongly affect satisfaction, treatment adherence, and, consequently health outcomes (Damasceno et al., 2012). Physcians are used to giving orders to diabetes patients without necessarily realizing the extra burden those orders place on the person with diabetes (Alzaid, 2014). Nurse communication plays a pivotal role in supporting patient health, unfortunately, less than 20% of T2DM patient reach all three targets for blood glucose (HbA1C), lipids levels, and blood pressure (Mulder et al., 2014).

The quality of the nurses' consultations is sub-optimal in about 75% of 85% consultations regarding aspects of consultation environment, care and information (Abdulhadi et al., 2006). Medical encounters are characterized by more of physicians' dominance and less of attention to the patients' concerns, expectations and role in their own diabetes management and self-monitoring (Abdulhadi et al., 2007). Diabetes mellitus requires a complex assortment of time-sensitive communications activity and interventions to avert serious complications and the dominant unidirectional clinician-biased forms of communication employed by healthcare professionals were a major barrier (Forbes, Sidhu & Singh, 2011) and as

many as 50% of patients leave the hospital visit not knowing what they are supposed to do to take care of themselves (Heisler et al., 2002).

Effective physician communication is significantly positively correlated with patient adherence and there is a 19% higher risk of nonadherence among patients whose physician communicates poorly than among patients whose physician communicates well (Zolnierek & DiMatteo, 2009). Despite the appropriate diabetic management practices, patients are noted to move from one healthcre provider to another or change facility with the belief that they will be be served better elsewhere. Again, diabetic patients in Africa have reported that the major concern in patient care is the lack of follow up (Azevedo & Alla, 2008). Though communication always takes place in healthcare provider patient encounters, its quality and effectiveness is of significance in regard to the desired health outcomes, as poor communication can negatively influence DM management(Campos, 2006). Often, healthcare providers are unaware of the communication needs of their patients and do not tailor their communication styles to fit patients' needs (Ngo-Metzger, 2006).

In spite of the great strides that have been made in the treatment of diabetes in recent years, many patients do not achieve optimal outcomes and still experience devastating complications that result in a decreased length and quality of life (Funnell & Anderson, 2004). Less than half of persons with diabetes meet the recommended levels of HbA1c, blood pressure and lipid control. Additionally, poorly managed diabetes is associated with serious complications including stroke, blindness, heart disease, kidney disease, nerve damage, amputations, and death (Alhodaib & Hala, 2014). The above studies show evidence that healthcare provider patient communication's place in the management of diabetes is critical. It is therefore important to examine the effect of healthcare provider patient communication on diabetes mellitus management practices in Kenya in order to understand how communication is used during the interaction between the healthcare provider and the patient as a tool to improve diabetes mellitus management practices.

1.3. Objectives

1.3.1. General objective

To examine the effect of healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya

1.3.2. Specific objectives

1. To establish the effect of healthcare provider patient verbal language use on diabetes mellitus management practices in selected hospitals in Kenya

2. To determine the effect of healthcare provider patient nonverbal communicative behaviour on mellitus diabetes management practices in selected hospitals in Kenya

3. To examine the effects of noise during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya

4. To investigate the effect of healthcare provider patient communication environmental context during interaction on diabetes mellitus management practices in selected hospitals in Kenya.

5. To find out the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya

1.4. Hypothesis

Ho_1: There is no significant effect of verbal language use by the healthcare provider and the patient on diabetes mellitus management practices in selected hospitals in Kenya

Ho_2: There is no significant effect of nonverbal communicative behaviour during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya

Ho_3: There is no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya

Ho_4: There is no significant effect of environmental context during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya

Ho_5: There is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya

1.5. Significance of the Study

The potential severity of diabetes is such that its economic impact and death toll will simply overwhelm the African continent's resources, and the world will witness the death of millions of Africans (Azevedo & Alla, 2008). Diabetes Mellitus is a major health issue and is among the most frequent chronic disorders causing a high economic burden to the government to manage and treat the complications of the disease (Torres et al., 2011). Therefore, this are some of the compelling evidentual reasons to carry out the study to enable interventions to ameliorate on the impact of the disease.

Findings of the research would add to the knowledge and understanding of the subject of healthcare provider patient communication and its application in improving diabetic management practices. The findings of this study would be significant in several ways: First, it would help in the identification of the concept and framework of healthcare provider patient communication that takes into account the diabetic management practices in the health settings, like Kenyatta National Hospital; Secondly, support and enrich theory and model of healthcare provider patient communication in the management of patients with diabetes mellitus, hence add value in academia; Thirdly, it would generate greater awareness among healthcare providers in Kenya and beyond on the importance of having a proper and practical communication framework as a vehicle to effecttive diabetes mellitus

management thereby add quality to consultation process when attending to patients; Fourthly, study findings should provide useful knowledge on factors that might have impact and contribute to the successful adoption and use of healthcare provider patient communication, improving diabetes mellitus management practices in healthcare settings and help in identifying strategies that could be put in place to bridge the communication gaps, hence stimulate development of health communication programmes/policies by government that would guide in formulating a framework to enhance eqiuping healthcare providers with communication skills through training so as to directly be helpful to patients in the management practices of diabetes mellitus, hence ultimately ensure improved and better health outcomes.

Communication is an important factor in medical care that cannot be overlooked as it contributes to the effectiveness of medical care among diabetic patients (Hickson et al., 1994; Hadlow & Pitts, 1991). Therefore, the ultimate objective of any healthcare provider patient communication is to improve the patient's health and medical care, since satisfied patients are advantageous for doctors in terms of greater job satisfaction, less work-related stress, and reduced burnout (Fong Ha & Longnecker, 2010).

1.6. Scope

The study was carried out at Kenyatta National Teaching and Referral Hospitals (KNTRH) and MP Shah Hospital in Kenya as its settings and patients' with diabetes mellitus and the healthcare providers who attended to them formed the accessible population. Kenyatta National Hospital is currently the largest referral and teaching hospital in Kenya located in Nairobi County and serves a diverse population from within Nairobi and its environs including referrals from other parts of the country.

MP Shah Hospital, the third largest private hospital in Kenya after Nairobi hospital and Aga Khan University Hospital, is located in Nairobi County and serves a diverse population within Nairobi, its environs and beyond. MP Shah Hospital was picked after Aga Khan University Hospital declined to be part of the study whereas Nairobi hospital had been used as a pilot site and again has low volumes of diabetes patients

unlike the other two private Hospitals. Both hospitals serve neighboring countries in the East and Central Africa.

Causal comparative research design was used with application of quantitative and qualitative methodologies. The target population comprised of all persons with diabetes mellitus and the healthcare provider who attend to patients with diabetes mellitus. The accessible population involved patients with diabetes mellitus aged 18 years and over who had been attending Kenyatta National Hospital (KNH) and MP Shah Hospital outpatient diabetic clinics for twelve (12) month and over and healthcare providers attending to patients with diabetes mellitus at KNH and MP Shah Hospital outpatient diabetic clinics.

The sample comprised of 400 patients and 21 healthcare providers. Systematic random sampling was used to sample the patients, whereas purposive sampling was used to sample the healthcare providers. A researcher administered questionnaire for patients and a self-administered research questionnaire for healthcare providers were used to collect data. Approval to carry out the study was granted by the Board of postgraduate studies, Jomo Kenyatta University of Agriculture and Technology; National council of science and technology institute (NACOSTI) and University of Nairobi / Kenyatta National Hospital and MP Shah Hospital - Research and Ethics Committee. Approval was also given by Kenyatta National Hospital and MP Shah Hospital administration to carry out the study at the hospitals' diabetic clinics.

The theoretical premise of this study did reside in uncertainty reduction theory and communication accommodation theory. These two theories seek to explain how individuals plan, activate and create effective and sometimes ineffective goals and messages, and how individuals process, appraise and cope with incoming information and uncertainty, situations that are very common in healthcare.

The conceptual framework highlighted the interactions between the independent variable and the dependent variable with the intervening moderating variable. The study examined the effect of verbal language use, nonverbal communicative behaviour, noise and environmental context of healthcare provider patient communication as the independent variables on diabetes mellitus management

practices as the dependent variable. The demographic characteristic was the moderating variable.

1.7. Limitations

This study had quite a number of limitations that had the potential to affect the findings. First, the present study relied on data whose nature is sensitive hence the possibility of dishonesty in responding to questionnaires or simply reporting what the respondents thought the researcher wanted.

Secondly, it was a causal comparative study; hence the researcher could not make definitive conclusions. The relationship between the independent variable and dependent variable is usually a suggested relationship because the researcher does not have complete control over the independent variable. However, the comparisons made between the hospitals helped to triangulate data and additionally, the application of quantitative and qualitative methodologies allowed for representative sampling and triangulation, thus replication of data quite possible to similar populations.

Third, the research study focused on diabetes mellitus only as a disease condition; hence these findings may not necessarily be applied in regard to other disease conditions in Kenya and elsewhere. Fourth, this research study focused on communication between the healthcare providers and patients. The researcher suggest that future studies be specific on research of specific types or specialization of healthcare providers such as doctors, nurses, clinical officers, pharmacist, and nutritionists instead of the holistic approach taken in the current study; be targeted research on specific personnel discipline in healthcare as it would enrich literature in this area of communication.

Fifth, there is limited research on the healthcare communication in Kenya. Most of the literature related to healthcare provider patient communication in this study focused on contexts outside Kenya. Therefore, the research would implore for more studies on communication to be conducted locally.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, literature was reviewed pertaining to healthcare provider patient communication in management of diabetes mellitus in selected hospitals Kenya. The specific objectives for the study were: 1) To establish the effect of verbal language use on diabetes mellitus practices in selected hospitals Kenya. 2). To determine the effect of nonverbal communicative behaviour on diabetes mellitus management practices in selected hospitals Kenya. 3) To examine the effects of noise on diabetes mellitus management practices in selected hospitals Kenya. 4) To investigate the effect of environmental context on diabetes mellitus management practices in selected hospitals Kenya. 5). To find out the moderating effect of demographic characteristics on diabetes mellitus management practices in selected hospitals Kenya.

The first section of this chapter provides an overview of diabetes mellitus, epidemiology of diabetes, education on diabetes, diabetes mellitus management practices and healthcare provider patient communication in general. In the second section, the major theoretical approaches are discussed and two communication theories are reviewed. The last section of the chapter is the general review of variables; then the empirical review of studies done on this area; the critique of the existing literature relevant to the study, and finally identifies the research gaps the study seeks to fill.

2.1.1. Diabetes mellitus

In the 2nd century AD, Aretaeus of Cappadocia provided the first accurate description of diabetes, coining the term diabetes. In 17th century, Thomas Willis added the term mellitus to the disease, in an attempt to describe the extremely sweet taste of the urine. The important work of the 19th century French physiologist Claude Bernard, on the glycogenic action of the liver, paved the way for further progress in the study of the diabetes as a disease condition (Karamanou et al., 2016).

Diabetes is defined as a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels (American Diabetes Association, 2010). Thus, the clinical picture can be created by absolute insulin deficiency as in type I or insulin - dependent diabetes mellitus (IDDM) or by insulin resistance and failure of compensatory additional insulin secretion as in type II or non - insulin dependent diabetes mellitus (NIDDM) (Rees & Williams., 1995).

Diabetes can be classified into the following general categories (American Diabetes Association, 2015; Mayfield, 1998): Type 1 diabetes, formerly called type I, IDDM or juvenile diabetes, is characterized by beta cell destruction caused by an autoimmune process, usually leading to absolute insulin deficiency. The onset is usually acute, developing over a period of a few days to weeks. Over 95 percent of persons with type 1 diabetes mellitus develop the disease before the age of 25, with an equal incidence in both sexes and an increased prevalence in the white population; Type 2 diabetes, formerly called NIDDM, type II or adult-onset, is characterized by insulin resistance in peripheral tissue and an insulin secretory defect of the beta cell. This is the most common form of diabetes mellitus and is highly associated with a family history of diabetes, older age, obesity and lack of exercise; Gestational diabetes mellitus (GDM) (diabetes diagnosed in the second or third trimester of pregnancy that is not clearly overt diabetes); Types of diabetes mellitus of various known etiologies are grouped together to form the classification called “other specific types.” This group includes persons with genetic defects of beta-cell function or with defects of insulin action; persons with diseases of the exocrine pancreas, such as pancreatitis or cystic fibrosis and acromegaly; and persons with pancreatic dysfunction caused by drugs, chemicals or infections.

The vast majority of cases of diabetes fall into two broad etiopathogenetic categories. Type 1 diabetes, the cause is an absolute deficiency of insulin secretion. Individuals at increased risk of developing this type of diabetes can often be identified by serological evidence of an autoimmune pathologic process occurring in the

pancreatic islets and by genetic markers. Type 2 diabetes mellitus, much more prevalent category; the cause is a combination of resistance to insulin action and an inadequate compensatory insulin secretory response. In Type 2 diabetes, a degree of hyperglycemia sufficient to cause pathologic and functional changes in various target tissues, but without clinical symptoms, may be present for a long period of time before diabetes is detected (American Diabetes Association, 2013).

Diabetes mellitus is characterized by recurrent or persistent high blood sugar, and is diagnosed by demonstrating any one of the following (American Diabetes Association, 2010): Fasting plasma glucose level ≥ 7.0 mmol/l (126 mg/dl); Plasma glucose ≥ 11.1 mmol/l (200 mg/dl) two hours after a 75 g oral glucose load as in a glucose tolerance test; Symptoms of high blood sugar and casual plasma glucose ≥ 11.1 mmol/l (200 mg/dl); Glycated hemoglobin (HbA1C) ≥ 48 mmol/mol (≥ 6.5 DCCT %).

2.1.2. Epidemiology of diabetes mellitus

Diabetes mellitus, a chronic metabolic disorder requires a significant amount of money for its management and thus puts considerable burden on healthcare services (Zimmet, Alberti & Shaw, 2001). Diabetes is emerging as an epidemic of the 21st Century and threatens to overwhelm the health care system in the near future. It imposes a high economic burden in terms of health care expenditure, lost productivity and foregone economic growth, hence the need for public health interventions to prevent diabetes or delay the onset of its complications that entail intensive lifestyle modification for those at risk of diabetes and aggressive treatment for those with the disease (Kiberenge et al., 2010).

It is estimated that 366 million people had DM in 2011 and by 2030 this would have risen to 552 million. DM caused 4.6 million deaths in 2011. The incidence of type 2 DM varies substantially from one geographical region to the other as a result of environmental and lifestyle risk factors. Studies examining data trends within Africa point to evidence of a dramatic increase in prevalence in both rural and urban setting affecting both genders equally. The majority of the DM burden in Africa appears to be type 2 DM, with less than 10% of DM cases being type 1 DM. A 2011 Centre for

Disease Control and Prevention (CDC) report estimated that DM affected about 25.8 million people in the US (7.8% of the population) in 2010 with 90% to 95% of them being type 2 DM (Olokoba, Obateru & Olokoba, 2012).

Diabetes mellitus prevalence is increasing worldwide at an alarming rate especially in low and middle income nations (Al Bimani, Khan & David, 2015). An estimated 382 million people worldwide have diabetes, including 25.8 million Americans. By 2035 this will rise to 592 million (Parajuli, Saleh, Thapa & Ali, 2014). The prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and to be 4.4% in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men. The most important demographic change to diabetes prevalence across the world appears to be the increase in the proportion of people > 65 years of age (Wild, Roglic, Green, Sicree & King, 2004).

In the US, diabetes is the seventh leading cause of death. Overall, the risk of death among people with diabetes is about twice the risk of death for people of similar age without diabetes (Richardson et al., 2014). Diabetes is diagnosed in around 5% of adults aged 20 years or over in the United States. The prevalence is similar in men and women, but diabetes is more common in many ethnic groups. The prevalence in people aged 40-74 has increased over the past decade (Vaaler, 2000). Diabetes occurs in all populations and age groups but is increasing in prevalence in the elderly and in blacks, Hispanics, Native Americans, and Asians (Olefsky, 2001). The current prevalence of diabetes in the United States is startling, with nearly 24 million affected individuals (~ 8% of the U.S. population) and another 57 million individuals (~ 19% of the U.S. population) believed to be at considerable clinical risk of developing diabetes (White, Beech & Miller, 2009).

Diabetes is the tenth leading cause of deaths in Australia. Type 2 Diabetes Mellitus (T2DM) comprises 80% to 90% of all diabetes cases and almost one in four Australians aged 25 years and older had either diabetes or a condition of impaired glucose metabolism (International Diabetes Institute, 2001). The number of people with type 2 diabetes is growing, most likely the result of rising overweight and

obesity rates, lifestyle and dietary changes, and an ageing population (The Royal Australian College of General Practitioners and Diabetes Australia, 2014).

Diabetes is a major public health problem that is approaching epidemic proportions worldwide and largely associated with lifestyle changes in emerging economies. The worldwide prevalence of both types 1 and 2 DM among adults was 285 million (6.4%) in 2010 and is predicted to rise to around 439 million (7.8%) by 2030 (Musenge et al., 2015 ; Qiu et al., 2012). However, the age-standardized prevalence of total diabetes was 9.7%, accounting for 92.4 million adults with diabetes in 2010 in China (Musenge et al., 2015). India today leads the world with over 32 million diabetic patients and this number is projected to increase to 79.4 million by the year 2030. Recent surveys indicate that diabetes now affects a staggering 10-16% of urban population and 5-8% of rural population in India and Sri Lanka (Shrivastava, Shrivastava & Ramasamy, 2013). Approximately 10% of the Omani population is suffering from diabetes and according to World Health Organization; number of subjects living with diabetes in Oman will rise from 75,000 in 2000 to 217,000 in 2025(Al Bimani, Khan & David, 2015). In Nepal the number of diabetic patients was 436,000 in 2000 and it is projected be 1,328,000 by 2030 (Parajuli, Saleh, Thapa & Ali, 2014).

Although sub-Saharan Africa has been reported to have an estimated DM adult prevalence of 2.4%, this is probably not just an understatement but the burden is also likely to increase in a few years' time (Musenge et al., 2015). Diabetes mellitus prevalence in South Africa is epidemic with marginalised communities being at high risk of developing T2DM and other chronic diseases of lifestyle (CDL). The growing prevalence of diabetes makes it a significant catalyst to morbidity, premature mortality, and increasing health care costs. Worldwide rates of diabetes will escalate by 54% from 2010 to 2030 (284.6 to 438.4 million). For sub-Saharan Africa, this growth is estimated at 98% (12.1 to 23.9 million) (Anderson, Jansen van Vuuren & Learmonth, 2013).

Type 2 diabetes is one of the most common chronic diseases influenced by the lifestyle of an individual. It is a quiet killer, constituting 37% of the mortality in

2000; 36% of deaths in males and 40% in females. In 2004, it was estimated that there were a million patients diagnosed with diabetes, with possibly the same number of cases undiagnosed in South Africa alone (Mshunqane, Stewart, & Rothberg, 2012). Diabetes Mellitus Deaths in Kenya reached 5,831 or 1.84% of total deaths. The age adjusted Death Rate is 42.44 per 100,000 of population ranks Kenya #74 in the world. The International Diabetes Federation estimated the prevalence of diabetes in Kenya to be about 3.3% in 2007. However, local studies have shown prevalence of 4.2% in the general population with a prevalence rate of 2.2% in the rural areas and as high as 12.2% in urban areas (Kiberenge, et al. 2010).

2.1.3. Education on diabetes mellitus

Educational intervention has been observed to improve the diabetic patients' knowledge of the disease and self-care and the long term control of the disease (Tan, Yong, Wan & Wong, 1997). Healthcare providers should give patients enough education about the treatment and disease (Jin, Sklar, Sen Oh & Li, 2008). Education is included with the explicit aim of enhancing active involvement of patients so that they become partners in their health care process, a model that has arisen with the realization that patients are both the producers of health and the customers of health care (Cooper, Booth & Gill, 2003). Patients and their carers should be offered a structured, evidence-based education program at the time of diagnosis, with annual update and review. Educating people with diabetes about their condition and its treatment will assist in self-management and reduce the risks of complications related to diabetes (The Royal Australian College of General Practitioners and Diabetes Australia, 2014).

Diabetes self-management education (DSME) is a critical element of care for all people with diabetes and is necessary in order to improve patient outcomes. Diabetes education must be responsive to advances in knowledge, treatment strategies, educational strategies, psychosocial interventions, and the changing health care environment (Funnell et al, 2010). Education sessions provided to patients with diabetes have resulted in positive changes in diabetes-related knowledge, as well as psychological and behavioural domains (Jones et al, 2013). A common problem with

health education content is that health professionals provide too much detail regarding pathophysiology and too little regarding the daily management of illnesses. In developing health education programs, the content, teaching modality and person designated to provide information all merit consideration (Tripp-Reimer, Choi, Kelley & Enslein, 2001).

Diabetes education is important but it must be transferred to action or self-care activities to fully benefit the patient (Shrivastava, Shrivastava & Ramasamy, 2013). Data on knowledge and practices (KP) of diabetic patients reveal aspects of education that need to be reinforced and addressed in order to improve diabetes management (Al Bimani, Khan & David, 2015). Patients need to be discouraged from using the information they are given to threaten themselves rather than improving their knowledge. The success of this management requires that health professionals understand the lifestyle, cultural beliefs, attitudes, family and social networks of the patients (Mshunqane, Stewart, & Rothberg, 2012).

2.1.4. Diabetes mellitus management

The general objectives of diabetes mellitus management practices are: To relieve symptoms; To correct associated health problems and to reduce morbidity, mortality and economic costs of diabetes; To prevent as much as possible acute and long-term complications; to monitor the development of such complications and to provide timely intervention; To improve the quality of life and productivity of the individual with diabetes. The interdependence of diabetes management strategies centre around three key elements: Education and support for self-management, including reduction of lifestyle risk factors; effective drug treatment strategies for maintaining normal blood glucose and lipid levels, and normal blood pressure; effective surveillance for early detection and treatment of complications. Failure to afford systematic attention to the significance of these factors continues to reinforce the passive role of patients so that the burden of coping with chronic illnesses like diabetes is reinforced at both individual and community levels (Cooper, Booth & Gill, 2003).

Diabetes is a disease requiring many types of interventions to prevent the associated morbidity and mortality. Aspects of the patient-physician relationship such as

communication and empathy have been shown to be important to patient's adherence and ability to complete self-care tasks (Bonds et al, 2004). Patients are expected to follow a complex set of behavioral actions to care for their diabetes on a daily basis. These actions involve engaging in positive lifestyle behaviors, including following a meal plan and engaging in appropriate physical activity; taking medications when indicated; monitoring blood glucose levels; responding to and self-treating diabetes - related symptoms; following foot-care guidelines; and seeking individually appropriate medical care for diabetes or other health-related problems. The proposed regimen is further complicated by the need to integrate and sequence all of these behavioral tasks into a patient's daily routine (Shrivastava, Shrivastava & Ramasamy, 2013).

Individuals with diabetes have been shown to make a dramatic impact on the progression and development of their disease by participating in their own care. It is critical that health care providers actively involve their patients in developing self-care regimens for each individual patient. This regimen should be the best possible combination for every individual patient plus it should be sound and realistic to the patient so that he or she can follow it. Health care providers should fully document the specific diabetes self-care regimen in the patients' medical record as it will facilitate provider patient communication and help in assessment of compliance. Diabetes self-care requires the patient to make many dietary and lifestyle modifications supplemented with the supportive role of healthcare staff for maintaining a higher level of self-confidence leading to successful behavior change (Shrivastava, Shrivastava & Ramasamy, 2013). Intensive treatment is designed to achieve blood glucose values as close to the non-diabetic range as possible. The essential components of such treatment are education, counselling, monitoring, self-management, and pharmacological treatment with insulin or oral antidiabetic agents, to achieve specific glycaemic goals (Vaaler, 2000).

The principles of achieving the objectives of diabetes management are adjustment of diet, reduction and avoidance of obesity, adequate physical activity, use of oral hypoglycaemic agents, and administration of insulin if necessary. Education and motivation of the patient to play an active part in the antidiabetic programme and

maintence of general physical and emotional health is essential if the therapeutic measures are to be effective (National Diabetes Data Group, 1985). Constantly seeking treatment and engaging in everyday self-care activities such as frequent glucose monitoring, following a meal plan, and correctly preparing or remembering to take insulin or oral medications at the right times can be a source of diabetes-specific emotional stress and can be difficult to follow a regime in times of stress for patients (Hapunda, Abubakar, van de Vijver & Pouwer, 2015). Effective management not only reduces the risk, but can prevent or delay developing complications, enhance health related quality of life and reduce hospital admissions and effective communication is central to this process (Alhodaib & Hala, 2014).

2.1.5. Healthcare provider patient communication

The quality of provider patient communication can affect numerous outcomes, including patient adherence to recommendations and health status (Healthy People, 2010). Patients' expectations and perceptions of the medical encounter and interactions are important tools in diabetes management. Some problems regarding the interaction during encounters may be related to a lack of communication skills on the part of either the physician or the patient (Abdulhadi et al, 2007). The problems encountered during communication are not solely the fault of the physician and it has been noted that 76% of the patients' main worries are not mentioned to the doctor (Chatterjee, 2006).

Better patient provider communication increases awareness of health risks and risky behaviors, helps patients make choices by clarifying complicated issues, and increases the likelihood that patients understand and adhere to complex treatment regimens (Ngo-Metzger, 2006). Thus, establishing partnerships with individual patients and creating truly patient-centered practices is of benefit to patients in terms of better communication with providers, greater satisfaction with care, improved metabolic and psychosocial outcomes, and emotional well-being. The benefits for providers include achievement of recommended standards of care, improved outcomes, and greater professional satisfaction (Funnell & Anderson, 2004).

Effective communication reinforces a clearly communicated information and language of our own which means that we are able to express our intended meaning through a verbal and non-verbal progress of information in ways that are appropriate in our cultures and different situations (Wong, 2013**).** Effective communication with patients is critical to the safety and quality of care. Barriers to this communication include differences in language, cultural differences, and low health literacy (Schyve, 2007).

Effective interpersonal communication is a dynamic and ongoing process that requires both patients and providers to find common ground through cooperation, coordination, and understanding of one another's perspectives. An essential component of this process is the provider's ability to interact with the patient in a caring and sensitive manner in order to engender trust in the medical relationship as it does influence diabetes care (Schoenthaler et al, 2012;. Lyles et al, 2012). Patients who understand the nature of their illness and its treatment, and who believe the provider is concerned about their well-being, show greater satisfaction with the care received and are more likely to comply with treatment regimens (de Negri et al, 1997).

When practitioners effectively use space, paying attention to both communicative and narrative parameters in the conversation, patients do not feel pressured or forced to omit information from their story. Rather, they are freed up to describe their health concerns on their own terms. A communicative process that honors both patient and physician will strengthen the relationship that develops. Skill, technique, and theory provide a foundation, or point of departure, for a physician to develop his or her voice and bring it to the medical encounter (Haidet, 2007).

There is a distinct dissonance between a communication style that focuses on medical information compared with a patient-centered communication style that focuses on patients' priorities, obstacles to self-management, and strategies for overcoming obstacles (Kruse, 2013). Patient outcomes depend on successful communication and therefore physician who encourages open communication may obtain more complete information, enhance the prospect of a more accurate

diagnosis, and facilitate appropriate counseling, thus potentially improving adherence to treatment plans that benefits long-term health, increasing patient involvement in their health care through negotiation and consensus-building between the patient and physician (Committee Opinion, 2014).

Communication is a vital element in nursing in all areas of activity and in all its interventions such as prevention, treatment, therapy, rehabilitation, education and health promotion. The nursing process moreover is achieved through dialogue, through interpersonal environment and with specific skills of verbal communication. The entire process occurs in a context consisting of physical space, cultural and social values and psychological conditions. Good communication also improves the quality of care provided to patients, which is observed in the results (Kourkouta & Papathanasiou, 2014).

Communication can falter for a variety of reasons. Patients who are ill or afraid they might be ill may suffer from heightened anxiety, which chips away at their self-confidence. Less obvious structural barriers may also impede the conversation, for instance, when patients belong to a health-care system in which they see a different provider every time, they may never develop a comfortable rapport with a single physician (Weir, 2012). Common mistakes that clinicians make in communication include overwhelming the patient with too much information, using jargon and technical terminology, relying on words alone, and failing to assess patient understanding. Patients with low health literacy (LHL) often rely solely on verbal instructions; therefore, verbal communication must be clear. It is recommended that clinicians slow down their speech, use plain, and avoid jargon. Because successful communication requires that patients draw from a common vocabulary and experience, attempting to match the clinician's vocabulary with that of the patient has been shown to be helpful (Sudore & Schillinger, 2009).

While many dimensions may contribute to patient satisfaction such as waiting time, hospital location, care delivery, and communication skills, the quality of communication with clinicians can influence patient perceptions of their clinicians and the quality of care they are receiving. A study suggested that 85% of patients

changed or considered changing their physician due to poor communication skills (Montague, Chen, Xu, Chewning & Barret, 2013). Ideally, information among physician and patient would be exchanged openly and equally; however, in reality, the amount of knowledge and expertise physicians have in their field creates a disparity between them and the patient. This gap results in more of a complementary relationship than an egalitarian one, which is evident in how they ultimately communicate (Mickel, McGuire & Gross-Gray, 2013).

Patient provider communication is essential for effective care of diabetes. One critical dimension of the communication process is the diabetes-specific content or information transfer that occurs during medical encounters, often considered under the broad rubric of "patient education." (Piette et al, 2003). Effective communication in diabetes management often provides patients with clear information, emotional support, opportunities for shared decision-making, and agreement on the nature of their medical problems and the need for follow-up (Quinn et al, 2011). A Ukrainian study noted that patients experience negative feelings about their state and dissatisfaction in their communications with their physician, hence information provision is especially important at the early development of the disease, when patients lack information on hypoglycemia manifestations and can fail to identify and manage the disease properly (Mandrik et al., 2013).

According to an exploratory qualitative descriptive design study to describe the experience of living with type 2 diabetes in adult females, patient provider communication is the most important factor affecting diabetes adherence in addition to knowledge of diabetes, and the consequences of poor glycemic control (Matthew, Peden & Rowles, 2009). Understanding a patient's diabetes-related experiences can improve patient practitioner communication and help the GP understand their patient's priorities for education, resources and management. This is essential for building and adapting diabetes management plans to be consistent with an individual patient's needs (The Royal Australian College of General Practitioners and Diabetes Australia, 2014). For patients, diabetes exemplifies as much as any chronic disease the extent to which individuals' behaviors influence outcomes. The behaviors of the

individual - diet, energy expenditure, medication taking - have a direct impact on the fundamental disease process of energy metabolism (Marrero et al, 2013).

Despite the potential of communication to improve diabetes patients' health, in practice this is often very difficult, not only because it is hard to persuade patients to change ingrained lifestyle patterns, but also because nurses and other healthcare providers are still primarily trained from a biomedical perspective. Hence, they are not accustomed to sharing responsibility for care with patients (Mulder et al, 2014). Research on optimal management of diabetes in primary care in New Zealand noted that the quality of communication between health practitioners and patients can make a significant difference to health outcomes. There is also good evidence that practitioners can improve the quality of care they provide by better understanding the consultation process and focusing on effective communication both within consultations and over time. In teasing out exactly how communication affects health outcomes, there are the "proximal outcomes of the interaction that could then affect health or that could contribute to the intermediate outcomes that lead to better health (Macdonald, et al, 2013).

2.2. Theoretical Review of Literature

Theories can provide an explicit understanding of an idea, concept or phenomenon which then provides the basis for future study. This study uses two theoretical frameworks, that is, uncertainty reduction theory and communication accommodation theory. By its very nature, the healthcare provider patient encounter is interpersonal communication. As healthcare communication interactions often occur at an interpersonal level, familiarity with theories of interpersonal communication may reinforce existing best practices and lead to the development of novel communication approaches with patients (Bylund, Peterson, & Cameron, 2012).

These two theories seek to explain how individuals plan, activate and create effective and sometimes ineffective goals and messages, and how individuals process, appraise and cope with incoming information and uncertainty, situations that are very common in healthcare; situations similar to what is under investigation in this study.

2.2.1. Uncertainty reduction theory

The uncertainty reduction theory, also known as initial interaction theory, developed in 1975 by Charles Berger and Richard Calabrese, is a communication theory from the post-positivist tradition. This theory generally concentrates on the reduction of the high level of cognitive uncertainty present in an initial interaction. It also distinguishes between a predictive component and an explanatory component. In formulating their uncertainty reduction theory, Charles R. Berger and Richard J. Calabrese attempted to model the processes through which communication is used to reduce uncertainty in an initial interaction between strangers (Berger & Calabrese, 1975).

Uncertainty can be broken down into behavioral uncertainty and cognitive uncertainty. Behavioral uncertainty is the extent to which behavior is predictable within a given situation. However, uncertainty is not just about predicting other people's behaviors, but also explaining them: offering the "why" and the reasons behind their behaviors. Cognitive uncertainty is the uncertainty individuals have about others' beliefs. Cognitive uncertainty commonly leads to anxiousness and tension in individuals until it can be resolved (Perrault & Silk, 2016).

As one of the uncertainty theories, it is an individually-centered theory that was originally developed to explain initial communication interactions between strangers. Central to its claim is the assumption that an individual's primary goal in initial communication is to increase predictability and decrease uncertainty of one's own behaviors and the behaviors of others. In time, theorists began to broaden URT's scope of application to explain uncertainty in interpersonal communication in general as opposed to solely in initial interactions.

One such application was in healthcare communication. Scholars found uncertainty to play a vital role in shaping provider-patient interaction as patients face uncertainty, including symptom attribution, state of the illness, treatment options and prognosis, social roles and predicting the effect of the illness on friends, family, and personal long-term plans (Bylund, Peterson & Cameron, 2012).

A study in China based on the uncertainty reduction theory (URT) that examined the relationship between patient-centered communication (PCC) and medical conflict, as well as the roles of perceived patients' trust, doctors' empathy, and expertise from physicians' perspectives, the results revealed that PCC was negatively associated with physician–patient conflicts and that patient trust mediated the relationship. Additionally, doctors' empathy moderated PCC on patient trust, while expertise positively predicted physician–patient conflicts (Chen, Tang & Guo, 2022).

Information exchange is a basic human function in which individuals request, provide, and exchange information with the goal of reducing uncertainty. Uncertainty Reduction Theory (URT) recognized that reducing uncertainty was a central motive of communication. It was developed to describe the interrelationships between seven important factors (concepts) in any dyadic exchange; verbal communication, nonverbal expressiveness, information-seeking behavior, intimacy, reciprocity, similarity, and liking (Berger & Calabrese 1975).

From those concepts, the researchers introduced a collection of axioms, supported by past uncertainty research. Each axiom states a relationship between a communication concept and uncertainty. From the basis of axioms, the theorists were able to use deductive logic to infer twenty-one theorems that comprise the theory of uncertainty reduction. Uncertainty is unpleasant and therefore motivational; people communicate to reduce it.

Uncertainty reduction follows a pattern of developmental stages (entries, personal, exit). Much of the interaction in this entry phase is controlled by communication rules and norms, characterized by the granting of essential demographic information (Berger & Calabrese 1975). During personal phase, the communicators feel less constrained by rules and norms and tend to communicate more freely with each other, reveal attitudes, beliefs, and more personal information. During the exit phase, the communicators decide on future interaction plans, characterized by the granting of less information and by the avoidance of communication altogether. However, any particular conversation maybe terminated at the end of the entry phase. Besides the

stages in uncertainty reduction patterns, there is a distinction between three basic ways people seek information about another person (Berger, 1986).

In the area between the entry and personal phases where trust is a formed, passive, active, and interactive strategy can reduce uncertainty and facilitate a more productive relationship. Passive strategies include unobtrusive observation of a person while active strategies might include finding out about the person from others. In the case of the doctor-patient relationship, the doctor might read the case-history notes of another practitioner or take a briefing about the patient from another practitioner. Interactive strategies, on the other hand, are dialogic and conversational in nature. The model holds that, together with passive and active strategies, dialogue and especially increased frequency of dialogue, builds coalitions.

In addition to the identification of the three 'relationship' phases, Berger and Calabrese's (1975) work offers a number of axioms from which are derived a range of theorems. Of the axioms, most pertinent is that as the amount of verbal communication between strangers' increases, uncertainty decreases and that as the number of non-verbal affiliative expressions increase, uncertainty decreases. Of the theorems, those most relevant are: that quantum of speech and quantum of non-verbal communicative expressions are positively related; that quantum of talking and level of intimacy are positively related; and that quantum of non-verbal expression and level of intimacy are positively related (Bylund, Peterson & Cameron, 2012).

URT interrogates the nature of initial meetings between strangers, such as the first consultation between patient and doctor and suggests how the inevitable uncertainty between such dyadic encounter might be overcome. The theory integrates most of the study concepts directly and indirectly as discussed above. Despite widespread influence of the Uncertainty Reduction Theory, Bajracharya, 2018 argued that positive relational experience is the actual motivation of interaction.

2.2.2. Communication accommodation theory

The second theoretical framework that this study uses is the Communication Accommodation Theory (CAT). CAT was developed by Howard Giles in 1973,

argues that "when people interact they adjust their speech, their vocal patterns and their gestures, to accommodate to others". It explores the various reasons why individuals emphasize or minimize the social differences between themselves and their interlocutors through verbal and nonverbal communication. This theory is concerned with the links between "language, context and identity". It focuses on both the intergroup and interpersonal factors that lead to accommodation as well as the ways in which power, macro and micro-context concerns affect communication behaviors (Gregory Jr. & Webster, 1996).

There are two main accommodation processes described by this theory. "Convergence" refers to the strategies through which individuals adapt to each other's communicative behaviors, in order to reduce these social differences. Meanwhile, "divergence" refers to the instances in which individuals accentuate the speech and non-verbal differences between themselves and their interlocutors. Sometimes when individuals try to engage in convergence, they can also end up over-accommodating, and despite their good intentions their convergence can be seen as condescending (Gregory Jr. & Webster, 1996).

Communication Accommodation Theory evolved from the speech accommodation theory (SAT), but can be traced back to Giles' accent mobility model of 1973. The theory was based on four major assumptions; Similarities and Differences, Perception and Evaluation, Social Status and Power, and Degrees of Accommodation. The speech accommodation theory was developed in order to demonstrate the value of social psychological concepts to understanding the dynamics of speech. It sought to explain "the motivations underlying certain shifts in people's speech styles during social encounters and some of the social consequences arising from them". Particularly, it focused on the cognitive and affective processes underlying individuals' convergence and divergence through speech. The communication accommodation theory has broadened this theory to include not only speech but also the "non-verbal and discursive dimensions of social interaction". Thus, it now encompasses other aspects of communication. In addition, CAT has moved in a more interdisciplinary direction than the previous speech accommodation theory. It now also covers a wider range of phenomena (Gregory Jr. & Webster, 1996).

A broadly heuristic theory, CAT sets out to 'describe and explain aspects of the way people modify their communication according to situational, personal, or even interactional variables.' More significantly, the model provides a framework through which changes in communicative behaviour might be considered in relation to certain psychological processes that either diminish or exacerbate the differences between interlocutors (Ryder & Garagounis, 2014).

Two descriptors 'reference' these polarities: processes of convergence, and processes of divergence. Of significance to the doctor-patient relationship, especially in its crucial early phase, when a speaker aims to improve the quality of interaction, in a process called 'communicative tuning', he or she will select communication strategies that attend to and/or anticipate the communication needs and characteristics of another. This may involve using plain language (as opposed to jargon), offering affiliative non-verbal cues, asking open questions, and mimicking the body language and speech behaviour of the other party. While the latter may sound potentially offensive, when people converse it is surprisingly common for them to mimic each other's speech. This is done almost intuitively, but in a muted, reciprocal way. Under these circumstances, such mimicking is interpreted as mutually sympathetic interaction and a sign of symmetrical communication (Ryder & Garagounis, 2014).

Communication accommodation theory is useful in this study as it aids in understanding how doctors can provide satisfactory care to patients through the ability to be not only a provider but also an active listener. CAT is a model for understanding the way two people interact with each other and revolves around the principle that their interaction is fundamentally transactional in nature. People are thought to make behavioral adjustments to manage their levels of social distance when interacting with others, and CAT provides a theoretical basis to forecast and account for such adjustments. One of the strategies comprising CAT is approximation, which involves convergence and divergence defined as whether individuals are adjusting their behaviors to match or differentiate their speech and nonverbal communication to another's style. The CAT model has previously been used to investigate physician-patient communication and interaction: adapted as a

method for understanding the role that nurturing communication plays during interpersonal interactions among health professionals and patients and used as a mechanism to explore intergroup communication between hospital doctors and the implications it has on levels of patient care (Mickel, McGuire & Gross-Gray, 2013).

Communication Accommodation Theory is a theory that describes the psychologic, social, and linguistic behaviors that people exhibit when communicating with each other. According to this theory, communication between two people can at any time be adjusted by either party in response to actual, perceived, or stereotyped expectations of the other person. This theory has potential in examining the patient-practitioner dyad to understand how ambulatory medical visit conversations function and where communication interventions may be useful to improve patient outcomes. One premise of CAT is that a defining characteristic of social groups is a common set of social and language behaviors. When members from different groups try to communicate they must find a way to adjust to each other's different communication styles and abilities. The strategies that people use to adjust their communication include approximation, interpretability, interpersonal control, and discourse management. The two strategies to focus on in the study, interpersonal control and discourse management, are psychologic elements of communication that are evident in the flow of communication between practitioners and patients and are more readily examined in written transcripts than the other two strategies.

Practitioner communication content and styles similar to CAT approximation and interpretability strategies have been previously examined, but not simultaneously with the patient's role in the communication encounters. For example, if a practitioner believes that older adults are typically hard of hearing and are naïve of medical terminology, they may alter their volume and choice of words to attempt to accommodate the older adult listener. Although this approach might be helpful and well received by some older adults, others may find this speech pattern condescending. The older adult may also alter own speech behaviors to decrease the risk of seeming too demanding in an attempt to please the practitioner whom they may see as an authority figure. These preconceived ideas and biases are fraught with danger in a medical visit setting, because they may get in the way of therapeutic

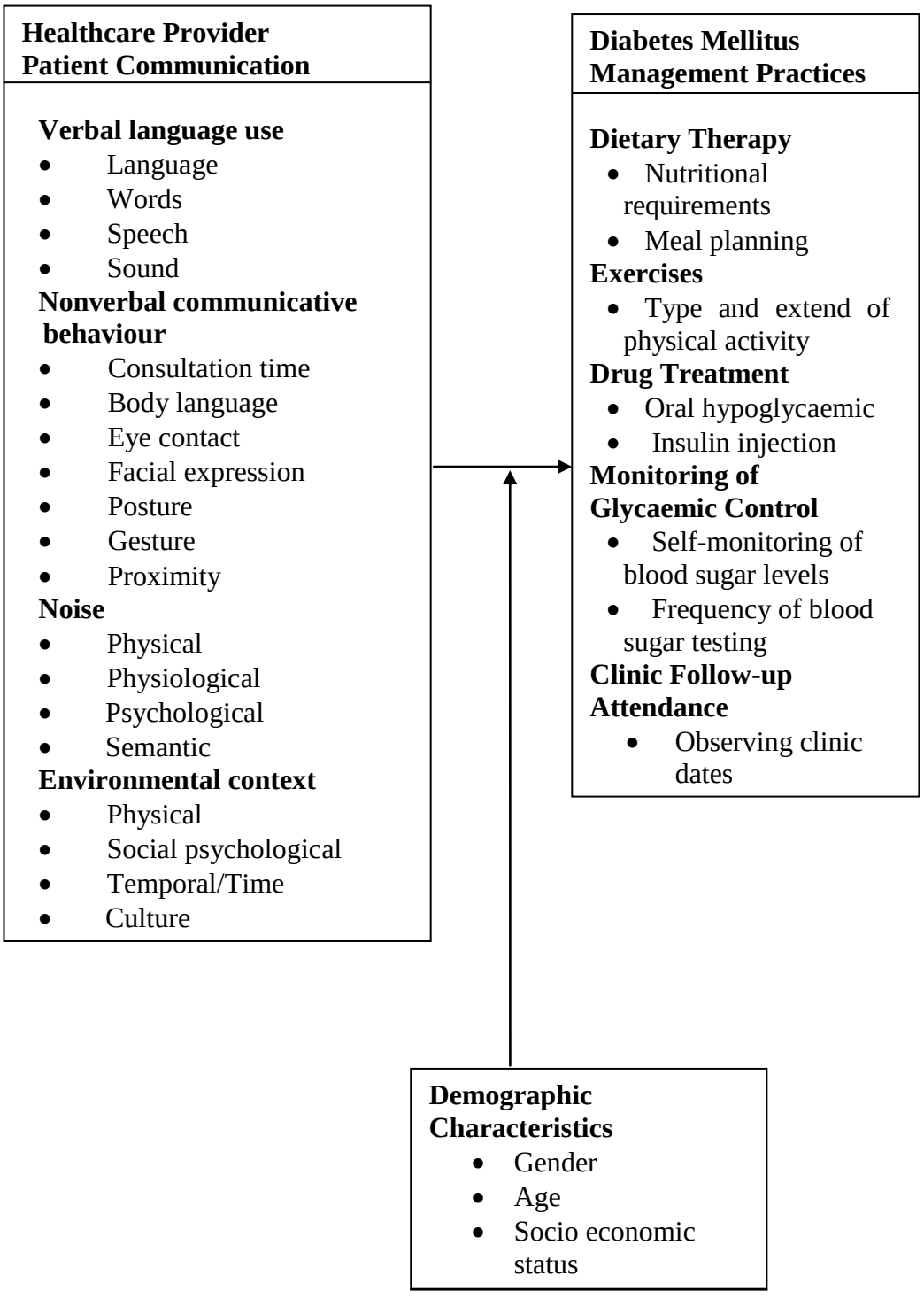
relationships and prevent the exchange of important information from both the practitioner and the patient (Hehl & McDonald, 2014).

In CAT, one's statements are viewed in the context of their partner's statements. This contextual view allows one's statements to be classified as either converging to or diverging from the partner's statements. Acts of convergence and divergence influence the patient-physician relationship, because converging statements signify a desire to gain approval, affiliate, establish rapport, and communicate meaning effectively, whereas diverging statements aim to separate, exert control, and generally downplay the statements of the partner. It takes listening aligned toward understanding, not just the collection of factual data. And it takes raising one's awareness to clues - nonverbal signals, fleeting glimpses of emotion, and key words (Haidet, 2007).

2.3. Conceptual Framework

The conceptual framework stems from the paradigm that; the communication process between physicians and patients can be complicated by any number of factors, two of which are language and cultural differences (Suurmond & Seeleman's, 2006). Four barriers in the interaction between physicians and patients have been identified as (Suurmond & Seeleman's, 2006): Physician and patient may not share the same linguistic background; Physician and patient may not share similar values about health and illness; Physician and patient may not have similar role expectations; Physician and patient may have prejudices and do not speak to each other in an unbiased manner.

The conceptual framework is depicted in figure 2.1 (next page). The independent variable for this study is healthcare provider patient communication. The dependent variable is diabetes mellitus management practices. The moderating variable is demographic characteristics.



Independent Variable **Moderating Variable** **Dependent Variable**

Figure 2.1: Conceptual Model

2.4. Review of Variables

2.4.1. Effect of verbal language use on diabetes mellitus management practices

Clinical communication around diabetes can be especially challenging when language barriers are present, and may contribute to poor diabetes management and outcomes. Communication tends to be one-sided and clinician-centered, with clinicians doing most of the talking, and controlling the conversation by using closed questions and directive speech (Hudelson et al, 2013). Most of their attention is directed towards language discordance and cultural differences, which can lead to biased or false conclusions (Scheppersa et al., 2006).

Barriers to the manner language is used can drive a wedge between patients and their doctors in the course of interaction and ultimate management of diabetes mellitus (Weir, 2012). Diabetes serves as a prime example of a disease whose clinical outcomes may be influenced by the use of language services given the inherent communication demands in care (Hacker et al., 2012). Language discordance is but one of many obstacles to good communication with patients. Speaking a common language enables, but does not ensure, effective communication. The risks of communication failure are clear when patients and health professionals do not speak the same language (Partida, 2012).

Elements of language enable thoughts and feelings to be conveyed through voice sounds, gestures, or writing. Shared language between patients and health care providers enables gathering information for diagnosis, explaining treatment strategies, and ensuring understanding and joint decision-making. Health care environments have unique cultures and use language in ways unfamiliar to average visitors. Millions of Americans have trouble understanding and acting on health information, even when language is not a barrier (Partida, 2012). Language barriers contribute to miscommunication and inappropriate treatment plans, often resulting in decreased client and provider satisfaction, poorer client understanding of disease, less recall of information, and premature termination of care (Tripp-Reimer, Choi, Kelley & Enslein, 2001).

When patients feel belittled verbally, as when a nurse may exercise the power of language, it reinforces a patient's vulnerability and inhibits open communication and cooperation (Larsson, Sahlsten, Segesten & Plos, 2011). This way of language use is likely to negatively impact on diabetes mellitus management practices. Nurses should pay attention to verbal expression and forms of language, in addition to non-verbal messages, because then they can empower patients by opening new and important perspectives for them. The emphasis is on speech formulae that encourage patients to discuss their concerns and to solicit information about the condition (Kettunen, Poskiparta & Liimatainen, 2001).

Particular attention should be given by the caregivers not to use technical terms and medical terminology during their contact with the ill, because it is often found that the patients ascribe different interpretations to what they hear or even more cannot understand what is meant exactly, mainly by the therapist, thus increasing mental stress, a fact which makes it more difficult to communicate with the patients. The language of communication should therefore be at the level of the listener, who is not able to assess the providers' scientific knowledge, but has to understand what is discussed (Kourkouta & Papathanasiou, 2014).

Language and functional health literacy may create another barrier to the practice of self-monitoring of blood glucose (SMBG) as was noted in a study that found that patients who could not speak English were much less likely to utilize SMBG as recommended (Karter, 2006). Semi-structured interviews done in a Zambian study showed that language limitations also affect quality of care because most languages have no equivalent words for some English diabetes and care-related words (Hapunda, Abubakar, van de Vijver & Pouwer, 2015). Healthcare providers should avoid using jargon and medical terminology. If it is necessary to use a medical term, make every effort to explain the word in plain language (Cornett, 2009).

In a study done in New Haven, Connecticut to assess patients' understanding and perception of common medical terminology used to describe diabetes risk, it was observed that scientific jargon may be too technical or cumbersome to use with most patients. Therefore, awareness about patients' comprehension of the language that

clinicians use when discussing diabetes prevention is essential for effective communication and may also affect an individual's motivation for lifestyle change (Tarasova, Caballero, Turner & Inzucchi, 2014).

Findings from a retrospective cohort design study to determine whether the amount and type of language services received during primary care visits had an impact on diabetes-related outcomes (hospitalization, emergency room utilization, glycemic control) in limited English proficient patients where Hospital and medical record data was examined for 1425 limited English proficient patients in the Cambridge Health Alliance diabetes registry; It was found that language barriers were implicated in reduced medication adherence, greater likelihood of hospital admission, longer hospital stays, and increased resource utilization. It was reported that the type of language services received by diabetic patients was significantly related to relevant utilization outcomes. Patients seeing language-concordant providers at 100% of their primary care visits were least likely to have diabetes-related hospitalization and emergency visits and noted that the challenges inherent in providing services to a diversifying population deserve further study to determine the best policy and practice strategies to achieve this goal (Hacker et al, 2012).

A study on Arab American immigrants in New York City identified language barrier as one of the most profound and pervasive barriers to health care access. Although they could speak English, the women in the study still preferred to see healthcare providers who speak Arabic. Both men and women in the study questioned why so few Arabic resources on health concerns are available (Young, 2013).

Health care professionals need to pay attention to various aspects like style and content of verbal interaction, verifying patient understanding, determining perceptions of key messages, and other strategies in fostering behavior change (Kadirvelu, Sadasivan & Hui Ng, 2012). A descriptive qualitative study noted that physicians frequently encounter situations where effective communication is difficult as in situation when physicians and patients do not speak the same language (Parsons, Baker, Smith-Gorvie & Hudak, 2014). Language concordance between patients and physicians, shared understanding of advice and availability of

interpreters are elements of support in the consultation and are associated with decreased communication errors, increased patient satisfaction and adherence with medications and follow-ups (Abdulhadi, Al-Shafaee, Wahlström & Hjelm,2013).

Communication difficulties faced by patients may be due in part to differences in vocabulary, but may also be attributed to differences in the structure and complexity of speech used by literate and low-literate populations. The centrality of patient voice is all the more critical in recognition of the cultural diversity that often characterizes vulnerable populations and distinguishes them from the majority culture (Cooper & Roter, 2003). Cultural differences in verbal and nonverbal communication are critical and key skills include attending to rules of conversation, choosing personalized or more detached interaction modes, selecting direct versus indirect approaches, and the therapeutic use of silence, proxemics, and touch (Tripp-Reimer et al, 2001). Culture and language capabilities influence the patient's health beliefs, attitudes, health literacy, thereby affecting diabetes self-management (Nam et al, 2011).

2.4.2. Effect of nonverbal communicative behaviour on diabetes mellitus management practices

Communication between health professionals and patients include the ability to express sincere concern for the care of the patient and the patient becomes a partaker of this interest. What of course in any case should be avoided by the caregivers is silence and indifference to the questions of the patient. In the best cases, the patient will leave disappointed and in the worst really indignant with healthcare provider (Kourkouta & Papathanasiou, 2014). Physician behavior can enhance favorable patient outcomes, such as understanding and adherence to medical regimens and overall satisfaction (Beck, Daughtridge & Sloane, 2002). Simple choices in words, information depth, speech patterns, body position, and facial expression can greatly affect the quality of one-to-one communication between the patient and physician (Travaline, Ruchinskas, & D'Alonzo, Jr., 2005).

Much of what is conveyed between a physician and patient in a clinical encounter occurs through nonverbal communication. For both physician and patient, images of body language and facial expressions will likely be remembered longer after the

encounter than any memory of spoken words. Patients' facial expressions are often good indicators of sadness, worry, or anxiety. The physician who responds with appropriate concern to these nonverbal cues will likely impact the patient's illness to a greater degree than the physician wanting to strictly convey factual information. At the very least, the attentive physician will have a more satisfied patient. Conversely, the physician's body language and facial expression also speak volumes to the patient (Travaline, Ruchinskas & D'Alonzo, Jr., 2005).

Sixteen specific nonverbal behaviors have been found in one or more studies to be significantly associated with outcomes of interest. Those behaviors associated with favorable outcomes include less mutual gaze, head nodding of the provider, forward lean, more direct body orientation, uncrossed legs and arms, and arm symmetry. Those behaviors associated with unfavorable outcomes include more patient gaze, body orientation 45 to 90 degrees away from the patient, indirect body orientation, backward lean, crossed arms, task touch, and frequent touch. No association was found for the following behaviors: sideways leaning, leg position, arm position asymmetry, amount of physician touch, and physician-patient distance (Beck, Daughtridge & Sloane, 2002).

Some of the nonverbal communication present in the literature include: gaze orientation, eye contact, head nodding, physician gesturing, physician proximity and lean, tone of voice, expressiveness and body position that are significantly linked to patient satisfaction and compliance. Nonverbal behaviors that are thought to imply power or dominance have been reported as negatively impacting patient outcomes that include interruptions and silence. Physicians speed and volume of talking correlate with patient satisfaction levels. Physicians with previous malpractice claims are significantly connected to ratings of lower concern in tone of physician voice and higher dominance. Conversely, physicians' use of positive words delivered in a negative tone resulted in higher patient satisfaction levels (Mickel, McGuire & Gross-Gray, 2013).

It was found in one interview study in Oman, that encounters with professionals who were friendly and welcoming were considered as satisfying to patients with diabetes

in primary health-care centers, while they described the dissatisfying encounters as being characterized by ignorance, including being treated unkindly or being made to feel unwelcome (Abdulhadi et al, 2007). The physician who hurriedly enters the examination room several minutes late, takes furious notes, and turns away while the patient is talking, almost certainly conveys impatience and minimal interest in the patient. The patient may interpret such nonverbal behavior as a message that his or her visit is unimportant, despite any spoken assurances to the contrary. Thus, it is imperative that the physician be aware of his or her own implicit messages, as well as recognizing the nonverbal cues of the patient (Travaline, Ruchinskas, D'Alonzo, Jr., 2005).

Improving communication even in short interactions with patients as when a physician sits at a patient's bedside, the patients perceives the visit as lasting longer than they did when physicians stood, even though the visits lasted the same number of minutes. Simply pulling up a chair can leave a patient feeling more satisfied, leading to better patient compliance and stronger patient-physician relationships (Weir, 2012). Moreover, attentive listening; eye contact with less gazes; uninterrupted consultation; and consultation lengths are important factors for a good patient-doctor communication and relationship. Many patients reflected that they themselves could affect good diabetes mellitus management and patient-doctor communication. The manner in which they were greeted by the doctors and nurses; poor attention and eye contact during encounters; interrupted consultation privacy; lack of encouraging the patients to ask questions or express their concerns; and lack of transfer of medical information (Abdulhadi et al, 2007).

Length of visit and eye contact between clinician and patient are positively related to the patient's assessment of the clinician's empathy. Eye gaze is a particular point of interest in nonverbal cues related to understanding trust, empathy, and rapport. In one survey study, results suggested that the clinician's gazing at the patient was not significantly related to the patient's satisfaction. Eye contact and social touch were significantly related to patient perceptions of clinician empathy. Longer visit lengths are associated with higher patient perceptions of a clinician's empathy; that increasing social touch during the health encounter does not increase patient ratings

as expected, but social touch can lead to better patient assessment of clinician in moderation; that eye contact between clinician and patient plays a key role in the consultation (Montague et al, 2013).

Greater clinician warmth, less nurse negativity, and greater clinician listening are associated with greater patient satisfaction (Henry et al, 2012). Both verbal and non-verbal interactions can be affected by expressiveness, a trait that is influenced both by the patient's individual personality and his cultural background (Ngo-Metzger, 2006). Affilliative nonverbal behavior of the physician is related to higher patient satisfaction. However, how different physician nonverbal behaviors are related to patient satisfaction also depends on personal attributes of the physician such as gender (Mast, 2007).

2.4.3. Effect of noise on diabetes mellitus management practices

Making your language more precise, sharpening your skills for sending and receiving nonverbal messages, and improving your listening and feedback skills are some ways to combat the influence of noise (DeVito, 2013). Noise interferes with communication, creates distractions, affects cognitive performance and concentration, and contributes to stress and fatigue. Particularly sensitive are mental activities involving working memory. Noise can also adversely impact healing, alter quality of sleep, and reduce overall perceived patient satisfaction (Reiling, Hughes & Murphy, 2008). Communication accuracy is affected by noise. Although noise may occur in almost any aspect of the communication process, such interference appears often as an obstruction in the channel between two interacting people. The greater the noise, the more difficult it becomes to communicate clearly. For this reason, it is important for the communicator to find ways of eliminating or reducing sources of distracting noise (Pfeiffer, 1973). A poor acoustical environment impedes effective communication by rendering speech and auditory signals less intelligible (Joseph & Ulrich, 2007).

Four types of noise in communication are: Physical noise is interference that is external where it impedes the physical transmission of the signal or message; Physiological noise, the barrier from and within the communicator /sender or

receiver, like visual impairments or hearing loss or loss of memory of a person; Psychological noise would be mental barrier or is the mental interference of the communicator or listener or receiver like preconceived ideas, biases and prejudices; Semantic noise interferes when the communicator and listener have different meaning systems like the use of jargon, complex words or ambiguous message, would be different language used, the use of technical terminology or jargon in a complex term whose meaning may be interpreted wrongly (Wong, 2013).

Although there is limited research focusing on the effects of noise on healthcare staff, noise is recognized as a distraction and stressor for staff. Understanding the physical characteristics of the indoor environment that affect human health and wellbeing is the key requirement underpinning the beneficial design of a healthcare facility (HCF). Medical errors can be caused by noise, insufficient lighting, or the transfer of patients between rooms or units. There are numerous noise sources in HCFs, and noise levels in most hospitals far exceed recommended guidelines. Noise is one of the features of the ambient environment that patients complain about most frequently (Salonen & Morawska, 2013).

A considerable body of research has documented the effects of noise on patient outcomes. Exposure to sudden, unexpected noise raises patient heart rates and has been proven to have a negative influence on patient recovery times. The frequent interruptions and distractions noise causes often result in medication errors, one of today's most challenging issues in delivering care (Miller, 2006). Semantic deficits, deficits in word meaning, have a large impact on aphasic patients' verbal communication. In a study that investigated the effects of semantic treatment on verbal communication in a randomized controlled trial, the selective gains on the semantic and phonological measures suggested that improved verbal communication was achieved in a different way for each treatment group (Doesborgh.et al, 2004).

Studies have found that among patients, reduced noise levels reduce annoyance, improve satisfaction, decrease psychological and physiological stress, reduce emotional exhaustion, improve better communication, enhance patient privacy and confidentiality, and improve safety. Among staff, reduced noise levels in HCFs has

been associated with reduced stress, reduced emotional exhaustion and burnout, reduced fatigue, increased satisfaction, increased effectiveness, increased productivity and improved communication and decreased medical errors (Salonen & Morawska, 2013).

Sound control is critically important in healthcare settings, and different environmental design strategies have proven successful in mitigating negative effects of noise while allowing effective yet private verbal communication. In many hospitals and outpatient physicians' offices, patients are frequently exposed to situations where they overhear conversations with or about other patients, or worse, have their private information communicated in an open environment where it can be heard by themselves and others. Clearly, such experiences are likely to impact patient trust and their ability to discuss their health problems freely with their physicians. Unwanted sound or noise is a major problem in hospitals the world over. High noise levels negatively impact patient and staff health and well-being and may slow the process of healing among patients (Barlas et al. 2001).

2.4.4. Effect of environmental context on diabetes mellitus management practices

The context of communication is important in determining the amount of accuracy needed or possible between people in a given situation. How much clarity can be achieved is somewhat determined by their communication skills, the nature of their relationship, the number of communication channels available to the person sending, and how much repetition can be incorporated into the message. It is important, however, that whenever multichannel communication occurs, the messages are consistent across all channels or the results will be confusing for the listener (Pfeiffer, 1973).

In the late 19th century, Florence Nightingale suggested that patients would recover more quickly if they were cared for in an environment that had natural light, ventilation, cleanliness and basic sanitation (Salonen & Morawska, 2013). There are many environmental factors that influence communication between patients and their healthcare providers (O'Halloran, Worrall & Hickson, 2010). A study by the Picker

Institute Europe revealed among the quality aspects, attention to physical and environmental needs (Kieft, de Brouwer, Francke and Delnoij, 2014).

The language of the clinic allows access to the inner workings of the body but doesn't see beyond the body to patients' social worlds. Without attention to patients' contexts, providers may not know what type of support or assistance they need (Kruse, 2013). Communication problems may be exacerbated by the health care environment, in which physicians have little time for providing information or explanations (Ngo-Metzger, 2006).

Communication always takes place within a context: an environment that influences the form and the content of communication. The context of communication has at least four dimensions (DeVito, 2013): Physical dimension, the room, workplace, or outdoor space in which communication takes place, the tangible or concrete environment, is the physical dimension. When you communicate with someone face to face, you're both in essentially the same physical environment; Social–psychological dimension, this includes, for example, the status relationships among the participants: The formality or informality, the friendliness or hostility, the cooperativeness or competitiveness of the interaction are also part of the social–psychological dimension; Temporal or time dimension, this dimension has to do with where a particular message fits into a sequence of communication events; Cultural dimension, the cultural dimension consists of the rules, norms, beliefs, and attitudes of the people communicating that are passed from one generation to another.

Physical environment working conditions include direct physical characteristics such as light, aesthetics, noise, air quality, toxic exposures, temperature, and humidity. This category also includes basic workplace design features, such as obstacles, physical layout, and distance from nursing stations (Hickam, Severance & Feldstein, 2003). The design of the physical environment clearly impacts patient confidentiality and speech privacy in healthcare settings even though few studies have focused on the role of unit design or architecture (Joseph & Ulrich, 2007). The environment alone may create conditions under which communication cannot take place effectively. A stuffy, warm room may make it impossible to send and receive

messages accurately. A person's physical state may also be detrimental to communication (Pfeiffer, 1973). Previous research identified high levels of background noise and the lack of written information in accessible formats as creating barriers to communication for patients with hearing and vision impairments, respectively. One way to improve a person's ability to communicate is by providing a supportive communicative environment (O'Halloran, Worrall & Hickson, 2010).

Clinical environments designed for patient and clinician interaction should be designed to facilitate positive nonverbal interactions such as eye contact and social touch (Montague et al, 2013). Poorly designed environments can result in private conversations between patients and staff or between staff members being overheard by unintended listeners, resulting in unacceptable breaches of confidentiality. There is a definite need for additional studies to examine the impact of different types of room and unit layout and finishes on privacy and confidentiality breaches in patient rooms, unit hallways, nursing stations, reception areas, and waiting rooms in healthcare settings (Joseph & Ulrich, 2007).

A key element is the need for a peaceful environment with no external distractions, which will ensure appropriate confidentiality of the dialogue. Frequently seen is the phenomenon of serious discussions taking place in the middle of the corridor of the outpatient department or the nursing department, clinic, or in some office of the hospital, in which third parties unrelated to the care of the individual patient are coming in and out. In such an environment the patients are ashamed to express themselves freely. Even more than the comfort of space, communication with the patient requires ample time. Where there is a need for a separate and private discussion with someone from the patient's environment, we should be very careful of the place, manner and time of this communication, which should be independent of the discussion with the patient (Kourkouta & Papathanasiou, 2014).

The most obvious "cultural" barrier in a clinical and educational encounter is the inability to communicate in the same language. It may limit the patient's ability to ask questions, to verbalize important information and concerns, and to establish a natural and spontaneous relationship with the health care provider. Improving health

care providers' cultural competence may help improve the quality of care provided to minority groups and may ultimately reduce health care disparities. Increased cultural competence may also improve patient provider trust and communication, as well as help patients adhere to prevention and treatment plans. Although no randomized clinical trial has been conducted to demonstrate that DM control and/or complications are improved by a group of health care providers with higher cultural competence compared with a group with a lower level, it appears clear that cultural competence can lead to a much more pleasant and productive health care provider patient interaction. In the field of DM, it may be particularly relevant because disease control is greatly determined by effective lifestyle and behavior modification, changes that are more likely to be implemented if the patient has developed a good rapport with his or her health care provider (Caballero, 2007).

2.4.5. The effect of demographic characteristics on diabetes mellitus management practices

Gender

Physician gender potentially affects the physician-patient relationship and its outcomes in a variety of ways. Patients also may have differential expectations of their physician based on gender. Another way in which physician gender might be important is in the status relationship between patient and doctor. As gender is a substantial component of social status, same gender physician-patient dyads may be closer in social status than opposite-gender dyads. Congruence in status may facilitate communication and mutual understanding. In order to independently assess the effects of physician and patient gender on the physician patient encounter, it is crucial that same-gender and opposite-gender dyads be examined (Franks &, Bertakis, 2003).

Differences between physicians and patients, including culture, gender, race, and religion, can introduce bias into patient physician communication (Committee Opinion, 2014). A meta- analytic review study documented that gender has stimulated a good deal of interest as a possible source of variation in interpersonal aspects of medical practice with speculation that female physcians facilitate more

open and equal exchange and a different therapeutic milieu from that of male physcians. Female primary physcians engage in more communication that can be considered patient centered and have longer visits than their male colleagues (Roter, Hall & Aoki, 2002).

A large amount of research conducted in non-clinical settings has found gender differences in communication style. Indeed, the magnitude of gender differences in nonverbal expression rivals or exceeds the gender differences found for a wide range of other psychological variables. As compared with women, men have been shown to engage in less nonverbal communication than women. Although male and female physicians did not differ in how much biomedical information they conveyed, the male engaged in less verbal and nonverbal communicative behaviour than female physicians. To the extent that male physicians' behavior and attitudes is less patient centered than those of female physicians, there may be implications for overall quality of care and health outcomes (Cooper & Roter, 2013).

Patient doctor gender concordance/discordance is associated with agreement/disagreement on advice given during the consultation, hence physicians need to be conscious that their own demographic characteristics and perceptions. A study noted that a better agreement was observed for female concordant dyads on advice given on nutrition and exercise, and female doctors appeared to facilitate agreement with their patients on advice given on nutrition. Analysis used the Intermede project's quantitative data collected via mirrored questionnaires at the end of the consultation. Multilevel logistic regressions were carried out to explore associations between patient–doctor gender discordance and their disagreement on advice given during the consultation adjusted on patients' and physicians' characteristics. The sample consisted of 585 eligible patients and 27 GPs (Scheiber et al, 2014)

Age

Study review of patient satisfaction suggests that one of the most consistent findings is that age is positively associated with satisfaction in health care. Pre- and post-visit questionnaire data was collected from 177 patients at a large family medicine clinic

by audiotaping the encounters between doctors and patients. Patient-centered interaction style was measured from coding from the audiotapes of the doctor-patient interactions. Patient satisfaction was measured using the Patient Satisfaction Questionnaire. Findings from the study suggest that doctors interact with patients differently depending on age and that age moderates the relationship between interaction style and patient satisfaction. Older patients were more likely than younger patients to interact with their physicians in ways consistent with patient-centered interaction (Peck, 2011).

Patient age is associated with both the frequency of medical contacts and the communication dynamic of clinic visits. The elderly typically demonstrate lower levels of literacy and have had less exposure to formal education than younger birth-cohorts. Particularly relevant to these decision-making demands is the fact that older patients appear to experience medical visits during which they are more passive and less actively engaged in the treatment decision-making process. Older patient visits are also distinguished from those of younger adults by the presence of a visit companion; estimates of the percentages of all visits that include a companion range between 20% and 57% (Cooper & Roter, 2013).

The Medical Outcomes Study (MOS), based on surveys of over 8,000 patients sampled from the practices of 344 physicians, found that patients aged 75 and over reported significantly less participatory visits with their doctors than all but the youngest age cohorts of patients. Interestingly, the most participatory visits were evident in the scores of only slightly younger patient groups including those aged 65 to 74, and the middle-aged group ranging from 45 to 64 years. In addition to age, ethnic minority status, poor health status and lower educational achievement were associated with lower reports of participatory visits. All of the above factors may act alone or in concert to diminish the likelihood that full patient-physician partnerships will develop (Cooper & Roter, 2013).

Socio economic status

Socioeconomic status (SES) influences health care quality and outcomes. In a study, physicians' indicated that patient SES did affect their clinical management decisions.

As a result, physicians commonly undertook changes to their management plan in an effort to enhance patient outcomes, but they experienced numerous strains when trying to balance what they believed was feasible for the patient with what they perceived as established standards of care (Bernheim, Ros, Krumholz & Bradley,2008).

Patients' social class is a significant predictor of how many explanations are volunteered by doctors. Physicians spontaneously offered more explanations to patients of higher-class backgrounds during visits than to other patients. The investigators suggested that physician explanations are less likely to be volunteered to patients of lower-class backgrounds because they are perceived as less interested in information and more diffident in question-asking (Cooper & Roter, 2013).

Research review of the social gradient in doctor-patient communication found that patients from lower social classes receive less socio-emotional talk, a more directive and a less participatory consulting style characterised by for example less involvement in treatment decisions; a higher percentage of biomedical talk and physicians' question asking; lower patient control over communication; less diagnostic and treatment information and more physical examination. Variability in physicians' communication and perceptions may be related to the patients' demographic characteristics and the patients' communication style can have a strong effect on physician behaviour and beliefs (Verlinde et al, 2012).

2.4.6. Diabetes mellitus management practices

Dietary therapy

Findings from randomized controlled trials (RCTs) and from systematic and Cochrane reviews demonstrated the effectiveness of nutrition therapy for improving glycemic control and various markers of cardiovascular and hypertension risk. The ADA also recognizes the integral role of nutrition therapy in overall diabetes management and has historically recommended that each person with diabetes be actively engaged in self-management, education, and treatment planning with his or her health care provider, which includes the collaborative development of an

individualized eating plan. In order to be effective, nutrition therapy should be individualized for each patient/client based on his or her individual health goals; personal and cultural preferences; health literacy and numeracy; access to healthful choices; and readiness, willingness, and ability to change (Evert et al, 2014).

It is well documented that nutrition therapy can improve glycemic control by reducing glycated hemoglobin (A1C) by 1.0% to 2.0% and, when used with other components of diabetes care, can further improve clinical and metabolic outcomes, resulting in reduced hospitalization rates (Dworatzek et al, 2013). Healthy dietary habits and lifestyle modifications are the cornerstones of type 2 diabetes prevention and management (Parajuli, Saleh, Thapa & Ali, 2014).

The goals of dietary therapy are difficult to achieve and often require significant sacrifices. The most important dietary goal for individuals with type I diabetes mellitus is the establishment of a regular meal pattern with consistent day-to-day caloric and carbohydrate intake. A second important dietary goal in type I diabetes is to avoid weight gain during intensive treatment programs. The most important dietary and therapeutic goal in obese persons with type II diabetes is weight loss. The dietary treatment of diabetes is likely to be more successful if physicians learn more about its essential features and pay it greater attention (Bantle, 1988).

Early type 2 diabetes can usually be managed through diet and exercise alone. The core themes around nutrition in type 2 diabetes are eating healthily and, where appropriate, body weight (loss) and caloric management. Two other key themes are eating for cardiovascular protection and meal planning and glycaemic control. Diet and physical activity are central to the energy balance equation, but are directly and indirectly influenced by a wide range of social, environmental, behavioural, genetic and physiological factors, the relationships between which are not yet fully understood (The Royal Australian College of General Practitioners and Diabetes Australia, 2014).

Medical nutrition therapy (MNT) is important in preventing diabetes, managing existing diabetes, and preventing, or at least slowing, the rate of development of diabetes complications. These nutrition recommendations start by considering energy

balance and weight loss strategies, choices and physical activity leading to moderate weight loss that is maintained (Bantle et al, 2008). For successful type 2 diabetes management individuals should pay more attention to food portions and weight control, as well as engaging in exercises in order to improve their impaired glucose tolerance and fasting glucose. This lifestyle modification will improve their glycaemic control (Mshunqane, Stewart, & Rothberg, 2012).

Medication

In addition to lifestyle modification, most people with type 2 diabetes require pharmacotherapy to achieve long-term glycaemic control and to prevent complications of diabetes. The choice, order and combination of medications are based on evidence, risk of side effects and patient choice/capacity (The Royal Australian College of General Practitioners and Diabetes Australia, 2014).

Worldwide, adherence rate for medication for diabetes vary between 36% and 93%. There is a need for regular appraisal of drug prescribing and better monitoring of patient adherence with prescribed anti diabetic drugs and other diabetes self-management practices (Wabe, Angamo, & Hussein, 2011). The ultimate aim of any prescribed medical therapy is to achieve certain desired outcomes in the patients concerned. Therapeutic compliance not only includes patient compliance with medication but also with diet, exercise, or life style changes (Jin, Sklar, Sen Oh & Li, 2008).

The knowledge gaps of patients with regard to indication for each of the prescribed medications, and the inaccurate description of prescribed dosage regimens among a significant proportion of patients in studies reported that over a third of patients could not identify the indication for many of their medications. The poor dietary adherence and self-management practice are possible indicators for diabetes primary care providers to always ensure active involvement of patients in diabetes treatment plans in order to consistently guarantee improved treatment adherence, and subsequently optimal glycemic outcome (Adisa & Fakeye, 2014).

Due to poor adherence with prescribed drug regimen and poor knowledge and practice of self-management behaviors, there is a need for regular appraisal of drug prescribing and better monitoring of patient adherence with prescribed anti diabetic drugs and other diabetes self-management practices (Wabe, Angamo, & Hussein, 2011).

Studies have found that compliance is good when doctors are emotionally supportive, giving reassurance or respect, and treating patients as an equal partner. Situations that may influence patients' trust in physicians would be like in instances when physicians asked few questions and seldom made eye contact with patients, and patients found it difficult to understand the physician's language or writing. More importantly, too little time spent with patients was also likely to threaten patient's motivation for maintaining therapy. Poor communication with healthcare providers was also likely to cause a negative effect on patient's compliance. These findings demonstrate the need for cooperation between patients and healthcare providers and the importance of good communication (Jin, Sklar, Sen Oh & Li, 2008).

Exercise / physical activity

Exercise affects the progression and outcome of diabetes, as well as the prevention of other comorbid chronic diseases. In addition, the act of engaging in regular physical activity can have a catalystic effect on other positive health behaviors such as healthy eating that also contribute to effective diabetes management. The American Diabetes Association (ADA) recommends that individuals with diabetes strive to engage in at least 150 minutes of moderate-intensity activity every week. The study found that 50% of participants with diabetes dropped out of an exercise program within 3 months, and only 10% were still exercising 1 year later. Diabetes-related barriers such as foot or leg pain, exercise-related hypoglycemia, peripheral neuropathy, poor eyesight, and limited endurance can all interfere with patients' ability or motivation to follow through with exercise recommendations (Mori et al, 2011).

Guidelines from the ADA and the European Association for the Study of Diabetes (EASD) stress the importance of diet and exercise in the treatment of all stages of

type 2 diabetes. Despite evidence for the benefits of exercise, adherence to long-term exercise programs can vary between 10% and 80%, particularly in the long term. Patients often have numerous cycles of weight loss and relapse before managing to maintain their weight loss, suggesting that healthcare professionals should consistently encourage therapeutic lifestyle changes (Garcia-Pérez et al, 2013).

Regular physical activity (PA) is a key element in the prevention and management of type 2 diabetes mellitus (T2DM). Participation in regular PA improves blood glucose control and can prevent or delay T2DM and its complications, along with positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life (Qiu et al, 2012). Exercise is considered a crucial component of disease management for individuals with type 2 diabetes, and it is associated with extensive health and mental health benefits. Although the benefits of exercise are well established, most people with diabetes do not engage in physical activity in a regular and sustained manner (Mori et al, 2011).

The Diabetic Prevention Program did suggest that dietary and physical activity changes to produce a 5-7% weight loss successfully maintain glycemic control in people diagnosed with type 2 diabetes. Nonadherence to diet and physical activity is a major problem in the management of diabetes mellitus and its complications. An analytical cross-sectional study conducted among type 2 diabetic patients showed that the vast majority (87.5%) of type 2 diabetic patients in Nepalgunj area of Nepal is nonadherent to dietary advice and even the remaining ones were only poorly adherent. Adherence to physical activity in the same population was much better (with corresponding nonadherence of 42.1%), but still only one-fifth (21.3%) of the population had good adherence level and the remaining (36.6%) are only poorly adherent (Parajuli, Saleh, Thapa & Ali, 2014).

Irrespective of weight loss, engaging in regular physical activity has been found to be associated with improved health outcomes among diabetics (Shrivastava, Shrivastava & Ramasamy, 2013). Regular physical activity improves metabolic control, reduces cardiovascular risks and can reduce the risk of developing type 2 diabetes. Low-level aerobic exercise like brisk walking for half an hour per day and physical resistance

training improves glucose tolerance, energy expenditure, feeling of wellbeing and work capacity, and improves BP, lipid profiles and mood (The Royal Australian College of General Practitioners and Diabetes Australia, 2014).

Despite the clear evidence that Physical Activity (PA) is a key element in controlling and managing T2DM, individuals with diabetes are among the least likely to engage in regular PA and the adherence to PA is surprisingly poor. PA is an important, but often underused, therapeutic strategy within diabetes care (Qiu et al, 2012). Despite the well-known benefits of exercise and the ADA recommendations, most people with diabetes do not exercise on a regular basis, and those who do have high rates of relapse to physical inactivity (Mori et al, 2011).

Monitoring glycaemic control

Recognizing the determinants of poor glycemic control may contribute to a clearer understanding of modifiable antecedents of diabetes-related complications and may help to achieve improved glycemic control and improve patient function and outcomes (Al-Akour, Khader & Alaoui, 2011). For diabetics, glycemic control is a primary goal. Prediabetics and those with metabolic syndrome or insulin resistance also have health improvements if blood sugar is more or less stable, as well as people with reactive hypoglycemia (Leroux et al, 2002).

To prevent acute and chronic complications of diabetes, treatment and care must be optimized by patients with diabetes and their health care team, by achieving and/or maintaining a good level of glycemic control (Hapunda, Abubakar, van de Vijver & Pouwer, 2015). Studies have reported that strict metabolic control can delay or prevent the progression of complications associated with diabetes (Shrivastava, Shrivastava & Ramasamy, 2013).

Self-monitoring of blood glucose (SMBG) complements HbA1c by providing real-time blood glucose data. It is an educational tool for both patients and their healthcare providers to understand the effects of diet, exercise, and medications on day-to-day glycemic control. SMBG should be implemented for all patients as part of an overall diabetes management plan that includes specific instruction on how, when,

and why to test (Renard, 2005). SMBG and continuous glucose monitoring (CGM) should be linked with a structured educational and therapeutic program designed to facilitate behaviour change for improving BG levels (Berard et al, 2013).

General Provider Patient Communication (PPC) is associated with mental functioning and physical functioning, and diabetes-specific PPC is associated with glycemic control. However, these associations are not mediated by self-care behaviors, which are independently associated with diabetes outcomes (Aikens, Bingham & Piette, 2005). Communication competence of the primary care physician, as measured with the common ground rating form, is associated with A1c levels in patients with type 2 diabetes. This may be more important for Hispanic patients with diabetes than non-Hispanic white patients (Parchman et al, 2009).

Patient clinic follow-up attendance

The need of regular follow-up can never be underestimated in a chronic illness like diabetes and therefore should be looked upon as an integral component of its long term management. The importance of regular follow-up of diabetic patients with the health care provider is of great significance in averting any long term complications (Shrivastava, Shrivastava & Ramasamy, 2013).

Nearly all diabetes management takes place during in-person encounters with clinicians in ambulatory care settings. Regular outpatient follow-up is important for all patients, and some need frequent attention because their health is unstable, their treatment regimen is complex, or their social supports are inadequate (Piette et al, 2001).

In a randomized controlled trial, ATDM calls with telephone nurse follow-up increased the frequency with which patients self-monitored their blood glucose and checked their feet for problems. The intervention increased the proportion of patients seen in podiatry and diabetes specialty clinics and the proportion of patients who had a cholesterol test and physician counseling about foot self-care. Although there was no impact on HbA_{1c} levels in the sample as a whole, statistically significant and clinically meaningful improvements in HbA_{1c} were observed among patients with

relatively poor glycemic control at baseline. The intervention also decreased patients' diabetes-related symptoms, increased their receptivity to telephone care, and increased their satisfaction with care (Piette, Weinberger, Kraemer & McPhee, 2001).

Data on 57780 T2DM patients from the 2009 diabetes registry analyzed using multinomial logistic mixed model in a study done to examine the factors associated with follow-up non-attendance (FUNA) and mortality among the adult patients with type 2 diabetes mellitus (T2DM) noted that out of 57780 patients, 3140 (5.4%) were lost to follow-up and 203 (0.4%) patients had died. Compared with patients who were under active follow-up, men, neither on insulin, nor on antiplatelet agents, having higher HbA1c, higher LDL-C and complications were associated with FUNA. Medication use to achieve better disease control in the younger age when diabetes complication is absent would not cause FUNA and might reduce mortality (Chew et al., 2015).

Frequent follow-up (i.e. every 3 months) with a registered dietitian (RD) has been associated with better dietary adherence in type 2 diabetes. Long-term follow-up of 7 to 10 years of intensive lifestyle intervention (ILI) programs targeting 5% to 7% weight loss in people at risk for type 2 diabetes suggests that there is some weight regain following discontinuation of the intervention, although the diabetes prevention benefits persist (Dworatzek et al, 2013). There are proven feasible approaches to providing ongoing follow-up and support, including nurse follow-up by telephone as well as through community health workers with various skill levels (Marrero et al, 2013).

2.5. Empirical Review of Studies

2.5.1. The effect of verbal language use on diabetes mellitus management practices

In a retrospective cohort design study, it was noted that language concordant providers may help reduce health care utilization for limited English proficient patients with diabetes. Hospital and medical record data were examined for 1425

limited English proficient patients in the Cambridge Health Alliance diabetes registry. The researcher categorized patients receiving usual care into 7 groups based on the amount and combination of language services received at primary care visits during a 9-month period. Bivariate analyses and multiple logistic regression were used to determine relationships between language service categories and outcomes in the subsequent 6 months. Patients who received 100% of their primary care visits with language concordant providers were least likely to have diabetes-related emergency department visits compared to other groups ($p<0001$) in the following 6 months. The study population was drawn from patients enrolled in the Cambridge Health Alliance diabetes registry prior to July 1, 2007. Only patients whose preferred language of care, identified at initial registration at Cambridge Health Alliance, was a language other than English were designated as limited English proficient and included in the study. The results suggest that these groups may have the most to benefit from language-concordant providers. According to the researcher, further research is needed to ascertain whether this is unique to the CHA population or generalizable elsewhere (Hacker et al, 2012).

An exploratory qualitative study, with semi-structured interviews was conducted to explore the experiences of primary health-care providers' encounters with patients with type 2 diabetes where a total of 26 health-care professionals (19 doctors and 7 nurses), aged 25–55 years, and working in diabetes care at PHCCs were interviewed. All interviews were audiotape-recorded with the participants' consent and transcribed verbatim. Qualitative content analysis was applied inductively. The study noted that good patient provider interactions and communication skills have been linked in empirical studies to favourable patient outcomes, such as satisfaction and recall, adherence, symptom resolution and better quality of life. The study did expose several barriers to good diabetes care in the urban region of Oman. The non-Arabic speaking doctors expressed language problems with patients who did not speak English. They avoided deep discussions or social talk with the patients and focused only on the current medical condition. They suggested avoiding giving instructions to the patients, but instead have good communication and respect their concerns, as this would be a more useful way to correct the patients' understanding of diabetes and gain their cooperation (Abdulhadi, Al-Shafaee, Wahlström & Hjelm,2013).

In an explorative study to examine whether doctor's and patient's verbal and nonverbal communication behaviours change during a series of consecutive outpatient consultations in NIDDM, findings suggest that communication patterns do indeed change. During the initial visit the proportion of speaking time as well as the proportion of affective and instrumental utterances did not appear to differ between doctor and patient. In subsequent visits, however, doctor's speech predominated and this predominant communication appeared to be primarily instrumental, whereas patient communication was mostly affective. At the same time, the proportion of patient-directed gaze had decreased when compared with the first consultation. The study focused exclusively on the dyadic consultations between the patient and the internist. Doctor-patient communication during the 54 consultations was measured by the Roter Interaction Analysis System (RIAS), which is specially designed to code both doctor and patient communication. The general affective impression of doctor's and patients' communication was rated on four six-point rating scales, measuring irritation, nervousness, interest, and warmth. Patient-directed gaze, what is the time the doctor looked directly into the patient's face, was measured and adjusted for the time the doctor was in sight. Findings suggested that the first consultation is most important for building an effective doctor-patient relationship, the second for discussing treatment matters, and the third for addressing psychosocial issues. The health outcome of outpatients with NIDDM may possibly benefit if the compatibility in communication between doctor and patient during the initial contact are maintained during repeat consultations (Dulmen, van, Verhaak & Bilo, 1997).

2.5.2. The Effect of nonverbal communicative behaviour on diabetes mellitus management practices

A qualitative study explored the perceptions of type 2 diabetes patients regarding the medical encounters and quality of interactions with their primary health-care providers in Muscat, Oman where four focus group discussions (two women and two men groups) were conducted among 27 purposively selected patients (13 men and 14 women) from six primary health-care centres. Each FGD was audio-tape recorded with the participants' consent, translated from Arabic into English language and transcribed verbatim. Qualitative content analysis was applied within the

structure of the thematic guide and for the data that emerged from the materials identified a number of weak areas concerning patient provider interactions and health care services in diabetes clinics in Muscat, like: unfriendly welcoming; interrupted consultation privacy; poor attention and eye contact; lack of encouraging the patients to ask questions on the providers' side and lack of information transfer in particular with regard to blood investigations, information about medicines, hypoglycaemia and self-monitoring of blood glucose, but also patient barriers like traditional unhealthy food beliefs and low education among patients with diabetes; and inability to participate in medical dialogue or express concerns on the patients' side. Other barriers and difficulties related to issues of patient-centeredness, organization of diabetes clinics, health education and professional competency regarding diabetes care were also identified. Findings revealed that the medical encounters in the health centers were characterized by more of physicians' dominance and less of attention to the patients' concerns, expectations and role in their own diabetes management and self-monitoring. Several patients had no interactions with the health educators or dieticians, irrespective of the duration of their diabetes. Long waiting time up to four or five hours' despite being given appointments is an issue that was raised spontaneously by almost all the patients and was expressed as stressful and unacceptable (Abdulhadi et al, 2007).

A study which examined how self-care is discussed during actual clinic visits noted that while self-care activities were discussed in every encounter, the length and breadth of the discussions varied widely. A distinct dissonance was found between a communication style that focuses on medical information compared with a patient-centered communication style that focuses on patients' priorities, obstacles to self-management, and strategies for overcoming obstacles. Providers use a standard medical vocabulary to discuss health outcomes such as the commonly used A1c, daily blood sugar, blood pressure, and so forth. Patients learn and, over time, respond to this medical vocabulary through repeated clinical interactions but when they leave the clinic, the vocabulary that is so salient in the clinical setting does not resonate in everyday activities and concerns. Data indicate that what patients tend to rely upon to make sense of health challenges are the physical symptoms that they are experiencing at a given time. Providers often engaged in checklisting–a rapid review

of several diabetes indicators, treatments, and practices. While numbers such as hemoglobin A1c play an important role in diabetes management, patients seemed unable to relate them to how well or poorly they felt, perhaps leading to reduced interest in some self-care activities. Barriers to improved self-care performance were highly individual, requiring substantial time and effort on the part of patients and providers to find workable solutions. Patients are motivated by how they feel. The importance of the numeric measures that represent their disease process might not be evident if they are feeling well, making it difficult for the physician to link numeric data with how the patient could eventually feel. These encounters highlight the contrast between how patients and providers view and use measurable indicators. In the course of conversations about self-care activities, patients' storytelling contrasted markedly to providers' emphasis on measurable outcomes (Kruse et al, 2013).

2.5.3. The Effect of noise on diabetes mellitus management practices

Though no empirical literature specifically related to the research study was found, findings from other studies do indicate that indeed noise gets in the way of communication, hence does have effect on patient health outcomes. Literature review of peer-reviewed journal articles, research reports, and books published in medicine, psychology, architecture, and acoustics publications found that sounds impacts patients and healthcare providers in many different ways. High noise levels negatively impact patient health and well-being and may slow the process of healing among patients. Poorly designed environments can result in private conversations between patients and healthcare providers being overheard by unintended listeners, resulting in unacceptable breaches of confidentiality. At the same time, a poor acoustical environment impedes effective communication by rendering speech and auditory signals less intelligible. Much evidence shows that improving the acoustical environment in hospitals by carefully considering design factors can go a long way toward reducing noise, improving speech intelligibility, as well as increasing patient confidentiality (Joseph & Ulrich, 2007).

A study conducted searches of multiple databases using terms for emotion, cognition, human behavior, psychosocial and psychological aspects in diabetes care, including

but not limited to MeSH terms for emotional disorders, depression, anxiety, stress, distress, diabetes mellitus and psychological interventions and obtained additional articles from systematic reviews; reference lists of pertinent studies and editorials. The researchers' compiled a narrative synthesis of findings, highlighting underlying theories, mechanisms and interactions of the different and essential psychological aspects of patients that might influence self-care behaviors and clinical outcomes. The study noted that patients with diabetes mellitus (DM) are at high risk of decreased psychological well-being which is already present in about half of the patients at the time of diagnosis, due to strained coping with changed life routine right from the time of diagnosis. An international survey, the Diabetes Attitudes, Wishes and Needs second study (DAWN2), included over 16000 individuals (comprising patients, family members and healthcare providers) in 17 countries across four continents, reported that the proportion of the people with DM who were likely to have depression and diabetes-related distress (DRD) was 13.8% and 44.6%, respectively, with overall poor quality of life at 12.2%. In adults, children and adolescents with DM, depression was related to poorer glycemic control, a range of diabetes complications, increased health care costs, worsened functional disability, re-hospitalization and early mortality. Those with psychological distress at the time of diagnosis had a higher risk of cardiovascular events and death than those without psychological distress (Chew, Shariff-Ghazali & Fernandez, 2014).

2.5.4. The Effect of environmental context on diabetes mellitus management practices

A cross-sectional, explorative study of on-going practice in diabetes care noted that the performance of the primary health-care doctors and diabetes nurses needs to be improved. Improving the work situation mainly for the diabetes nurses and further improvement in the organizational efficiency of diabetes services such as lowering the number of patients in diabetes clinic, were suggested. Research methodology included patient interviews, focus group discussions with patients and providers, and the collection of metabolic parameters in Muscat region, Oman, by direct observations of 90 consultations between 23 doctors and 13 diabetes nurses concerned with diabetes management during their consultations with type 2 diabetes

patients in six primary health-care centres, using checklists developed from the National Diabetes Guidelines. The consultations were recorded using audiotapes for corroboration of some of the verbal communication aspects of the observations. Analysis was by SPSS version 14, using Fisher's Exact Test; Minitab program version 13, by using the Mann-Whitney U test and the Kruskal-Wallis test. Consultations were assessed as optimal if more than 75% of observed aspects were fulfilled and sub-optimal if less than 50% were fulfilled. Overall 52% of the doctors' consultations were not optimal. Some important aspects for a positive consultation environment were fulfilled in only about half of the doctors' consultations: ensuring privacy of consultation (49%), eye contact (49%), good attention (52%), encouraging asking questions (47%), and emphasizing on the patients' understanding of the provided information (52%). The doctors enquired about adverse effects of anti-diabetes drugs in less than 10% of consultations. The quality of the nurses' consultations was sub-optimal in about 75% of 85 consultations regarding aspects of consultation environment, care and information (Abdulhadi et al, 2006).

In a study that examined provider-level factors and reported discrimination in the healthcare setting where data analyzed patient-reported racial/ ethnic discrimination from providers, the primary exposures were characteristics of the primary care provider, including specialty/type, and patient provider relationship variables, including racial concordance. Patients seeing nurse practitioners as their primary care providers (PCP) and those rating their provider higher on communication were less likely to report discrimination, while those with more visits were more likely to report discrimination. Among diverse diabetes patients in managed care, provider type and communication were significantly related to patient-reported discrimination. Given potential negative impacts on patient satisfaction and treatment decisions, future studies should investigate which interpersonal aspects of the provider patient relationship reduce patient perceptions of unfair treatment. The study suggests that racial similarity between patients and their PCPs did not eliminate patient perceptions of racial/ethnic healthcare discrimination among diabetes patients within an integrated delivery system. More primary care visits, but not PCP gender or specialty, were also associated with patient reported discrimination. Data was analyzed from the Diabetes Study of Northern California (DISTANCE), a race-

stratified, random sample of patients from the Kaiser Permanente Northern California Diabetes Registry. Because of the race-stratified survey design, DISTANCE had diverse patient representation across the largest racial/ethnic groups in Kaiser. The PCP of each survey respondent was identified in the year preceding the survey. The study captured the PCP information (age, gender, race/ethnicity, etc.) from administrative databases. Almost every patient is assigned to a PCP within the Kaiser system, with only 0.2% of respondents having no identifiable PCP (Lyles et al, 2012)

A cross-sectional survey study found that African Americans, Spanish-speakers, and less-educated patients reported patient provider communication that was as good as or better than that reported by less-vulnerable patients. Both general and diabetes-specific dimensions of communication were associated with self-care behaviors. Findings support the traditional advice to physicians to “treat the whole patient, not just their disease,” insofar as success across both dimensions of communication was associated with better self-care in a variety of critical areas. Providers in the study sites were communicating successfully with vulnerable patients. Seven hundred fifty-two diabetes patients were enrolled. Fifty-two percent were nonwhite, 18% had less than a high-school education, and 8% were primarily Spanish-speaking. Patients' assessments of providers' general and diabetes-specific communication were measured using validated scales. Self-reported foot care; and adherence to hypoglycemic medications, dietary recommendations, and exercise were measured using standard items. General and diabetes-specific communication reports were only moderately correlated and had differing predictors. In multivariate probit analyses, both dimensions of communication were independently associated with self-care in each of the 4 areas examined. Sociodemographically vulnerable patients reported communication that was as good as or better than that reported by other patients. Patients receiving most of their diabetes care from their primary provider and patients with a longer primary care relationship reported better general communication (Piette et al, 2003).

A study in Australia where the communications support model utilized the mapping of ontologies, a community Healthcare ontology dedicated to mapping a clinical

taxonomy for T2DM national guidelines to Aboriginal English (AE) ontology where the knowledge representation outcome was achieved through formal semantics and syntax applications using the Web Ontology Language (OWL), showed evidence that patient-practitioner interactions was falling short due to a cultural disconnect leading to misunderstandings between clinicians and their Aboriginal patients. Since the management of the Type 2 Diabetes Mellitus (T2DM) requires a complex assortment of time-sensitive communications activity and interventions to avert serious complications, communications barriers arising from pervasive cultural misunderstanding in primary care go far beyond language differences and routine translation techniques. Practitioners and patients lacking the ability to share understanding in the examination and testing discourse need a culturally sensitive purpose-driven informatics system of support for the Patient-Practitioner Interview Encounter (PPIE). The dominant unidirectional clinician-biased forms of communication employed by healthcare professionals are a major barrier (Forbes, Sidhu & Singh, 2011).

2.5.5. The effect of demographic characteristics on diabetes mellitus management practices

Findings from a review of the literature characterizing the association between SEP and health in persons with diabetes noted that less effective communication has been observed among patients of lower occupational status and may pose a significant barrier to good care. Physicians are more likely to adopt a more directive approach with less-educated patients, who are then less likely to have their expectations met. Provider communication style has also been shown to influence diabetes outcomes and patients who interact with less controlling, more informative physicians and nurses achieve better metabolic control. Indigent patients whose physicians facilitate participation in decision-making are more satisfied with their care. Moreover, satisfaction with both the effectiveness of the provider's communication and participatory decision-making styles are important predictors of diabetes self-care behavior, an outcome that appears to be mediated by enhanced patient understanding of his/her diabetes care and confidence in his/her self-management skills and knowledge (Brown et al ,2004).

A descriptive cross-sectional study, of a sample consisting of 88 patients with diabetes mellitus type 2 who were diagnosed by physicians and no other complications and met the inclusion criteria were recruited by simple random sampling. Data was analyzed using descriptive statistics and multiple regression analysis. Study findings revealed that, altogether, 34.4% of the variability in diabetes self-management was predicted by age, gender, self-efficacy, family support, and patient-provider communication. Only three of the predictors such as self-efficacy, patient-provider communication, and age contributed significantly to prediction of diabetes self-management. Gender and family support could not predict diabetes self-management of patients with diabetes mellitus type 2. The findings showed that self-efficacy has more influence on diabetes self-management, followed by patient-provider communication and age. Activities or programs to promote self-efficacy and patient-provider communication for patients with diabetes mellitus type 2 should be developed. Differences in their ages should be taken into account in order to ensure appropriateness and effectiveness of the programs on enhancing diabetes self-management of the patients (Phetarvut, Watthayu & Suwonnaroop, 2011).

A multi-center, cross-sectional survey conducted in the Mainland China noted that only a minority of patients with type 2 diabetes understood their A1c value and the patients who had a good understanding of their A1c demonstrated significantly better diabetes self-management behavior and had lower A1c levels. The study found that patients' understanding of their A1c was associated with age, gender, education level, diabetes duration, regions and diabetes education. These findings revealed the need for more effective diabetes education and care, and indicate the importance of HCPs actively communicating their A1c test results with patients and ensuring that their patients understand the meaning of their A1c level. The study suggested that older patients and patients with longer diabetes duration are more likely pay attention to their diabetes care. Females showed a higher rate of understanding their A1c value. Education level is also a positive predictor of good understanding of A1c, and suggests that patients with a higher education level are more likely to take actions to better manage their diabetes when they understand the implications of an elevated A1C than patients with a lower education level. In total, 6043 patients agreed to participate in the study. Study questionnaires were used. In addition, the Summary of

Diabetes Self-Care Activities (SDSCA) scale was used to assess patients' past 7 day's self-management. SPSS 16.0 was used in all the data analyses. Chi-square test when appropriate was used to compare categorical variables, and two independent-samples *t*-test or Wilcoxon two-sample test when appropriate was used to compare continuous variables. Logistic regression was performed in order to determine the significant factors, which predicted understanding of A1c (Yang et al, 2016).

2.5.6. Diabetes mellitus management practices

This descriptive qualitative study explored the thoughts and feelings of GPs on patients' compliance/adherence. In five focus groups (FG), GPs were asked how they think their type 2 diabetes patients adhere to life style and dietary advices, medicine taking and management of the disease. Also explored were some coping mechanisms they use to handle the conflict arising when patients do not heed their advices. In compiling the different groups, no distinctions were made on age, gender or number of years in practice in the hope of maximizing interaction and outcome. If after the five focus groups content saturation was not achieved, additional focus groups were planned. Study findings did show that GPs realize they have opportunities for communication with the patient, that, it is wise to check first what the patient already knows, in order to give further relevant information, taking into account the patient's ability to assimilate the messages. Study findings suggest a necessary shift to a model of patient-provider-partnership with mutual agreement on shared decisions. General practitioners experience problems with the patient's deficient knowledge and the fact they minimize the consequences of having and living with diabetes. It was recognized that the GP's efforts do not always meet the patients' health expectations. This initiates GPs' frustration and leads to a paternalistic attitude, which may induce anxiety in the patient. GPs need communication skills to cope with patients' expectations and evidence based goals in a tailored approach to diabetes care. (Wens et al, 2005).

Measures to promote better physician communication and patient understanding of diabetes care should improve patients' self-management and, thereby, health outcomes. At a minimum, such care necessitates adequate time for office visits for

those with chronic illnesses to allow for effective communication and discussion as well as mechanisms to ensure appropriate follow-up for patients and intervals between visits. The study noted that ratings of providers' communication effectiveness were more important than a participatory decision-making style in predicting diabetes self-management. Reported understanding of self-care behaviors was highly predictive of and attenuated the effect of both PDMstyle and PCOM on self-management, raising the possibility that both provider styles enhance self-management through increased patient understanding. The study surveyed 2,000 patients receiving diabetes care across 25 Veterans' Affairs facilities. Patients' evaluation of provider participatory decision making was measured with a 4-item scale (Provider Participatory Decision-making Style), rating of providers' communication with a 5-item scale (Provider Communication), understanding of diabetes self-care with an 8-item scale, and patients' completion of diabetes self-care activities (self-management) in 5 domains. Using multivariable linear regression, self-management was examined with the independent associations of PDMstyle, PCOM, and Understanding. Higher ratings in PDMstyle and PCOM were each associated with higher self-management assessments. When modeled together, PCOM remained a significant independent predictor of self-management, but PDMstyle became non-significant. Adding Understanding to the model diminished the unique effect of PCOM in predicting self-management. Understanding was strongly and independently associated with self-management (Heisler et al, 2002).

In the French ENTRED study and in the multinational DAWN study, it was suggested that communication between patients and healthcare providers resolved patient distress, and patients were more informed about treatment options and decisions, which improved adherence and glycemic control. In this retrospective cohort study of 11,532 patients, multivariate analyses showed that medication nonadherence was associated with higher HbA1c, blood pressure, and LDL cholesterol levels. Such changes lead to an increased risk of morbidity and mortality. Poor communication between doctor and patient, adverse outcomes such as weight gain and hypoglycemia, and failure of clinicians to modify medications appropriately can also affect adherence. The World Health Organization (WHO) has shown that adherence to long-term therapy for chronic illnesses in developed countries averages

only around 50%. Over the last 18 years in the USA, the proportion of adults in the age group 40–74 years with a body mass index ≥30 kg/m2 has increased from 28% to 36%, while the proportion undergoing physical activity 12 times a month or more has decreased from 53% to 43%, exacerbating the obesity problem. However, despite strong clinical recommendations for individuals with a history of diabetes to adopt a healthier lifestyle, adherence to improved diet and exercise is poor. (Garcia-Pérez et al, 2013).

Prospective cohort and cross-sectional observational studies show that higher PA levels are associated with reduced risk for T2DM. Most American adults with T2DM or at highest risk for developing it do not engage in regular PA, the rate of participation is significantly below national norms. Among adults with diabetes, 39% reported they were physically active compared with 58% of those without diabetes. Recent data showed that based on the American Diabetes Association and the Department of Health and Human Services guidelines, just only 25% and 42% of older adults with diabetes mellitus (DM) met recommendations for total PA, respectively. Adults with DM were 31% to 34% less likely to participate in PA at recommended levels and 13% to 19% less likely to be physically active at insufficient levels than those without DM. In a survey of "the situation of self-management in Chinese patients with T2DM" from Chinese Diabetes Society in 2010 reported that only 35.2% of patients with T2DM remained physically active at recommended levels of PA. In the other survey of adults aged 55 years with T2DM, 55% of respondents reported no weekly PA (Qiu et al, 2012).

A qualitative design employed to study patients' experiences and preferences showed that although the majority of diabetic patients appreciated the doctors' attentiveness regarding problems of diet and weight, the most serious problem according to the participants was the incompatibility of the dietary recommendations with daily life and their views of eating culture. As a consequence, GPs should explore their patients' capabilities of self-management in open communication and accept their wish to protect nutrition as part of their culture. Lifestyle interventions are endorsed as one of the most promising therapeutic options and evidence suggests that type 2 diabetes patients would like to receive nutritional advice. Ambivalence towards

patient self-management and tensions between the necessary changes to patients' lifestyles and their culture makes the GP's role difficult and full of conflict, hence the need for GPs to explore the patients' capabilities of self-management through open communication (Wermeling et al, 2014).

In a structured literature review to retrieve empirical articles on communication between nurse practitioners in primary care and T2DM patients, searched through Medline, PsycInfo, and Scopus many type 2 diabetes mellitus patients were found to have difficulties reaching optimal blood glucose control. With patients treated in primary care by nurses, nurse communication plays a pivotal role in supporting patient health. Unfortunately, less than 20% of T2DM patient reach all three targets for blood glucose (HbA1C), lipids levels, and blood pressure. Changing diet is often experienced as the most difficult part of managing diabetes. Adhering to physical activity guidelines can be equally difficult, with at least 60% of diabetic patients being insufficiently active. Perhaps even more worrying, systematic reviews show that approximately 40% of people with diabetes take less than 80% of prescribed drugs, with an average adherence of 58%. All in all, poor health behavior modification following diagnosis places diabetic patients at an increased risk of disease progression, impacting their quality of life, and increasing their risk of premature death (Mulder et al, 2014).

2.6. Critique of the Existing Literature Relevant to the Study

2.6.1. The effect of verbal language use on diabetes mellitus management practices

A retrospective cohort design study by Hacker et al, 2012, that examined for 1425 limited English proficient diabetic patients in the Cambridge Health Alliance diabetes registry conducted in one urban public hospital system serving a diverse and underserved population noted that findings from such a setting may not be generalizable to other similar populations. This study was one of the first to examine the impact of amount and type of language services received on diabetes outcomes. While it suggests that language-concordant providers may help reduce health care utilization for limited English proficient patients, it is unlikely that health care

systems will ever be able to provide enough language-concordant providers to meet demand. Yet, to ensure that limited English proficient patients receive high quality care, multiple strategies are needed to increase the availability of language-concordant providers including recruiting and retaining more bilingual individuals to the health care professions, as well as providing testing and training to build the language capacities of bilingual primary care providers. In addition, systems serving diverse populations must clarify why some limited English proficient patients do not receive language services at some or all of their visits and whether this has an impact on quality of care. The challenges inherent in providing services to a diversifying population deserve further study to determine the best policy and practice strategies to achieve this goal. More research is needed to understand how provider language fluency impacts health outcomes particularly given that language proficiency may vary among providers. Too, further research is needed to ascertain whether this is unique to the CHA population or generalizable elsewhere (Hacker et al, 2012).

This study had an explorative aim, and the main goal in qualitative research is to understand reality and gain information about issues or situations of central importance for the purpose of the inquiry rather than empirical generalization. However, the relevance of findings for other settings could be considered by countries with similar characteristics. The background of the principal investigator as a medical doctor employed by the MoH is that such a connection might either enhance or reduce the credibility. Clearly defined professional roles and appropriate education to support patients to be able to have a key role in their own care could be useful as the next step to develop diabetes services at primary care level in Oman. A discussion of the findings among the policy and decision makers in the MoH in Oman could lead to suggestions to strengthen the organization of diabetes care to support patients' needs, and thereby raise the quality of care and health outcomes. The findings further reflect the need for changes in professional behaviour towards less authoritarian and more patient-centred care, and to recognize cultural influences and the patients' beliefs in order to individualize the care according to each person's needs (Abdulhadi et al, 2013).

An explorative study with semi-structured interviews to explore the experiences of primary health-care providers' encounters with patients with type 2 diabetes where a total of 26 health-care professionals (19 doctors and 7 nurses), aged 25–55 years, and working in diabetes care at PHCCs were interviewed to examine whether doctor's and patient's verbal and nonverbal communication behaviours change during a series of consecutive outpatient consultations in NIDDM indicated that during the initial outpatient consultation the doctor-patient interaction is more equal and reciprocal. Conversely, the findings also suggest that once the doctor-patient relationship has been established, less effort is put into maintaining it. The observed lack of congruency between doctor and patient in subsequent visits might engender, however, a risk of overlooking important cues, such as psychosocial issues like patient needs and concerns, which are known to be related to the compliance and general well-being of the patient with NIDDM**.** A remarkable finding is that, although in the study, repeat consultations seemed less balanced than initial ones, this imbalance was not reflected in a decrease in patient satisfaction scores or in changes in the scores on the affect scales as parameters for the affective impression of the consultation. Nevertheless, on the basis of patient satisfaction scores, consecutive consultations can roughly and tentatively be characterized in terms of patients' most highly valued communication parameters. In regard to methodology the number of patients in this study was relatively small, particularly with regard to the number of patients who started with insulin therapy during the outpatient consulting period. Larger samples will be required to examine the effect of doctor-patient communication on the mutual decision to commence insulin therapy. Additionally, only one doctor and eighteen patients took part in this study. Therefore, one might argue that, instead of consultation differences, our results are only a reflection of the doctor's working style. Nevertheless, further work is needed to examine this and to determine the generalizability of the present results. Moreover, as there appear to be meaningful shifts in communication patterns over time, further research into medical communication should be careful neither to mingle initial and repeat consultations, nor to generalize findings from initial to subsequent consultations. In this respect, there is not only a need for less variability in

complaints for which patients go to the doctor, but also in the rank order of the consultation (Dulmen, van, Verhaak & Bilo, 1997).

2.6.2. The Effect of nonverbal communicative behaviour on diabetes mellitus management practices

The diabetes patients' experiences with the primary health-care providers showed dissatisfaction with the services. Many patients reflected that they themselves could affect good diabetes management and patient-doctor communication. It was found that encouraging the patient to ask questions is not only a method of information seeking, but also a mechanism of patient participation in the medical dialogue which is positively associated with patients' satisfaction and health outcomes. Promoting the exchange of information between the doctor and the patient is a main purpose of medical communication and a facilitating mechanism for a patient-centred approach. However, too broad generalizations in explaining people's beliefs and behaviours should be avoided, as there are other individually influencing factors such as age, gender, education (including education into a religious sub-culture), personality, intelligence, experience, occupation and socio-economic factors. Despite the availability and accessibility of health services in well-equipped diabetes clinics in Muscat, many patients believed that the doctors and nurses were not experienced in managing diabetes. It was found that good diabetes care with significantly better outcomes depends on the competency of the individual provider and the doctors' special interest in diabetes. The nature of diabetes care requires teamwork and diffusion of responsibility of care from physicians to nurses, dieticians, and further to patients and their families. Most importantly, providers should base their health education on patients' unique understanding of their own situation (Abdulhadi et al, 2007).

Clinicians must go beyond inventories of patients' test results to provide self-management support that treats patients within their individual social contexts. In the study, checklisting was both a helpful strategy and a distraction. In one sense, it ensures that providers address important indicators of high-quality care. But checklisting as a style of patient-provider interaction can become so routinized as to

pull the conversation away from other concerns. This could illustrate a discord between efficiently addressing the myriad of issues involved in diabetes management and helping patients determine how to improve or maintain their health. While checklisting highlights relevant diabetes indicators, it does not necessarily lead to an in-depth conversation about the relationship between self-care and the measures. Physicians may be held accountable for specific measurements and performance indicators by the health care system, but patients don't attach the same importance to this "measureables. A longitudinal study may provide insight into topics that are addressed in detail over several visits. The study analyzed recordings of encounters and therefore lacked the ability to further probe participants about specific remarks. Finally, it did not specifically address factors such as provider skills, education, and years in practice; how long patients have had diabetes; and patient characteristics such as education and health literacy. Successful support of self-management may require providers to create a "bridge" between providers' technical vocabulary and patients' physical symptoms, the former of which does not follow patients outside the clinic. Many patients require help linking medical measurements, symptoms, and eventual outcomes. This is particularly difficult when the severity of measurements don't align with the symptoms the patient is feeling (Kruse et al, 2013).

2.6.3. The Effect of noise on diabetes mellitus management practices

Sound control is critically important in healthcare settings, and different environmental design strategies have proven successful in mitigating negative effects of noise while allowing effective yet private verbal communication. Noise can be detrimental to patient health. Another aspect of sound, speech intelligibility and audibility, is essential to communication between patients and healthcare providers. On the other hand, if confidential patient information being discussed between patient and healthcare providers is overheard by others, it can pose a serious breach of patient confidentiality, and issues of speech security and speech privacy come to the fore. These different aspects of sound suggest the importance of designing and controlling the environment to prevent the transmission of unwanted sound yet maximize speech intelligibility between persons who need to communicate with each other. In many hospitals and outpatient physicians' offices, patients are frequently

exposed to situations where they overhear conversations with or about other patients, or worse, have their private information communicated in an open environment where it can be heard by themselves and others. Clearly, such experiences are likely to impact patient trust and their ability to discuss their health problems freely with their physicians (Joseph.A & Ulrich, 2007).

A study conducted searches of multiple databases using terms for emotion, cognition, human behavior, psychosocial and psychological aspects in diabetes care, including but not limited to MeSH terms for emotional disorders, depression, anxiety, stress, distress, diabetes mellitus and psychological interventions and obtained additional articles from systematic reviews; reference lists of pertinent studies and editorials found that understanding the nature of the psychological aspects that are pertinent in patients with DM provided a mechanistic insight into the relationships between psychological domains and poor physical health. Positive emotional health may sustain long-term coping efforts and protect patients from the negative consequences of prolonged emotional disorders, illness perception and thus facilitating diabetes self-management behaviors and better physical health. Having patients acquire valued personal beliefs and achievable standards of performance could strengthen self-regulation and self-efficacy and lead to more positive experience and healthy behaviors. Furthermore, improved personal resources such as resilience would lead to better functioning of cognition and stronger willpower, quality of life and disease control in patients with DM. More research is needed to understand what factors contribute to individual DM differences in vulnerability, treatment response and resilience to psychological disorders and cardio-metabolic risk factors control across the life course. Psychological training programs grounded on sound theoretical framework such as that draw on the fundamental value system or personal purpose in life could affect powerful involvement of emotion and cognition leading to meaningful and lasting behavioral change. Lastly, a cross-disciplinary workforce is necessary and the program should be culturally flexible for it to work in different models of healthcare system and for patients with DM of different backgrounds (Chew, Shariff-Ghazali & Fernandez, 2014).

2.6.4. The Effect of environmental context on diabetes mellitus management practices

Overall slightly more than half of the interactions between doctors and type 2 diabetes patients were not optimal, and that three out of four consultations with nurses were suboptimal. It has been suggested that good communication inevitably takes more time that can be compressed only at the cost of the quality of care. A good consultation and patient-doctor communication demand uninterrupted privacy and undivided attention to the patient. Encouraging the patient to ask questions allows the patient's point of view to guide the conversation which has been shown to be positively associated with health outcomes. The overall performance of the diabetes nurses in this study was sub-optimal. The reasons could partly be that in the studied health centres the diabetes nurses either shared the room with the doctors in three health centres or counselled the patients in the nurses' offices. Interruptions by other nurses and patients occurred in both situations, but were more common in the nurses' offices than in the doctors' offices. Focusing on the health care providers' behaviours was considered as an important factor in the process of communication and care at the preliminary stage of the study would provide us with more information about an unknown situation in Oman. However, it has been argued that physicians appeared to make minimal efforts to foster patient involvement and autonomy that induce self-efficacy. Furthermore, doctors' communication skills, hostility during interactions and training of health-care providers regarding interactions with patients and patient- centred care have been identified as crucial for effective health outcomes. The results of this study can provide a basis for further studies concerning diabetes care at the primary care level in Oman and countries with similar health systems. The results can also be used as a material for educational interventions (Abdulhadi et al, 2006).

A study that examined provider-level factors and reported discrimination in the healthcare setting where data analyzed patient-reported racial/ ethnic discrimination from providers, the primary exposures were characteristics of the primary care provider, including specialty/type, and patient provider relationship variables, including racial concordance noted the importance of communication during the

medical encounter, as provider communication scores were strongly associated with how patients perceived and ultimately reported racial/ethnic discrimination from healthcare providers. Improvement in the interpersonal aspects of the provider patient relationship is likely more critical among individuals with chronic diseases who have more intensive interactions with their provider to manage their illness. Furthermore, as racial/ethnic minority diabetes patients may face unique barriers to shared decision-making with their providers, additional provider training and/or education on interpersonal aspects of care may be influential in reducing patient perceptions of unfair treatment in the healthcare setting. This training would not be limited to cultural competency or diversity education, which is already a mandatory component of medical education for many healthcare settings, but more broadly focused on communications skills and patient-centered care. Too, qualitative research would be particularly informative for understanding when and how patients perceive unfair treatment from providers, including the influence of provider type or race/ ethnicity, as these patient reports of discrimination could represent particularly negative experiences that would impact healthcare treatment (Lyles et al, 2012)

The demands of self-management compete with a multitude of other demands of daily life. Despite knowing the importance of maintaining a healthy diet and regular exercise, patients generally find these to be the most difficult areas of self-management. A number of participants were caregivers for family members, making it more difficult to focus on their own self-care needs. Others engaged in lengthy problem-solving with their providers about specific barriers such as work schedules. Patients and providers may disagree on the relative importance of barriers. Dietitians placed more importance on portion control, while patients considered food selection and having to eat differently than others as bigger barriers. Helping patients' deal with their self-care in a social context is an important strategy, an invaluable component of diabetes management, and a skill that physicians would do well to master. Analysis of the interactions points to "parallel play" in which providers and patients articulate what is essentially the same problem in different ways (Kruse et al, 2013).

Diabetes self-care behavior is notoriously difficult to measure, and self-report data may reflect both biases as well as random errors. Patients who are more adherent

with their self-care plans may be more likely to recall conversations regarding their diabetes self-care. Also, it is well known that patients tend to over-report their adherence to self-care activities. This over-reporting may differ across sociodemographic groups or may be more common among patients who receive more intensive counseling regarding these issues. In the study, survey questions regarding patients' self-care behaviors, general communication, and diabetes-specific communication were asked at different points in the interview in order to minimize the likelihood of socially desirable responses. Both general communication processes and diabetes-specific communication were independently associated with patients' self-care, even when controlling for multiple indicators of patients' sociodemographic characteristics, health status, and other characteristics of their health care context. This finding should provide further support for including provider training in communication as a legitimate and important component of medical education and bolster efforts to develop novel strategies for increasing patients' access to effective diabetes education. Nevertheless, analyses of the relationship between communication and self-care should be interpreted with several caveats in mind. (Piette et al, 2003).

2.6.5. The effect of demographic characteristics on diabetes mellitus management practices

Study findings did indicate that a poor understanding of A1c was common and was associated with age, gender, education level, diabetes duration, regions and diabetes education. However, the sample in this study was recruited from just one diabetes outpatient clinic and just contained individuals with type 1 diabetes. The sample was relatively small, all of which limit generalizability. The findings of the study regarding the association of multiple factors and the patients’ understanding of A1c need to be confirmed by other studies. Besides knowledge, there are many other factors influencing self-management behavior and A1c level, such as attitude, self-efficacy. But, these variables were not measured in the study. The way assessments of, if patients received diabetes education was not specific. Therefore, the answer might mean very brief instruction during a physician visit rather than structured or formal diabetes education (Yang et al, 2016).

Inequalities in health are a major challenge for the health care system, yet there is a very limited understanding of the mechanisms by which social gradients are related to health disparities. Attempts to reduce these disparities should be guided by an understanding of the individual and contextual factors that may influence health outcomes and the associations between these factors. In the model presented in the study, there are attempts to integrate the many dimensions that might explain how SEP influences diabetes outcomes. The mechanisms proposed are likely to be complementary rather than competing and to vary at different levels of the social hierarchy rather than act uniformly across social strata. Many questions remain, and many issues need further exploration: Is the gradient in health outcomes for persons with diabetes consistent across levels of SEP? In health care systems in which access to care is comparable or uniform, is there substantial marginal benefit to be obtained by targeting interventions toward socioeconomically disadvantaged groups? What are the greatest socioeconomic influences on diabetes-related health behaviors? These questions have direct implications for the types of interventions that might be developed to reduce health inequalities among persons with diabetes, the populations that should be targeted by these interventions, and the barriers to their successful implementation. Critical to the success of such efforts is the realization of the multifaceted nature of socioeconomic influences on health and the need to examine individual, system-level, and area-level factors and their relation to access to care, health behaviors, and quality of care (Brown et al, 2004).

2.6.6. Diabetes mellitus management practices

GPs should repeat information, check the understanding; explore the patients' own thoughts about and the willingness to apply them, being careful not to overload patients with information and not to keep "harping on" about health advice that does not interest the patient. Besides, they recognize the lack of effective communication tools for making the patient a real partner in their decisions. The patient's own expectations with regard to illness and health do not always correspond to the objectives and expectations of the physician's treatment proposals. The motivation of the physician to achieve a good result may be in conflict with the patient's own motivation to lead his own life. GPs therefore seem to be in need of communication

skills to integrate the various expectations of physicians and patients regarding diabetes care (Wens et al, 2005).

Physicians may feel frustrated about their ability to improve patients' self-management and constrained by the limited time available in office visits. The study findings specifically found that patients' evaluations of their physicians' communication and participatory decision-making style were both strongly associated with their reported diabetes management. Patients' perceptions of information provision may be an equally or even more important dimension of patient-provider relations than participatory decision-making style for patients' disease management and health outcomes. The need for physicians to balance multiple, often competing priorities in the limited time available in office visits leads to as many as 50% of patients leaving an office visit not knowing what they are supposed to do to take care of themselves. Since this was a cross-sectional study, longitudinal studies are necessary to establish the causal relations among the associations seen in this study. It is possible that participatory decision making could lead to changes in understanding and self-management over time, whereas communication carries more variance in these outcomes in the cross section. All measures were based on self-report and therefore, the researcher cannot be certain whether physicians' differences in style led to better reported self-management or those with better self-management perceived their physicians differently. Reported self-management was examined as the outcome measure, rather than a medical outcome such as glucose control or quality-of-life measure. Care should be structured to maximize the exchange of information to facilitate patients' self-management and such care necessitates adequate time for office visits for those with chronic illnesses to allow for effective communication and discussion, as well as mechanisms to ensure appropriate follow-up for patients and intervals between visits. Therefore, management practices between the health practitioner and patient need to incorporate communication that is ideal, sensitive and accommodative of the patient (Heisler et al, 2002).

2.7. Research Gaps

There is need for research to fill gaps in knowledge on healthcare provider patient communication. While there is some evidence for ways to reduce communication difficulties in studies done elsewhere, little is known about the most effective and efficient ways to overcome communication difficulties between patients and healthcare providers in Kenya. Generally, there is empiric evidence of problems related to healthcare provider patient communication and how these problems may lead to poorer care and outcomes, hence, there is an opportunity and a need to improve and extend the evidence base on the effect of healthcare provider patient communication on diabetes mellitus care and outcomes.

Miscommunication and misunderstanding in clinical practice has widened the communication gap between patient and healthcare providers (Schirmer et al, 2005). There is a gap in regard to dominance as the patient are not given the opportunity to fully and equally participate in the medical encounters. The study by Abdulhadi et al, 2006 & Abdulhadi et al, 2007, revealed that the medical encounters were characterized by more of physicians' dominance and less of attention to the patients' concerns, expectations and role in their own diabetes management. Additionally, healthcare providers focus more on diabetic indicators to make decisions on treatments through checklisting, hence a distinct dissonance found between a communication style that focus on medical information compared with a patient-centered communication style (Kruse et al, 2013).

Healthcare providers need communication skills to cope with patients' expectations and evidence based goals in a tailored approach to diabetes care (Wens et al, 2005) as a bridge to resolving the paternalistic attitude that arises out of frustration, due to communication difficulties inherent between the provider and patient. In regard to Hacker et al, 2012, language concordance challenges inherent in providing services to a diversifying population deserve further study to determine the best policy and practice strategies to achieve this goal and to ascertain whether this is unique to the study population or generalizable elsewhere like Kenya. Sarkar, et al, 2008, noted that many patients reported an unmet need for better communication to support their efforts to self-manage their condition and given the high prevalence of limited health

literacy and the extent to which patients, particularly racial/ethnic minorities perceive a benefit of improved provider communication for their diabetes control, the design and delivery of self-management support interventions should directly address the communication barriers experienced by vulnerable groups. According to Piette et al, 2003 and Lyles et al, 2012, though providers in the study sites were communicating successfully with vulnerable patients, findings support the traditional advice to physicians to treat the whole patient, not just their disease, insofar as success across both dimensions of communication is associated with better self-care in a variety of critical areas.

Too, important to explore is consistency in communication through all subsequent consultations, where the health outcome of outpatients with NIDDM may possibly benefit if the compatibility in communication between doctor and patient during the initial contact are maintained during repeat consultations. Findings suggest that once the doctor patient relationship has been established, less effort is put into maintaining it what might engender, however, a risk of overlooking important cues, such as psychosocial issues, which are known to be related to the compliance and general well-being of the patient with NIDDM (Dulmen, van, Verhaak & Bilo, 1997). Communicative behaviour in regard to Heisler et al, 2002, that participatory decision-making style is unimportant, but it does suggest that perhaps the most critical pathway may be its impact of facilitating information exchange and overall communication as an aspect of healthcare provider patient communication effect on diabetes management.

Therefore, the gaps between optimal evidence based medicine and actual practice can be great, dependent not only on the ability of the clinician to make changes in practice patterns but also on the central role of the patient in implementing optimal management plans in daily life (Marrero et al, 2013).

2.8. Summary

Past studies on healthcare provider patient communication were reviewed and it was noted that effective communication reinforces a clearly communicated information and language of our own which means that we are able to express our intended

meaning through a verbal and non-verbal progress of information in ways that are appropriate in our cultures and different situations (Wong, 2013**).**

Diabetes mellitus as a condition under research is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action, or both. Its epidemiology was discussed and diabetes noted to be emerging as an epidemic of the 21st Century that threatens to overwhelm the health care system in the near future. Diabetes imposes high economic burden in terms of health care expenditure, lost productivity and foregone economic growth, hence the need for public health interventions to prevent diabetes or delay the onset of its complications that entail intensive lifestyle modification for those at risk of diabetes and aggressive treatment for those with the disease. Many of the complications can be prevented with appropriate medical care and, often requires significant alterations in lifestyle and strict adherence to self-care tasks, such as checking blood sugars, taking medications by the patient, increasing exercise and changing the type of food one eats are an essential portion of the treatment regimen. Aspects of the patient - physician relationship such as communication and empathy have been shown to be important to patient's adherence and ability to complete self-care tasks (Bonds et al, 2004).

The theoretical framework discussed provides an explicit understanding of how theory applies in healthcare provider patient communication which then provides the basis for this study. Two theories, uncertainty reduction theory and communication accommodation theory were explored and seek to explain how individuals plan, activate and create effective and sometimes ineffective goals and messages, and how individuals process, appraise and cope with incoming information and uncertainty, situations that are very common in healthcare. The conceptual framework as discussed stems from the paradigm that; the communication process between healthcare providers and patients can be complicated by any number of factors such as language, noise, environment and cultural differences. The independent variable for this study is healthcare provider patient communication; the dependent variable is diabetes mellitus management practices and the moderating variable is demographic characteristics.

CHAPTER THREE

METHODOLOGY

3.1. Introduction

In this chapter, research methodology in regard to healthcare provider patient communication in management of diabetes mellitus in selected hospitals Kenya is described. The specific objectives for the study are: the specific objectives for the study are: 1) To establish the effect of verbal language use on diabetes mellitus practices in selected hospitals Kenya. 2). To determine the effect of nonverbal communicative behaviour on diabetes mellitus management practices in selected hospitals Kenya. 3) To examine the effects of noise on diabetes mellitus management practices in selected hospitals Kenya. 4) To investigate the effect of environmental context on diabetes mellitus management practices in selected hospitals Kenya. 5). To find out the moderating effect of demographic characteristics on diabetes mellitus management practices in selected hospitals Kenya.

In this section, the selection of methodological approaches are discussed; the research design, study population, study sites, sample and sampling technique, research instruments and the ethical requirements are described. A description of the main data source for the pilot and main study, including the development process is discussed. Data method collection processes are reviewed and the data analysis plan described.

3.2. Research Design

This was a causal comparative research design study, with application of quantitative and qualitative methodology. Quantitative methodology was applied in the entire research study and in regard to the research instruments when it came to data collection and analysis. Purposive sampling, a nonprobability technique mostly used in qualitative studies was applied in sampling healthcare providers only. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques.

Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon (Babbie, 2010; Muijs, 2010).

Causal comparative method is an ex post facto research design. A causal comparative design is a research design that seeks to find relationships between independent and dependent variables after an action or event has already occurred. The researcher's goal is to determine whether the independent variable affected the outcome, or dependent variable, by comparing two or more groups of individuals (Salkind, 2010). The design seeks to establish causal relationships between events and circumstances, to find out the cause of certain occurrences or non-occurrences. This is achieved by comparing the circumstances associated with observed effects and by noting the factors present in the instances where a given effect occurs and where it does not occur. Attempts are made to explain the consequences based on the antecedent conditions; determine the influence of a variable on another, and test a claim using statistical hypothesis testing techniques (Lord, 1973). As in the current study, the independent variable, healthcare provider patient communication had already occurred and its effect on the dependent variable, diabetes mellitus management practices had already taken place in the sample groups being studied. The groups though in healthcare settings differ by belonging either to a public or private healthcare setting; hence such circumstances could bear varying effects on them in regard to the study outcome as shown in past studies as follows.

Healthcare can be provided through public and private providers. Public healthcare is usually provided by the government through national healthcare systems. Private healthcare can be provided through “for profit” hospitals and self-employed practitioners, and “not for profit” non-government providers, including faith-based organizations. Past research on different types of health settings have shown contrasting findings, A systematic review study on types of healthcare institution did not support the claim that the private sector is usually more efficient, accountable, or medically effective than the public sector; however, the public sector appears frequently to lack timeliness and hospitality towards patients (Basu, Andrews, Kishore et al, 2012). Research findings have also shown that only in a tangible realm of health services quality, the private sector enjoyed a higher status. Because the

issue of health services quality is important for customers, there is need to focus more on weaknesses and, by taking appropriate facilities and equipment and paying more attention to amenities for customers, improve the public sector. The study suggested improving the quality of public services by updating medical equipment and paying more attention to amenities, competence, and experience of healthcare workers; reducing waiting time for services, rapid reception and convenient access to a doctor should be considered (Alijanzadeh, Zare, Rajaee et al, 2016)

Past research studies also point to the comparative aspect as regards the public and private healthcare systems in lieu of them as consumers of their services. Researchers observed that public hospitals are easy to locate whereas the private hospital had healthy, neat and clean environment for patients; moreover, medical staffs are well dressed and appear neat than public medical staffs. In addition, private hospital had the drugs required by patient at its pharmacy. However, it was found that medical staffs are consistently courteous with patients when communicating with them in both private hospital and the public hospital. The research also showed that public hospital has patient interest at heart than private hospital. Moreover, private hospitals are well structured for physical challenged elderly and emergency patient to access the hospital than the public hospital. In addition, medical specialists are available to patients at private hospital when needed than patient in the public hospital. Also, patient spends less time in receiving medical treatment in public hospital than private hospitals. Apparently the private were noted to have good diagnostic service than private hospital (Ayiah-Mensah., Kwabena & Sherif, 2016).

Causal comparative research attempts to identify a cause-effect relationship between two or more groups. It is called “ex post facto” which means ‘after the fact’, alleged cause and effect has already occurred and are being examined after the fact and is used when independent variables cannot or should not be examined using controlled experiments. In ex post facto research the researcher takes the effect or dependent variable and examines the data retrospectively to establish causes, relationships or associations, and their meanings. Ex post facto research is concerned with discovering relationships among variables in one’s data. Ex post facto research, then, is a method of teasing out possible antecedents of events that have happened and

cannot, therefore, be controlled, engineered or manipulated by the investigator. Researchers can report only what has happened or what is happening, by trying to hold factors constant by careful attention to the sampling. Ex post facto research is a method that can also be used instead of an experiment, to test hypotheses about cause and effect in situations where it is unethical to control or manipulate the dependent variable (Cohen, Manion & Morrison, 2007). In this type of research investigators attempt to determine the cause or consequence of differences that already exist between or among groups of individuals; identify a causative relationship between an independent variable and a dependent variable. The relationship between the independent variable and dependent variable is usually a suggested relationship because the researcher does not have complete control over the independent variable.

3.3. Population

The target population comprised of all persons with diabetes mellitus and the healthcare provider who attend to patients with diabetes mellitus. The accessible population involved both the female and male patients with diabetes mellitus aged 18 years and over who had been attending Kenyatta National Hospital (KNH) and MP Shah Hospital outpatient diabetic clinics for twelve (12) month and over and healthcare providers attending to patients with diabetes mellitus at KNH and MP Shah Hospital outpatient diabetic clinics. Studies have used 12 months or greater than 12 months as duration of interaction between the healthcare provider and the patient as in a cross-sectional analysis study (Wallace et al, 2009) and a descriptive, cross-sectional study that included participants aged ≥18 years, reporting visiting a health care provider within the past 12 months or more preceding data collection (Houle et al, 2012).

3.3.1. Criteria for patients

The inclusion Criteria was in regard to patients above 18 years; with informed consent; patients with diabetes mellitus and had attended the diabetic clinic for one year (12 months) or more and patients with diabetes mellitus who were attending outpatient diabetic clinics at KNH and MP Shah Hospital. The exclusion criteria targeted patients below 18 years; who did not consent; and patients with diabetes

mellitus who had not attended the diabetic clinic for one year and above and patients who presented in a state that in one way or another made it not easy for them to participate in the study.

3.3.2. Criteria for healthcare providers

The inclusion Criteria was in regard to healthcare providers who worked at and had been attending to diabetes mellitus patient at KNH and MP Shah Hospital for twelve (12) months or more and healthcare providers who consented. The exclusion criteria targeted healthcare providers who worked but had not been attending to diabetes mellitus patient at KNH and MP Shah Hospital for 12 months or more and healthcare providers who did not consent.

3.4. Study Site

The research study was done at the Kenyatta National Hospital and MP Shah Hospital outpatient diabetic clinics.

3.4.1. Kenyatta National Hospital (KNH)

Kenyatta National Hospital is the oldest hospital in Kenya. It is a public, tertiary, referral hospital for the Ministry of Health. It is also the teaching hospital of the University of Nairobi College of Health Sciences. It is the largest hospital in the country. The hospital is located in the area to the immediate west of Upper Hill in Nairobi, the capital and largest city of Kenya. Its location is about 3.5 kilometres (2 mi) west of the city's central business district. The hospital complex measures 45.7 acres (18.5 ha). KNH had its Centenary Celebration in 2001.

The Hospital was built to fulfill the role of being a National Referral and Teaching Hospital, as well as to provide medical research environment. It is currently the largest national referral and teaching hospital in the country. Established in 1901 with a bed capacity of 40, KNH became a State Corporation in 1987 with a Board of Management and is at the apex of the referral system in the Health Sector in Kenya. It was founded in 1909 with a bed capacity of 40 as the Native Civil hospital, renamed the King George VI in 1952. It was renamed Kenyatta National Hospital

after Jomo Kenyatta following independence from the British. It has a capacity of 1800 beds, has over 6000 staff members. Within the KNH complex are College of Health Sciences (University of Nairobi); the Kenya Medical Training College; Kenya Medical Research Institute and National Laboratory Service (Ministry of Health) http://en.wikipedia.org/wiki/Kenyatta National Hospital, 2009).

Kenyatta National Hospital (KNH) has 50 wards, 22 outpatient clinics, 24 theatres (16 specialized) and an accident and emergency department. Out of the total bed capacity of 1800, 225 beds are for the private wing. There is a Doctors Plaza consisting of 60 suites for various outpatient specialties. The hospital offers a wide range of diagnostic services such as laboratories, radiology / imaging and endoscopy among other specialized services. Sometimes, the average bed occupancy rate goes to 300%. In addition, at any given day the hospital hosts in its wards between 2500 and 3000 patients. On average, the hospital caters for over 80, 000 in-patients and or 500,000 outpatients annually. The hospital is administered by a 10-person board of directors, currently chaired by Mark Bor, a non-physician, non-executive board member. The chief executive officer is Lily Koros Tare. The principal of the College of Health Sciences of the University of Nairobi and representatives from the Ministry of Finance and from the Ministry of Health, also sit on the board (Wikimapia.http://wikimapia.org/ 1016902/ Kenyatta-National Hospital- Hospital). The study area was chosen and noted to be suitable because it is the largest public health facility in the country and as a referral hospital it receives patients from other parts of the country and its immediate environs and thus does give a broad spectrum of the patients with diabetes mellitus.

3.4.2. MP Shah Hospital

Located in parklands area in Nairobi, MP Shah Hospital is a modern 210-bed facility. For generations, it has been ranked among the best private hospitals in Kenya (http://mpshahhosp sp.org/). The hospital is located approximately 3.1 kilometres by road northwest of the central business district of Nairobi (Wikipedia, the free encyclopedia, http://en.wikipedia.org/wiki/westlands, Nairobi). MP Shah Hospital operates under the umbrella of the Social Service League which is a non-racial, non-

religious, non-political charitable institution (http:// mpshahhosp.org / about-us/). MP Shah Hospital is committed to providing easily accessible, affordable and available healthcare which surpasses patient's expectations. Some of the services provided by the hospital include outpatient, inpatient, pathology/laboratory medicine, radiology, pharmacy, physiotherapy and specialty clinics. The hospital is affiliated to the Cancer Care Centre which is one of a kind in East and Central Africa in providing state of the art treatment. The hospital also has a Doctor's Plaza (Dinesh Chandaria Medical Centre) where specialist consultants have their offices (https://www.linkedin.com/company/m-p-shah-hospital/).

MP Shah Hospital has been recognised as level 6B hospital and a national referral facility with ISO 9001: 2015 quality management certification. Formally known as Parklands Nursing Home, MP Shah Hospital (Meghji Pethraj Hospital) was founded in early 1930s by prominent philanthropists to alleviate human suffering in the community. With time, it broadened from a mere community nursing home to a fully- fledged facility that is now called MP Shah Hospital. Today MP Shah Hospital is a multi-specialty hospital covering every segment of medicine. The hospital is now one of the most respected and established institutions in Kenya providing professional medical, nursing and rehabilitative care. The focus has and always remains patient-centered care driven by the values of the social service league (http://mpshahhosp.org/about-us/).

The Diabetes Center at the hospital dedicated to conquering diabetes in all its forms providing care and education. It is focused towards a discovery aimed at preventing and curing diabetes. The Centre develops innovative patient therapies that immeasurably improve the lives of people with diabetes in a one stop shop approach. At the core of the Centre lies its ambition to provide holistic multidisciplinary care to patients and families. The aim is to promote self-management for patients while minimizing the risk of developing diabetes – related complications. Other services offered at the Centre include: Nutrition, Counselling, Foot care, Specialty clinics for vascular, Nephrology, Ophthalmology (http://mpshahhosp.org/about-us/). MP Shah Hospital has a modern diabetes centre with relatively high patient volume attending its diabetic clinic compared to the other private hospitals, hence serves a relatively

large number of persons who seek diabetes related services in a private hospital setting.

3.5. Sampling Frame

The sampling frame is the actual list of individuals that the sample will be drawn from. Ideally, it should include the entire target population (and nobody who is not part of that population) (McCombes, 2023). The patient registers for diabetes mellitus patients who attended the diabetic clinics at Kenyatta national hospital and MP Shah Hospital were used (Appendix VII AND VIII respectively). The healthcare providers involved the physcians (doctors), clinical officers, nurses and dieticians as per the diabetic clinic registry. The sample from the sampling frame is as depicted in table 3.1 below.

Table 3.1: Healthcare providers / patients at the diabetes mellitus clinics, KNH / MP Shah Hospital

HEALTHCARE PROVIDERS	KNH	MP SHAH HOSPITAL	TOTAL
Doctors	4	4	8
Clinical Officers	2	0	2
Nurses	5	3	8
Nutritionists	1	2	3
SUBTOTAL	**12**	**9**	**21**
PATIENTS	313	87	400
TOTAL	**325**	**96**	**421**

Source: Kenyatta National Hospital/ MP Shah Hospital Diabetic Clinics

3.6. Sample and Sampling Technique

3.6.1. Sample

The sample size for patients was determined according to this formula:

$$\text{(i)} \quad n = \frac{Z^2 \, p \, q}{d^2}$$

Since there were no estimates available of the proportion in the target population assumed to have the characteristic of interest, 50% was used as recommended by fisher et al. (Mugenda & Mugenda, 1999). Therefore, since the target population with the characteristic is 0.50, the z-statistic is 1.96, and the desired accuracy is at the 0.05 level, the sample size would be:

If, Z – 1.96 P – 0.50 q - 0.50 d – 0.05

$$\text{Then,} \quad n = \frac{(1.96)2 \; (0.050) \; (0.50)}{(0.05)2}$$

n= 384

Given that a study on communication was done at Moi Referral and Teaching Hospital (MTRH), Eldoret, to describe perceived physician communication behaviors and its association with adherence to care, among HIV patients in Kenya, whereby a convenient sample of 400 HIV adult patients, attending three Academic Model Providing Healthcare program (AMPATH) clinics in Eldoret, Kenya was surveyed between July and August 2011(Wachira et al, 2014), the present study did in regard to the calculated sample size above peg its sample to 400 participants.

In regard to healthcare providers, nonprobability purposive sampling was applied since they were few and all those present at the Kenyatta National Hospital and MP Shah Hospital diabetic clinics were considered hence making a total sample of 21.

Therefore, the total study sample did constitute 421 participants.

3.6.2. Sample technique

The sampling procedure whereby the patients were picked was as follows. The sample was from the total number of patients that made up the clinic attendance register for the given period of sampling and from this as per required sample size, the total number of patients was divided by the calculated sample size and hence every n^{th} Patient would then be sampled to make up the sample.

The accessible population who were all the patients attending the outpatient diabetic clinic at K.N.H in a year was approximately 3726 (main clinic, done on Fridays only) and 5797(mini clinic, that runs on a daily basis). These were patient consultations as patients seen in the main clinic could end up being seen in the minor clinic on any other day of the week throughout the year. Therefore, there is repetition at the minor clinic. As such the figure of the main clinic (3726), as advised by the Kenyatta diabetes clinic was used as the accessible population from whom the participants were sampled. These figures were according to diabetic clinic attendance of January to December 2015 as per the attachment from the health information department-03-02-2016 (AppendixVIII).

Too, all patients, approximately 2954 attending the MP Shah Hospital's diabetic clinic, which operates on a daily basis from Monday to Friday, formed part of the accessible population. This figure was in regard to the diabetic clinic attendance of the year July 2017/ June 2018 (AppendixVIII) whereby there were 1030 new patients and 1924 revisits. Therefore, the figure of new patients (1030) was used since this same patients did come back to be seen as revisits.

To avoid double recruitment, the patient registration numbers were referred to throughout the whole research study exercise. To get the sampling interval, the accessible population of approximately 3726 (main clinic, KNH) and 1030 (MP Shah Hospital) was used, whereby each was divided by allocated proportionate samples of 313 patients' (KNH) and 87 patients' (MP Shah Hospital) of the total 400 to yield a sampling interval of 11.90415335 for KNH and11.83908046 for MP Shah Hospital, approximated to 12 respectively. Hence, every 12^{th} participant at every research centre was sampled to make up the sample size and was done till the total sample

size was achieved.

As advised by the diabetic clinics to use the main (new patients) clinics attendance visits in the year, the rationale for the distribution of the respondents between KNH and MP Shah Hospital was in regard to the new visits in the year depicted by the main clinic attendance (new visits in the year) of 3726 at KNH and 1030 as new patients but actually being the first visit in the year at the clinic in MP Shah Hospital. The total volume of patients seen at both clinics, viz, 5797(KNH) and 2954(MP Shah Hospital) included both the new patients and the re-attendances. As such the new visits numbers was used to calculate the respective allocations of the sample size to each study area as follows. Since the total number of the main clinic (new) attendance for both study areas is 3726 + 1030= 4756 in a year which corresponded to the sample of 400 participants; to get the proportionate sample for each of the study area, the computations below was of essence:

Thus,

If, 4756 patients corresponded to 400 participants

Then, 3726(KNH) would correspond to; 3726 multiplied by 400 divided by 4756 = 313.372582 rounded off to 313, and 1030 (MP Shah Hospital) would correspond to 1030 multiplied by 400 divide by 4756 =86.627418 rounded off to 87. Therefore, KNH would be allocated 313 and MP Shah Hospital 87 and all to make the total of 400 respondents.

Purposive sampling was used in regard to healthcare providers, since they were few and therefore their participation in the study would be essential. The sampling in regard to the sample frame for the healthcare providers involved the physcians, clinical officers, nurses and dieticians, who were twelve (12) at Kenyatta National Hospital and nine (9) at MP Shah Hospital in number according to the registry on the healthcare providers at the diabetic clinics, hence did constitute a total of twenty one (21).

3.7. Research Instruments

To collect data, the questionnaires as indicated below were used.

3.7.1. A researcher administered questionnaire for patients.

This questionnaire was administered to the participants by the researcher and his assistants. It did seek information on their sociodemographic data; diabetes mellitus and healthcare provider patient communication. This type of questionnaire was used on the patients and considered suitable as the patient participants would be taken through it as they filled. This was due to the nature of the study being in a technical field, hence, any queries from the participants would be explained in the process.

3.7.2. A self-administered research questionnaire for healthcare providers

This was a self-administered questionnaire for healthcare providers seeking information on healthcare provider patient communication. This type of questionnaire was suitable for the healthcare providers since they would fill the questionnaires on their own as they had the technical knowledge in the field of study.

3.8. Data Collection Procedure

The study was carried out at two sites; Kenyatta National Hospital, a public hospital and MP Shah Hospital, a private hospital. Data from these two sites was collected separately. At KNH, the researcher would visit on Fridays of every week when the main clinic is conducted to collect data. But since the registers and patient files are prepared a day prior to the actual clinic day, the researcher would visit the clinic a day prior, that is on Thursdays of every week to sample the participants to be recruited into the study as the clinic registers for patients were used for the purpose. At MP Shah Hospital, the researcher would visit the clinic daily from Monday to Thursday as clinic days are conducted daily from Monday to Friday.

The recruitment of participants was done a week prior to the next week or the day prior to the next day at MP Shah Hospital, since according to the clinic, the registers and patient files are prepared a week/day prior, though booking of the patients for the specific clinic days would have been done at the previous clinic visit when they were

attended to. Two research assistants were involved, with one of them coming daily from Monday to Friday and the other joining in on Thursdays and Fridays because of the MP Shah Hospital clinic on Friday since the clinic at KNH was conducted on the same day. Since the researcher had two research assistants, they would assist in the recruitment of the participants by visiting the sites together with the researcher except on Fridays when one research assistant would visit MP Shah Hospital to identify and physically recruit the participants by talking to them and agree with them on when they could meet the researcher to be taken through data collection within the next week. This whole process would be done by the researcher and his assistants helped by the staff at the clinic. The assistants and the staff did undergo some training in regard to the study requirements. Once identified and recruited, consent was sought from the participants.

To ensure that there was no double participant recruitment, the clinic attendance registers and patient record files were used and therefore the outpatient registration numbers of the patients noted at all times throughout the sampling and data collection. Since the clinics began at 8a.m and ended at 5p.m; and since the registers were used to identify the participants, recruitment began immediately the patients arrived and as they waited to be attended to by the healthcare providers, and if they had already been attended to, they would continue with the process, though they would be allowed to collect the prescribed drugs or go for any tests/ investigations or medical procedures requested for by the healthcare providers. The data collection instruments and data collected for KNH and MP Shah Hospital was kept separately. For the healthcare providers as participants in the study, all those who worked at the diabetic clinics were purposively sampled as they were few as per the sampling frame in table 3.1(page 90).

Consenting was done by the researcher, by first explaining to the participant about the nature of the research and why it is being done by taking them through the consent explanation form contents and any questions raised would be answered. The selection process of the participant would be explained to him or her so that he/she understood as to why he/she had been selected. Once this was done and he or she agreed to participate, the informed consent form would be provided to the participant

to sign in the presence of the researcher and once signed he/she was recruited into the study. Those who declined to participate were not recruited into the study. For the healthcare providers, the researcher explained the consent explanation form contents and any questions raised were answered. Those who agreed to participate in the study would be provided with the informed consent form to fill and sign in the presence of the researcher and once signed; then they were recruited into the study and those who declined to participate were not recruited. Data collection would then commence afterwards. In all this the researcher was assisted by his research assistants.

Data collection was done by the researcher only and this upon the participant consenting. The participants would be taken through the questionnaires. This took about 30 to 45 minutes to complete the questionnaire. The healthcare providers too would be taken through the questionnaire, and then be requested to fill it. After filling the questionnaire, the healthcare provider would hand it back to the researcher. Once data had been collected, the participant would be informed of the end of the exercise and how the information they had given was useful in the study. The researcher would thank the participant for agreeing and participating in the study. They would be informed of the confidentiality of their participation, the information they had given and the safe keeping of the research instrument. Once data had been collected, it was kept safely in a locker only accessible to the researcher

3.9. Ethical Considerations

Approval for the study was sought from the department of media technology and applied communication and Board of postgraduate studies, Jomo Kenyatta University of Agriculture and Technology; National council of science and technology institute (NACOSTI), then to the Kenyatta National Hospital and MP Shah Hospital - Research and Ethics Committee for review and approval. Too, approval was sought from the Kenyatta National Hospital and MP Shah Hospital administration to carry out the study at the hospitals' diabetic clinics. Once approved, the study commenced. Informed consent was obtained from the participants before the administration of the research instruments. This was on the basis of appropriate

information given in the informed consent form/document and adequate time given to consider the information and ask questions. The consent was in written form with details on ethical considerations procedure of the study, confidentiality, benefits-personal and general, risks and the right not to participate or withdraw at any time. All information obtained was stored in a locker only accessible to the researcher to ensure confidentiality. There were no anticipated risks in the study. However, those who participated in the study and needed to be helped were assisted accordingly. There were no direct immediate benefits to the participants. Although, the information obtained from the study was to enable an understanding of the effect of healthcare provider patient communication on diabetes mellitus management practices. This would shade light on the best communication approaches required in managing patients with the conditions thereby improve on health outcome and their quality of life.

3.10. Pilot Test

This was done at the Moi Referral and Teaching National Hospital as the hospital share similar characteristics with Kenyatta Referral and Teaching National Hospital. Too, a pilot study was done at The Nairobi hospital since as a private hospital it has similar characteristics' with MP Shah Hospital. Reliability and validity of the instruments was ascertained by the pretesting of the instruments through the pilot study.

3.10.1. Testing for reliability

Testing for reliability is important as it refers to the consistency across the parts of a measuring instrument. A scale is said to have high internal consistency reliability if the items of a scale "hang together" and measure the same construct. The most commonly used internal consistency measure is the Cronbach Alpha coefficient. It is viewed as the most appropriate measure of reliability when making use of Likert scales. No absolute rules exist for internal consistencies, however most agree on a minimum internal consistency coefficient of 0.70. For an exploratory or pilot study, it is suggested that reliability should be equal to or above 0.60 and the suggested four cut-off points for reliability, which includes excellent reliability (0.90 and above),

high reliability (0.70-0.90), moderate reliability (0.50-0.70) and low reliability (0.50 and below) (Taherdoost. H, 2016) and technically speaking, Cronbach's alpha is not a statistical test; it is a coefficient of reliability or consistency with the accepted value of Cronbach's alpha as 0.70; however, values above 0.60 are also accepted (Griethuijsen et al., 2015; Taber, 2018). As such test of internal consistency in the separate communication questionnaires in the current study involving the patients as well as the healthcare providers carried out at the two pilot sites was done with findings as in the tables 3.2 and 3.3 below.

3.10.1.1: Testing of reliability for patients

Table 3.2: Reliability analysis of the healthcare provider patient communication questionnaire of patients using Cronbach's alpha

Variable	Overall	MTRH	T N H
Verbal language use	0.967	0.949	0.993
Nonverbal communicative behaviour	0.975	0.966	0.996
Noise	0.760	0.700	0.981
Environmental context	0.918	0.879	0.992
Diabetes mellitus management practices	0.923	0.920	0.915
Demographic characteristics	0.887	0.862	0.928

Source: Field Data (2018)

As shown in table 3.2 for the patients, verbal language questions had excellent internal consistency with Cronbach's alpha (α) of 0.967 that was excellent and also shown to be excellent at both hospitals. Internal consistency for non-verbal communication questions was also excellent (α=0.975) and similarly so at both hospitals. Noise questions were rated as of high reliability in the overall (α=0.760) with an acceptable high rating at MTRH and excellent at TNH. Environmental context communication questions gave excellent internal consistency of α=0.918 which was excellent reliability and similarly so at TNH but with a high reliability rating, hence good at MTRH.

In relation to diabetes mellitus management practices questions, internal consistency was of excellent reliability of α=0.923 in the overall and similarly so at both hospitals. On the other hand, demographic factors questions had high reliability, hence good rating of internal consistency with α=0.887 and similarly with a high reliability, hence good rating at MTRH and an excellent reliability rating at TNH. Hence the data instrument for the patients was determined as reliable for the study.

3.10.1.2: Testing of reliability for healthcare providers

Table 3.3: Reliability analysis of the healthcare provider patient communication questionnaire of healthcare providers using Cronbach's alpha

Variable	Overall
Verbal language use	0.942
Nonverbal communicative behaviour	0.617
Noise	0.821
Environmental context	0.641
Diabetes mellitus management practices	0.763
Demographic characteristics	0.904

Source: Field Data (2018)

In table 3.3 for the healthcare providers Cronbach's alpha for internal consistency unlike for the patients, only the overall figure was generated because of the few number of healthcare providers who agreed to participate in the pilot study and given that they were also few at the two hospitals. The results showed that verbal language use questions had excellent internal consistency with α=0.942. Internal consistency for non-verbal communication was of moderate reliability, α=0.617, hence acceptable; for noise it was high reliability, α=0.821 and for environmental context was, α=0.641 which was moderate reliability, hence acceptable.

Diabetes mellitus management practices internal consistency was of high reliability, α=0.763 and in relation to demographic factors questions, internal consistency was excellent reliability, with α=0.904. Hence the questions in these categories did meet

the threshold of reliability and hence the data instrument for the healthcare providers was determined as reliable for the study.

3.10.2. Testing for validity

A validity test of a questionnaire/instrument is conducted to check if it measures the attribute for which it was designed (Apostolakis & Stamouli, 2006). Validity of a research instrument assesses the extent to which the instrument measures what it is designed to measure (Robson, 2011). In quantitative research, validity is the extent to which any measuring instrument measures what it is intended to measure (Mohajan, 2017). It is the degree to which the results are truthful and so it requires research instrument (questionnaire) to correctly measure the concepts under the study. Validity refers to whether the measuring instrument measures the behaviour or quality it is intended to measure and is a measure of how well the measuring instrument performs its function. It is determined by the meaningful and appropriate interpretation of the data obtained from the measuring instrument as a result of the analyses and obtaining data that is appropriate for the intended use of the measuring instruments (Sürücü & Maslakci, 2020).

In order to determine the validity of the measuring instrument, different types of validity have been suggested in the literature (Oluwatayo, 2012). Although it is possible to expand this list further, two types of validity are generally accepted to have particular importance, namely content validity and construct validity. Content validity evaluates whether the expressions contained in the measuring instrument represent the phenomenon intended to be measured. It can be said that a content validity of a measuring instrument is a validity study that reveals the extent to which each item in the measuring instrument serves the purpose. A subset of content validity is face validity, where experts are asked their opinion about whether an instrument measures the concept intended; is the extent to which a measurement method appears "on its face" to measure the construct of interest and thus refers to the degree to which a test appears to measure what it claims to measure ((Heale & Twycross, 2015; Mohajan, 2017).

In regard to the current study, there was probability that questions would be misunderstood or misinterpreted. Therefore, pre-testing of the study instruments in the pilot study was to ensure face validity. As for content validity; after developing the instruments (questionnaires), the researcher requested experts in scholarly disciplines of communication and medicine to read and give opinion on whether the questionnaires had adequate content in the area to be researched on. The questionnaires were also shared with the university supervisors of this study and the study site supervisors who gave their input which was incorporated in the final study instruments. The opinion of the experts and supervisors helped restructure, improve and align/even remove sections of the instruments that were found inconsistent.

Construct validity on the other hand is concerned with the degree to which the instrument measures the concept, behaviour, idea or quality, that is, a theoretical construct that it purports to measure. It is the ability to distinguish between participants with and/or without the behaviour or quality to be measured. The fact that the measuring instrument has construct validity means that it proves the construct to be measured and hence it can reveal the construct. Construct validity is widely used in research and is based on the logical relationships between variables (Mohajan, 2017). An important method for checking the construct validity of a test is the factor analysis.

Factor analysis is a complex statistical method, according to which the number of variables constituting the test in question (the questionnaire) decreases significantly and factors are created. Each factor is a concept, which includes those variables that correlate with another. In this way the degree to which each question contributes to the measurement of the attribute to be evaluated is calculated. If the characteristic under measurement is not complex and if only one general factor is produced by factor analysis, then the fact that the test answers reflect the characteristic under measurement can be considered as proof and thus the test is characterized by construct validity. If the characteristic under measurement is complex, then more than one factor will result from factor analysis. Then the test will cover the specific characteristic being measured and it will be characterized by construct validity if a small number of factors come up (Apostolakis & Stamouli, 2006).

Sixty-one (61) variables relating to effect on diabetes mellitus practices were factor analysed using principal components analysis with varimax rotation. Table 3.4 below shows the KMO and Bartlett's test

Table 3.4: KMO and Bartlett's Tests

Kaiser-Meyer-Olkin Measure of Sampling adequacy		0.867
Bartlett's test of Sphericity	Approx. Chi-Square	3983.768
	df	108
	Sig.	0.000

Source: Field Data (2018)

From table 3.4, the Kaiser-Meyer-Olkin test of sampling adequacy assessed whether or not the sample size was sufficient for factor analysis. A value of less than 0.5 indicates the sample is too small, but ideally the aim is for a value of 0.7 or above. In this case the value was KMO = 0.87, which meant our sample size was sufficient.

The second statistic is Bartlett's test of sphericity which tells us whether there are an adequate number of correlations between the variables for factor analysis. In this case there should be a significance value of less than the alpha level, that is, $p< 0.001$, which means that there are enough correlations for factor analysis. The Bartlett's test of sphericity was significant (χ^2 (108) = 3983.77, $p < 0.001$), hence an indication for factor analysis.

Through the principal component method to estimate the factor loadings and specificity, the Exploratory Factor Analysis (EFA) was conducted. It adopted the varimax rotation method, in a correlation matrix composed of 61 variables. To help visualize which factors to keep, a scree plot for all 61 eigenvalues for the factors was presented as shown in figure 3.1(next page). These plots often show a point in the curve (or 'elbow') where the eigenvalues drop off and level out. Eigenvalues above this point may be important enough to retain, whereas the others may not.

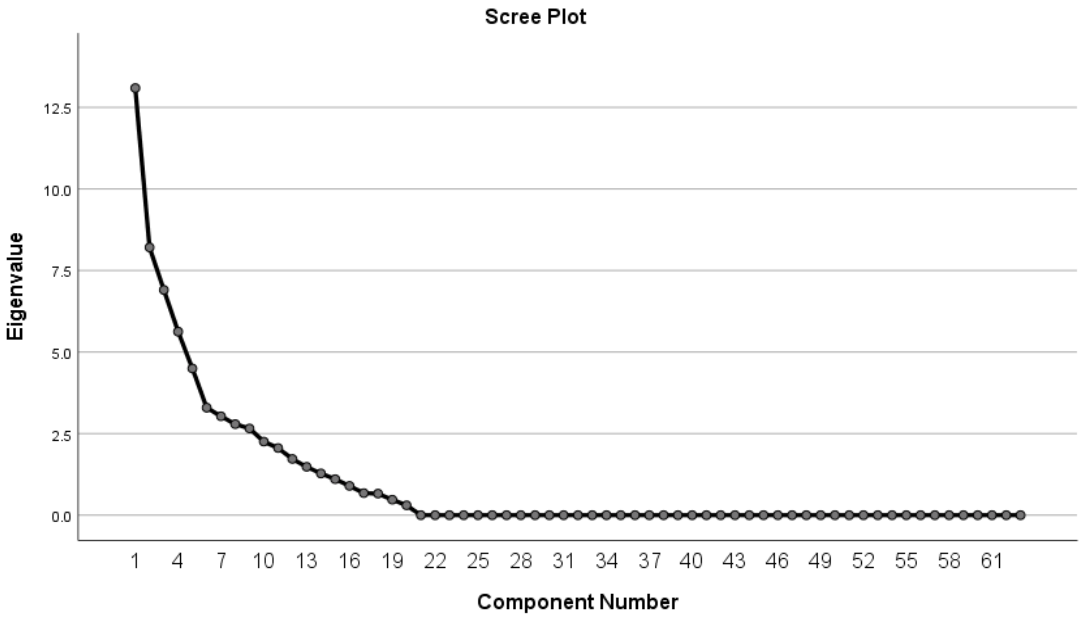


Figure 3.1: Scree Plot of the eigen values

Source: Field Data (2019)

Scree plot curves can often be difficult to interpret. As in figure 3.1 above; in this case the graph appears to tail off after 7 factors, but there is also another drop after 20 factors. So, using this method of extraction, it was possible to justify either 7 factors or 20 factors here. To determine exactly how many factors to retain, further analyses was carried out a few more times exploring the different factor options and see which one make the most sense. Using both the scree plot and eigenvalues > 1 to determine the underlying components, the analysis yielded 20 factors explaining a total of 67.66 per cent of the variance in the data. Testing suggested that the questions were valid and could be used to produce scale scores.

Exploratory Factor analysis of the constructs discovered that all the items had good factor loadings on the constructs with Eigen values greater than 1 to explain more than 67.66% variance in each of the constructs. Based on the outcomes of the pilot results, the items with problem were looked into and were deleted to reflect the study area very well because some comments were also received with the questionnaire that the items were too many and its effects on the answering the items as expected. The deleted items were then checked again to see the effect of that items on

constructs, but no effect were found and that is why it still remained in that way to reflect the study in good manner. The drafted questionnaires were therefore updated to reflect the observation made.

3.11. Data processing and analysis

Data was collected and edited to ensure conformity and keyed into a computer. To ensure data quality assurance the investigator reviewed the questionnaire responses at the end of every interview to ensure completeness and accuracy of the information. Any discrepancy was addressed before the data collection session ended. The questions with categorical responses were coded using numeric codes. The lowest code was 1 while the highest depended on the number of categories available in the question of interest. In relation to communication, the Likert scale responses were coded as 1-Strongly agree, 2-Agree, 3-Uncertain, 4-Disagree and 5-Strongly disagree. The dichotomous questions were given 1 or 2 codes for example 1-Yes and 2-No.

When it came to data entry, a data entry sheet was prepared in SPSS software using the coded questionnaire. Coding in the entry sheet was done to reflect the coding system in the questionnaire. Data entry was done by a research assistant with statistics qualification and experience in data management. Patients' and healthcare workers' questionnaires were handled separately and entry was done in two independent data sheets. Two separate data sets, one for patients and another for healthcare providers were generated during entry. The questionnaires were serialized first during data entry using unique numbers to differentiate the entered questionnaires from those not entered. This was done to ensure there were no mistakes of double entry of questionnaires. This was to help in case of any errors made during data entry or any reference during data analysis because that questionnaires could be accessed very easily because of the unique serial numbers assigned to questionnaires.

Data cleaning was performed in the course of data entry. Data cleaning is a process of eliminating data entry errors made during data entry. It was done by running descriptive analysis and checking for the abnormal values in the descriptive analysis

results and the questionnaires which were entered wrongly were referred to and mistakes corrected accordingly. The data entrant double checked every entry to ensure accurate information was captured. This ensured minimization of errors that would bias the results of the study. At the end of data entry, general frequency distribution analysis was done to pick the obvious mistakes in the data sets. Those with observable errors were corrected by retrieving the specific questionnaires to check the entries. This process was repeated until the investigator was satisfied that the data was clean and ready for analysis.

Statistical analysis was then done after data was posted by a computer data base developed using statistical package for social sciences (SPSS) in version 23.0. The results were presented in descriptive and inferential form. Patient characteristics were summarized using percentages and means or medians for categorical and continuous data respectively. Comparisons were done between private and public hospital patients using chi square test of association for categorical variables and independent t-test for comparison of means.

Healthcare provider patient communication rating were scored and calculated as overall mean scores for verbal language use, nonverbal communicative behaviour, noise and environmental context. Healthcare provider patient communication rating between the hospitals was compared using independent t-test. Similarly, diabetes mellitus management practices scores were summarized into means and compared between the two hospitals. In addition, diabetes mellitus management status in patients was measured using random blood sugar level, fasting blood sugar level and HbA1C. Blood glucose control levels were presented as a mean percentage RBS, FBS and HbA1C and categorized into good (within normal range) and poor control (above normal range). The healthcare provider patient communication in regard to healthcare providers' responses was analyzed by summarizing verbal language use, nonverbal communicative behaviour, noise, environmental context and diabetic mellitus management practices scores into means and standard deviations. Comparison of mean scores between hospitals was done using independent t-test.

Linear regression was used to test the relationship/association between healthcare provider patient communication ratings and diabetes mellitus management practices scores. Test of significance was done at a significant level of 0.05 at 95% confidence interval to test hypotheses. To analyse the relationships/associations as conceptualized in the conceptual framework, simple linear regression and then multiple linear regression model 1 and 2 were performed. The dependent variable was diabetes mellitus management practices score while the independent variables were verbal language use score, nonverbal communicative behaviour score, noise score and environmental context score with the moderating variables of age, gender and socio economic status. The regression models generated were as follows:

Simple linear regression

To analyse the relationships as conceptualized in the conceptual framework, a simple linear regression analysis was performed. The dependent variable was diabetes mellitus management practices score while the independent variables were verbal language use score, nonverbal communicative behaviour score, noise score and environmental context score. The linear regression used the following formula to determine the relationship between the dependent variable and each one of the independent variables:

$$y = \beta_0 + \beta_1 x_1 + \epsilon ,$$

Where:

y – The dependent variable – diabetes mellitus management practices score

x – Independent variable (verbal language use score, nonverbal communicative behaviour score, noise score and environmental context score) each at a time

ϵ – the model's error term

Regression Model 1

To analyse the relationships as conceptualized in the conceptual framework, a regression analysis was performed in regard to the model as indicated below. The dependent variable was diabetes mellitus management practices score while the independent variables were verbal language use score, nonverbal communicative behaviour score, noise score and environmental context score. The regression model was developed using the following formula to determine the relationship between the dependent variable and all independent variables to find out the predictors of the response variable:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \epsilon ,$$

Where:

y – The dependent variable – diabetes mellitus management practices score

x – Independent variables 1, 2, 3 and 4 (verbal language use score, nonverbal communicative behaviour score, noise score and environmental context score)

ϵ – the model's error term

Regression Model 2

Further, moderating variables were included in the model to determine the independent predictors of diabetes mellitus management practices score with consideration of the demographic factors scores. This was first done with each of the independent variable and thereafter with all the independent variables. The regression model 2 was then extended as follows:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 z + \beta_3 x z,$$

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_{1z} x_1 z + \beta_{2z} x_2 z + \beta_{3z} x_3 z + \beta_{4_z} x_4 z + \epsilon$$

Where:

y – The dependent variable – diabetes mellitus management practices score

x – Independent variables – Communication variables: 1, 2, 3 and 4 (verbal language score, nonverbal communicative behaviour score, noise score and environmental context score) then moderating variables (5-Young healthcare providers, 6-Older healthcare providers, 7-Female healthcare providers, 8-Male healthcare providers, 9-Financial status, 10-Quality of life, 11-Level of assets and 12-Ability to save).

z –Moderator variable

xz – interaction term

ϵ – the model's error term

3.12. Test of Assumptions

The tests of assumptions for both healthcare workers and patients in this study were done in regard to the statistical tests applied. The variables that were the subject of hypothesis testing in this study were measured in a continuous scale. Test of normality of data was done to guide the decision on the type of statistical tests that were appropriate for testing the hypotheses.

The tests done were; test of normality, test of equality of variance and test of linearity (multicollinearity). Many statistical procedures including correlation, regression, t tests, and analysis of variance, namely parametric tests, are based on the assumption that the data follows a normal distribution or a Gaussian distribution as it is assumed that the populations from which the samples are taken are normally distributed. Normality and other assumptions should be taken seriously, for when

these assumptions do not hold, it is impossible to draw accurate and reliable conclusions about reality. With large enough sample sizes (> 30 or 40), the violation of the normality assumption should not cause major problems as this implies that we can use parametric procedures even when the data are not normally distributed.

According to the central limit theorem, if the sample data are approximately normal then the sampling distribution too will be normal and in large samples (> 30 or 40), the sampling distribution tends to be normal, regardless of the shape of the data and the means of random samples from any distribution will themselves have normal distribution. However, to be consistent, we can use significance test like Shapiro-Wilk's comparing the sample distribution to a normal one in order to ascertain whether data show or not a serious deviation from normality. Assessing the normality assumption should be taken into account for using parametric statistical tests and it is preferable that normality be assessed both visually by using normal plots and through normality significance tests, of which the Shapiro-Wilk test, provided by the SPSS software, is highly recommended (Ghasemi & Zahediasl, 2012).

Statistical methods assume some characteristics about the data. Generally, they assume that: The data are normally distributed and the variances of the groups to be compared are homogeneous (equal). These assumptions should always be taken into consideration in order to draw reliable interpretation and conclusions of the research. These tests; correlation, t-test and analysis of variance are called parametric tests, because their validity depends on the distribution of the data. Before using parametric test, some preliminary tests should be performed to make sure that the test assumptions are met. In the situations where the assumptions are violated, non-parametric tests are recommended. The tests of assumptions for both healthcare workers and patients in this study were done and findings presented as follows.

3.12.1. Test of Normality

Normality tests were done to establish whether sample data had been drawn from a normally distributed population.

3.12.1.1. Test of Normality by Histogram

The main statistical tests used for analysis of clinical and experimental data are based on theoretical models that assume a normal distribution and testing data distributions for normality is an essential element of adequately describing samples and their inferential analysis.

The first step in evaluating the normality of a dataset should be to examine its histogram to identify major asymmetries, discontinuity of data, and multimodal peaks. It is also important to stress that when analyzing subsets or conducting multiple comparisons, all of the categories or subsamples being analyzed must be tested for normality, and not just the overall sample (Miot, 2017). Data is considered to be normal if Skewness is between -2 to +2 and Kurtosis is between -7 to +7. Multi-normality data tests are performed using leveling asymmetry tests (skewness < 3), (Kurtosis between -2 and 2) and Mardia criterion (< 3) (Hair & Byrne et al.. 2010).

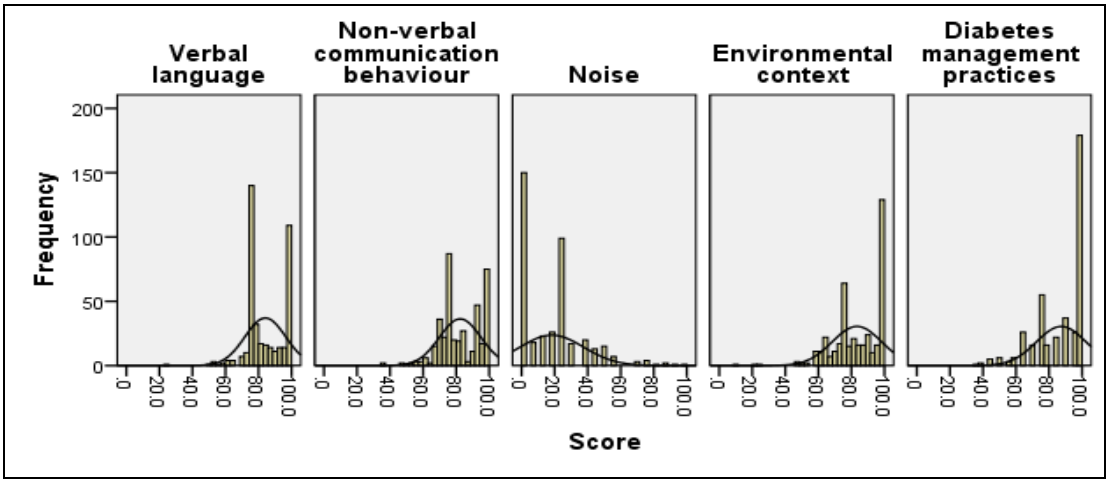


Figure 3.2: Normality of Data Distribution for Patients

Source: Field Data (2019)

The histogram as in figure 3.2, the distribution does show the normality curves of the variables of patients.

Table 3.5: Skewness and Kurtosis for Patients

Variable	Skewness	Distribution	Kurtosis	Distribution
Verbal language use	-0.171	Normal	0.081	Normal
Nonverbal communicative behaviour	-0.327	Normal	- 0.033	Normal
Noise	1.174	Normal	1.681	Normal
Environmental context	-0.814	Normal	1.192	Normal
Diabetes mellitus management practices	-1.036	Normal	0.295	Normal

Source: Field Data (2019)

As shown in the table 3.5, verbal language use, nonverbal communicative behaviour and diabetes mellitus management practices scores were normally distributed for patient. Too, noise and environmental context were within the limits hence the distributions were normal.

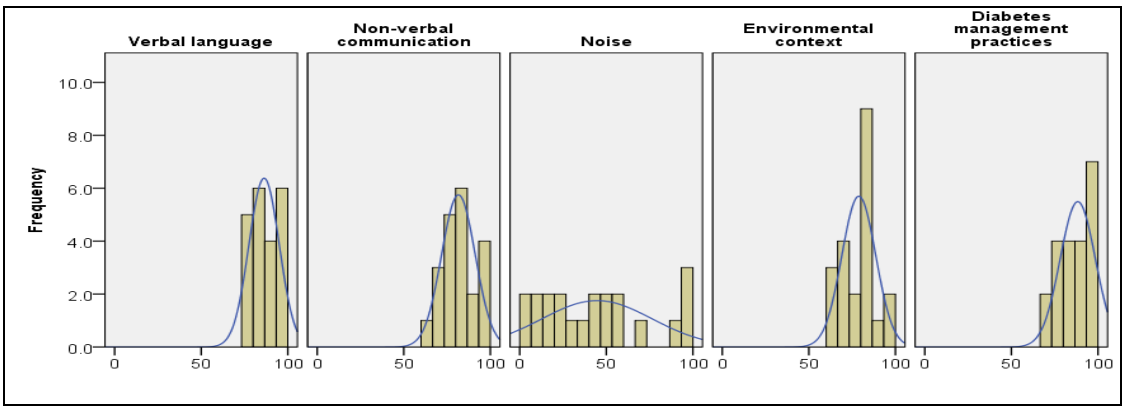


Figure 3.3: Normality of Data Distribution for Healthcare Providers

Source: Field Data (2019)

The histogram as in figure 3.3, the distribution does show the normality curves plots of the variables of healthcare providers.

Table 3.6: Skewness and Kurtosis for Healthcare Providers

Variable	Skewness	Distribution	Kurtosis	Distribution
Verbal language use	0.419	Normal	-1.113	Normal
Nonverbal communicative behaviour	0.083	Normal	-0.593	Normal
Noise	0.525	Normal	-0.684	Normal
Environmental context	-0.047	Normal	-0.748	Normal
Diabetes mellitus management practices	-0.286	Normal	-0.964	Normal

Source: Field Data (2019)

From table 3.6, the distributions of the scores were normal for healthcare providers' data as regards the normality plots in addition to skewness and kurtosis as tested. Therefore, the analysis of the pilot data as in table 3.4 and 3.4 revealed that all the data were normally distributed within the range of skewness and kurtosis scores of +/-2.

3.12.1.2. Test of Normality by Kolmogorov-Smirnova / Shapiro-Wilk

The Shapiro-Wilk test was used to test the normality of data collected as it is the most powerful test for all types of distribution and sample sizes. The Shapiro-Wilk test rejects the hypothesis of normality when the P-Value is less than or equal to 0.05. Two well-known tests of normality are the Kolmogorov-Smirnov Test and the Shapiro-Wilk Test.

The Shapiro-Wilk Test is more appropriate for small sample sizes (< 50 samples), but can also handle sample sizes as large as 2000. For this reason, we will use the Shapiro-Wilk test as our numerical means of assessing normality. If the Sig. value of the Shapiro-Wilk Test is greater than 0.05, the data is normal. If it is below 0.05, the data significantly deviate from a normal distribution.

Table 3.7: Test of Normality by Kolmogorov-Smirnova / Shapiro-Wilk for Patients

Variable	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	P value	Statistic	P value
Verbal language use	0.202	<0.001	0.846	<0.001
Nonverbal communicative behavior	0.123	<0.001	0.931	<0.001
Noise	0.205	<0.001	0.841	<0.001
Environmental context	0.146	<0.001	0.894	<0.001
Age				
Young healthcare providers	0.249	<0.001	0.811	<0.001
Older healthcare providers	0.219	<0.001	0.870	<0.001
Gender				
Female healthcare providers	0.254	<0.001	0.815	<0.001
Male healthcare providers	0.224	<0.001	0.840	<0.001
Socio economic status				
Financial status	0.225	<0.001	0.831	<0.001
Quality of life	0.206	<0.001	0.890	<0.001
Level of assets	0.267	<0.001	0.881	<0.001
Ability to save	0.260	<0.001	0.883	<0.001
Diabetes management practices	0.247	<0.001	0.813	<0.001

Source: Field Data (2019)

Table 3.7 shows tests of normality for the variables, from this table all the Shapiro-Wilk significant values are less than 0.05 showing that the data significantly deviates from the normal for all the variables. Therefore, these variables were transformed using the Log10 transformation option so as to be able to apply parametric measures.

Table 3.8: Test of Normality by Kolmogorov-Smirnova / Shapiro-Wilk for Healthcare Providers

Variable	Kolmogorov-Smirnov		Shapiro-Wilk	
	Statistic	P value	Statistic	P value
Verbal language use	0.195	0.037	0.897	0.031
Nonverbal communicative behavior	0.094	0.200	0.980	0.919
Noise	0.120	0.200	0.925	0.108
Environmental context	0.141	0.200	0.952	0.372
Age				
Young healthcare providers	0.331	<0.001	0.785	<0.001
Older healthcare providers	0.322	<0.001	0.779	<0.001
Gender				
Female healthcare providers	0.337	<0.001	0.738	<0.001
Male healthcare providers	0.331	<0.001	0.837	0.003
Socio economic status				
Financial status	0.282	<0.001	0.878	0.014
Quality of life	0.311	<0.001	0.837	0.003
Level of assets	0.282	<0.001	0.878	0.014
Ability to save	0.229	0.005	0.890	0.023
Diabetes management practices	0.208	0.018	0.888	0.020

Source: Field Data (2019)

Table 3.8 shows tests of normality for the variables. Nonverbal communicative behaviour score, noise and environment context score have Shapiro-Wilk significant values greater than 0.05 showing that they are normally distributed. The Shapiro-Wilk significant values for verbal language use, demographic characteristics (age, gender and socio economic status) and diabetes mellitus management practices are less than 0.05 showing that the data significantly deviates from the normal for the variables. Therefore, verbal language use, demographic characteristics (age, gender

and socio economic status) and diabetes mellitus management practices variables were transformed using the Log10 transformation option so as to be able to apply parametric measures.

3.12.2. Homogeneity of Variance

Homogeneity of variance (homoscedasticity) is an important assumption shared by many parametric statistical methods and this assumption requires that the variance within each population be equal for all populations (two or more, depending on the method) and the assumption is used in the two-sample t-test and ANOVA (Erjavec, 2011). The standard Student's t-test (comparing two independent samples) and the ANOVA test (comparing multiple samples) assume also that the samples to be compared have equal variances.

If the samples, being compared, follow normal distribution, then it's possible to use: F-test to compare the variances of two samples, Bartlett's Test or Levene's Test to compare the variances of multiple samples. Levene`s test tests whether the variances of two samples are approximately equal. If Sig. value is greater than 0.05, Levene`s test is non-significant so equal variances are assumed, that is, the variances are equal. If Sig. value is less than 0.05 Levene`s test is significant so equal variances are not assumed, that is, the variances are statistically and significantly different.

Table 3.9: Test of Homogeneity of Variance for Patients

		Levene's Statistic	**df1**	**df2**	**Sig.**
Diabetes mgmt.	Based on Mean	2.567	1	396	.110
	Based on Median	.257	1	396	.613
	Based on Median and with adjusted df	.257	1	370.131	.613
	Based on trimmed mean	1.785	1	396	.182

Source: Field Data (2019)

From Table 3.9, the significant value for Levene`s test based on the mean is 0.110 which is greater than p<0.05 showing that Levene`s test is non-significant and so equal variances are assumed, that is variances are equal. Therefore, parametric tests were used to test the hypotheses for patients.

Table 3.10: Homogeneity of Variance for Healthcare Providers

		Levene's Statistic	**df1**	**df2**	**Sig.**
Diabetes mgmt.	Based on Mean	1.998	1	19	.174
	Based on Median	1.730	1	19	.204
	Based on Median and with adjusted df	1.730	1	17.714	.205
	Based on trimmed mean	1.929	1	19	.181

Source: Field Data (2019)

From Table 3.10, the significant value for Levene`s test based on the mean is 0.174 which is greater than p<0.05 showing that Levene`s test is non-significant and so equal variances are assumed, that is variances are equal. Therefore, parametric tests were used to test the hypotheses for healthcare providers.

3.12.3. Test of Linearity

Linearity means that the predictor variables in the regression have a straight-line relationship with the outcome variable. If the residuals are normally distributed and homoscedastic, there should be no worry about linearity. The linearity test is a requirement in the correlation and linear regression analysis. Good research in the regression model require there to be a linear relationship between the free variable and dependent variable. If the significant value for decision making process in the deviation from linearity is p> 0.05, then the relationship between the independent variables are linearly dependent and if the value of significance in deviation from

linearity is $p<0.05$, then the relationship between independent variables with the dependent is not linear.

When multicollinearity diagnostic is considered, pairwise correlation coefficients between predictors and VIF (variance inflating factor) are the most common tools for inspection used by statisticians and epidemiologists. Some investigators use correlation coefficients cutoffs of 0.5 and above, but most typical cutoff is 0.80. Although VIF greater than 5 or VIF greater than 10 are suggested for detecting multicollinearity, there is no universal agreement as what the cut-off based on values of VIF should be used to detect multicollinearity. The statistical literature emphasizes that the main problem associated with multicollinearity includes unstable and biased standard errors leading to very unstable p-values for assessing the statistical significance of predictors, which could result in unrealistic and untenable interpretations. Multicollinearity does not affect the overall fit or the predictions of the model.

If the purpose of the regression model is to investigate associations, multicollinearity among the predictor variables can obscure the computation and identification of key independent effects of collinear predictor variables on the outcome variable because of the overlapping information they share. When the predictor variables are highly correlated the common interpretation of a regression coefficient of one predictor as measuring the change in expected value of the response variable due to one unit increase in that predictor variable when holding the other predictors constant may be practically impossible. These could lead to misleading conclusions for the role of each of the collinear predictors in the regression model. Although conducting a multicollinearity diagnosis does not solve nor lead to any specific solution of the problem, realizing its potential impact on findings from regression analysis allows a more careful interpretation of data (Vatcheva et al., 2016).

Collinearity, sometimes termed multicollinearity is usually defined as when two or more independent variables included in the model are highly correlated so that the values of one can be accurately predicted by that of another. This has clear implications for the size, perhaps the sign, and also the standard error of the

regression coefficients associated with those collinear variables, and hence for their interpretation. The result is frequently termed confounding, the situation when the relationship between two variables is distorted because of the strength of the relationships between either one or both of them and a third variable included in the analysis (Johnston, Jones & Manley, 2018).

3.12.3.1. Multicollinearity Diagnostics

The collinearity test for tolerance and VIF was done for both the patients and healthcare providers and tabulated as follows.

Table 3.11: Collinearity Statistics for Patients

Variable	Tolerance	VIF
Verbal language	0.538	1.860
Non-verbal communicative behavior	0.450	2.221
Noise	0.704	1.421
Environmental context	0.539	1.855
Age		
Young healthcare providers	0.384	2.605
Older healthcare providers	0.323	3.099
Gender		
Female healthcare providers	0.313	3.200
Male healthcare providers	0.305	3.280
Socio economic status		
Financial status	0.380	2.630
Quality of life	0.421	2.377
Level of assets	0.391	2.555
Ability to save	0.414	2.413

Source: Field Data (2019)

As shown in the table 3.11, tolerance values for the predictor variables were greater than the 0.2 cut-off and the VIF (variance inflating factor) was lower than 5.

Therefore, there was no multicollinearity detected among the variables hence inferences from the results findings would be deemed to be reliable.

Table 3.12: Collinearity Statistics for Healthcare Providers

Variable	Tolerance	VIF
Verbal language	1.000	1.000
Non-verbal communicative behavior	0.809	1.236
Noise	0.991	1.009
Environmental context	0.959	1.043
Age		
Young healthcare providers	0.983	1.017
Older healthcare providers	0.937	1.067
Gender		
Female healthcare providers	0.987	1.013
Male healthcare providers	0.982	1.018
Socio economic status		
Financial status	0.998	1.002
Quality of life	0.925	1.081
Level of assets	0.991	1.009
Ability to save	0.973	1.027

Source: Field Data (2019)

As shown in the table 3.12, tolerance values for the predictor variables were greater than the 0.2 cut-off and the VIF (variance inflating factor) was lower than 5. Therefore, there was no multicollinearity detected among the variables, thus the two conditions were met, hence the statistical inferences to be made from the data findings could be deemed as highly reliable and there is no multicollinearity problem.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1. Introduction

In this chapter, data analysis will be described and presented pertaining to the effect of healthcare provider patient communication on the management practices of diabetes mellitus in selected hospitals in Kenya. The specific objectives for the study included: 1) To establish the effect of verbal language use on diabetes mellitus management practices in selected hospitals in Kenya. 2) To determine the effect of nonverbal communicative behaviour on diabetes mellitus management practices in selected hospitals in Kenya. 3) To examine the effects of noise on diabetes mellitus management practices in selected hospitals in Kenya. 4) To investigate the effect of environmental context on diabetes mellitus management practices in selected hospitals in Kenya. 5) To find out the moderating effect of demographic characteristics on diabetes mellitus management practices in selected hospitals in Kenya.

The analyses are presented in different phases. The first part captures the demographic characteristics of the study participants. The second part outlines the clinical outcomes of the patients who participated in the study. The third part is on how the patients' found the communication with the healthcare providers. The fourth part deals with how the healthcare providers found the communication with the patients. Thereafter, this chapter gives an analysis of the first objective of verbal language use during the interaction between the healthcare providers and the patients. It then presents the second objective which was to analyse nonverbal communicative behaviour in healthcare provider patient communication in regard to diabetes mellitus management practices. The chapter also presents findings of the third objective on the effect of noise in healthcare communication between the healthcare providers and the patients. The fourth objective analyses the environmental context in which healthcare provider patient communication took place. Finally, the fifth objective on demographic characteristic is presented with the aim of understanding its moderating effect in healthcare provider patient

communication on diabetes mellitus management practices. In addition, the fifth part is on regression analysis of the independent variables in relation to the dependent variable. The sixth part of the chapter is on hypothesis testing to determine the rejection or failure of rejection of the null hypothesis.

Data was collected and edited to ensure conformity and keyed into a computer. The data was then analyzed after it was posted by a computer data base developed using statistical package for social sciences (SPSS). Participants' characteristics were summarized using percentages and means or medians for categorical and continuous data respectively. Comparisons were done using chi-square test of association for categorical variables and the independent t-test for comparison of means. The section therefore presents an outcome on nature of communication between the patients and healthcare providers during their interactions using descriptive and inferential statistical analysis. This is first done on how the patients found the healthcare providers communication and vice versa on each of the variables. This will be done in the context of the theoretical framework that involved uncertainty reduction theory and communication accommodation theory.

4.2. Socio Demographic Characteristics

4.2.1. Response Rate

A total of 421 participants, 400 patients with diabetes mellitus aged 18 years and above and 21 healthcare providers who attended to the patients at the diabetes and endocrinology Centre's of both Kenyatta National Hospital and MP Shah Hospital were involved in the study as is depicted in table 4.1. 313 patients with 11 HCPs at KNH and 87 patients with 10 HCPs at MP Shah respectively were studied between the months of February 2019 and November 2019. Overall, there were 166 (41.5%) males and 234(58.5%) females in regard to patients, while for HCPs; there were 7(33.3%) males and 14(66.7%) females. Overall, a response rate of 100% for patients and 100% for healthcare providers was achieved. 400 and 21 questionnaires for patients and healthcare providers respectively were sufficiently completed.

At KNH, there were 14 HCPs at the diabetes centre against the initial projected 12 as in the sampling frame. Of the 14 HCPs, 11HCPs participated in the study, hence a response rate of 78.57% can be said to have been achieved; but given the initial target of 12, then 91.7% response rate was achieved in regard. One doctor did not participate as she had proceeded on maternity and subsequently took the annual leave. One nurse did not participate as she was on sick leave and afterwards proceeded on annual leave. The only nutritionist at the diabetes centre did not participate as did not meet the selection criteria requirements, since had only worked there for less than one year. 100% response rate was achieved for the patients.

Table 4.1: Distribution of Study Participants (Healthcare Providers / Patients at Diabetes Mellitus Clinics, Kenyatta National Hospital / MP Shah Hospital)

Healthcare Providers	**Kenyatta National Hospital**			**MP Shah Hospital**			**Total**		
	Target	**Actual**	**Response rate (%)**	**Target**	**Actual**	**Response rate (%)**	**Target**	**Actual**	**Response rate (%)**
Doctors	4	3	**75**	4	5	**125**	8	8	**100**
Clinical officers	2	2	**100**	0	0	**0**	2	2	**100**
Nurses	5	6	**120**	3	3	**100**	8	9	**112.5**
Nutritionists	1	0	**0**	2	2	**100**	3	2	**66.7**
Subtotal	12	11	**91.7**	9	10	**111**	21	21	**100**
Patients	313	313	**100**	87	87	**100**	400	400	**100**
Total	325	324	**99.7**	96	97	**101**	421	421	**100**

Source: Field Data (2019)

At MP Shah Hospital, a response rate of 100% or more, specifically 111% for healthcare providers was achieved since all healthcare providers who met the criteria at the diabetes centre participated in the study. Though, according to the sampling frame, the projected number of HCPs was 9, the 10 HCPs working at the diabetic center participated. 100% response rate was achieved for the patients. This high response rate at both study centers was achieved as a result of the researcher being involved at every stage of data collection from the time of issuing to collection of the questionnaires.

4.2.2. Socio Demographic Characteristics of Patients

Table 4.2: Socio demographic characteristics of patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n %	Female (n=190) n %	P value
Gender		-	-	-
Male	123 (39.3)			
Female	190 (60.7)			
Age				
Mean (SD)	59.3 (14.0)	61.2 (14.4)	58.1 (13.7)	0.053
Min – Max	18 – 92	22-92	18-86	
Age groups				
18-27	6 (1.9)	4 (3.3)	2 (1.1)	**0.047**
28-37	12 (3.8)	2 (1.6)	10 (5.3)	
38-47	41 (13.1)	9 (7.3)	32 (16.8)	
48-57	71 (22.7)	29 (23.6)	42 (22.1)	
58-67	83 (26.5)	35 (28.5)	48 (25.3)	
>67	100 (31.9)	44 (35.8)	56 (29.5)	
Marital status				
Single	36 (11.5)	8 (6.5)	28 (14.7)	**< 0.001**
Married	228 (72.8)	113 (91.9)	115 (60.5)	
Separated	3 (1.0)	0	3 (1.6)	
Divorced	3 (1.0)	0	3 (1.6)	
Widowed	43 (13.7)	2 (1.6)	41 (21.6)	
Highest level of education	22 (7.0)	5 (4.1)	17 (8.9)	**0.010**
None	116 (37.1)	37 (30.1)	79 (41.6)	
Primary	116 (37.1)	55 (44.7)	61 (32.1)	
Secondary	40 (12.8)	14 (11.4)	26 (13.7)	
College	19 (6.1)	12 (9.8)	7 (3.7)	
University				
Occupation				
Professional	76 (24.5)	34 (27.6)	42 (22.5)	**< 0.001**
Business personnel	118 (38.0)	44 (39.9)	75 (39.6)	
Technical personnel	19 (6.1)	15 (12.2)	4 (2.1)	
Skilled personnel	38 (12.3)	24 (19.5)	14 (7.5)	
Unskilled personnel	55 (17.7)	6 (4.9)	49 (26.2)	
Learner	4 (1.3)	0	4 (2.1)	
Religion				
Catholic	100 (31.9)	41 (33.3)	59 (31.1)	0.581
Protestant	201 (64.2)	79 (64.2)	122 (64.2)	
Muslim	5 (1.6)	2 (1.6)	3 (1.6)	
Other	7 (2.2)	1 (0.8)	6 (3.2)	

Source: Field Data (2019)

As shown in table 4.2 above, three hundred and thirteen (313) diabetic patients with a mean age of 59.3 years (SD 14 years) were studied at KNH. There were 190 (60.7%) females with a mean age of 58.1years (SD13.7) and 123(39.3%) males with a mean age of 61.2 years (SD14.4), hence males being insignificantly older than females, p=0.053. The youngest patient was 18 years and the oldest 92 years old. In regard to males the youngest was 22 years and the oldest was 92years and for females the youngest was 18 years and the oldest 86 years.

The majority of patients in age group distribution were 67 years and above (100(31.9%)) with proportionately more males (44(35.8%)) than the females (56((29.5%)). This was followed by those in the age group 58-67 years with proportionately more males (35(28.5%)) than the females (48(25.3%)). Except for the 28-37 and 38-47 year age groups where female patients were proportionately and significantly more than the male patients, there were significantly more male than female patients in the other age group distributions, p=0.047.

Majority of the patients were married (72.8%) being significantly higher in males (91.9%) than in females (60.5%), p<0.001. Overall, the highest level of education was mainly primary (37.1%) and secondary (37.1%) with significantly more males compared to females having secondary and university level of education, p=0.010. On the other hand, significantly more females reported primary level, college level and no education than males, p=0.010.

Occupation was mainly of professional work (24.5%) and business (38%). As regards professionals, business personnel, unskilled personnel and learners; there were significantly more females than males and vice versa for the technical personnel and skilled personnel differences, p< 0.001. In regard to religion the majority of the patients were of Catholic (31.9%) and Protestant (64.2%) denominations with the female patients insignificantly more in each category than the male patients.

Table 4.3: Socio demographic characteristics for patients at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (43) n %	Female (44) n %	P value
Gender				
Male	43 (49.4)	-	-	-
Female	44 (50.6)			
Age				
Mean (SD)	55.5 (10.0)	57.5 (6.9)	53.5 (12.0)	0.061
Min – Max	19.0 – 79.0	34-72	19-79	
Age groups				
18-27	1 (1.1)	0	1 (2.3)	0.188
28-37	5 (5.7)	1 (2.3)	4 (9.1)	
38-47	5 (5.7)	1 (2.3)	4 (9.1)	
48-57	38 (43.7)	18 (41.9)	20 (45.5)	
58-67	31 (35.6)	20 (46.5)	11 (25.0)	
>67	7 (8.0)	3 (7.0)	4 (9.1)	
Marital status				
Single	10 (11.5)	0	10 (22.7)	**0.008**
Married	72 (82.8)	41 (95.3)	31 (70.5)	
Separated	1 (1.1)	0	1 (2.3)	
Divorced	1 (1.1)	1 (2.3)	0	
Widowed	3 (3.4)	1 (2.3)	2 (4.5)	
Highest level of education	4 (4.6)	1 (2.3)	3 (6.8)	0.137
Primary	10 (11.5)	4 (9.3)	6 (13.6)	
Secondary	23 (26.4)	8 (18.6)	15 (34.1)	
College	50 (57.5)	30 (69.8)	20 (45.5)	
University				
Occupation				
Professional	60 (71.4)	35 (85.4)	25 (58.1)	0.114
Business personnel	15 (17.9)	4 (9.8)	11 (25.6)	
Technical personnel	2 (2.4)	1 (2.4)	1 (2.3)	
Skilled personnel	4 (4.8)	1 (2.4)	3 (7.0)	
Unskilled personnel	2 (2.4)	0	2 (4.7)	
Learner	1 (1.2)	0	1 (2.3)	
Religion				
Catholic	22 (25.6)	9 (21.4)	13 (29.5)	0.109
Protestant	52 (60.5)	26 (61.9)	26 (59.1)	
Muslim	5 (5.8)	1 (2.4)	4 (9.1)	
Other	7 (8.1)	6 (14.3)	1 (2.3)	

Source: Field Data (2019)

At MP Shah in table 4.3, 87 diabetic patients with a mean age of 55.5 years (SD 10 years) were studied; 50.6% were females and 49.4% males. Males were insignificantly older (mean age, 57.5 years) than females (mean age, 53.5 years), p=0.061. The youngest male was 34years with the oldest being 72years while for the females, the youngest was 19 years and the oldest 79 years. In the age group distribution, the majority of patients were in the age group of 48 -57 years, 38(43.7%) followed by those in the age group of 58-67 years, 31(35.6%). The majority of the males were in the age group of 58-67 years, 20(46.5%), followed with the ones in age group 48-57 years, 18(41.9%). Majority of the females were in the age group of 48-57 years, 20(45.5%), followed with the ones in the age group 58-67 years, 11(25%). No significant difference was noted by genders in the age group distributions.

Majority of the patients were married and divorced which was significantly higher in males than females and vice versa for those who were single, separated and widowed p=0.008. Highest level of education was university education (57.5%) and the lowest was primary education (4%). Occupation of the patients was mainly of professional work (71.4%). As for religion, the majority of patients were of Catholic (25.6%) and Protestant (60.5) denominations. There were no significant differences between male and female patients in all categories of occupation and religion.

Table 4.4: Comparison of socio demographic characteristics between patients at Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) n (%)	MP Shah (n=87) n (%)	P value
Gender			
Male	123 (39.3)	43 (49.4)	0.090
Female	190 (60.7)	44 (50.6)	
Age, mean (SD)	59.3 (14.0)	55.5 (10.0)	**< 0.001**
Category, n (%)			
18-27	6 (1.9)	1 (1.1)	**0.009**
28-37	12 (3.8)	5 (5.7)	
38-47	41 (13.1)	5 (5.7)	
48-57	71 (22.7)	38 (43.7)	
58-67	83 (26.5)	31 (35.6)	
>67	100 (31.9)	7 (8.0)	
Marital status			
Single	36 (11.5)	10 (11.5)	**0.050**
Married	228 (72.8)	72 (82.8)	
Separated	3 (1.0)	1 (1.1)	
Divorced	3 (1.0)	1 (1.1)	
Widowed	43 (13.7)	3 (3.4)	
Highest Level of Education			
None	22 (7.0)	0	**< 0.001**
Primary	116 (37.1)	4 (4.6)	
Secondary	116 (37.1)	10 (11.5)	
College	40 (12.8)	23 (26.4)	
University	19 (6.1)	50 (57.5)	
Occupation			
Professional	76 (24.5)	60 (71.4)	**< 0.001**
Business personnel	117 (38.0)	15 (17.9)	
Technical personnel	19 (6.1)	2 (2.4)	
Skilled personnel	38 (12.3)	4 (4.8)	
Unskilled personnel	55 (17.7)	2 (2.4)	
Lerner	4 (1.3)	1 (1.2)	
Religion			
Catholic	100 (31.9)	22 (25.6)	**0.008**
Protestant	201 (64.2)	52 (60.5)	
Muslim	5 (1.6)	5 (5.8)	
Other	7 (2.2)	7 (8.1)	

Source: Field Data (2019)

Gender distribution among patients was not significantly different between KNH and MP Shah Hospital, p=0.090 as in table 4.4. On age, the patients at KNH were significantly older as compared to patients at MP Shah Hospital with an average age of 59.3years as compared to 55.5 years respectively (p<0.001). There were significantly more patients in the 18-27, 38-47 and >67years age group distribution at KNH than MP Shah Hospital and vice versa in the age groups of 28-37, 48-57 and 58-67years, p=0.009. Though with no significant difference in gender distribution between the two hospitals, there were more male patients in percentage ratio at MP Shah Hospital (49.4%) than those at KNH (39.3%). The female patients were more in percentage ratio at KNH accounting for 60.7% compared to 50.6% female patients at MP Shah Hospital.

What then accounts for the differences in both the age group and gender percentage proportionate between the two hospitals? The reasons could probably be adduced to affordability of the services by the patients. Since most of those above 67 years of age are likely to be in retirement and not so much actively involved in gainful income generating activities could hence explain the situation as seen at KNH. Those between 48 years and 67 years are most likely to be in active employment and additionally likely to be financially stable. In regard to gender, it is likely that as bread winners the male patients are more likely than the female patients to be more financially stable and thus cater for such medical needs in comparison to the female gender. This could be possible reasons for the proportionately higher percentage of patients at MP Shah Hospital in these age groups in comparison to those at KNH.

Of the other sociodemographic characteristics, a higher proportion of patients were married at MP Shah Hospital than KNH, while those who were widowed were more at KNH (p=0.050). Education level was significantly higher among patients at MP Shah Hospital than at KNH (p<0.001) and they were more likely to be in professional work (p<0.001). Similarly, there were significantly higher proportions of Muslims and other religions at MP Shah Hospital than at Kenyatta National Hospital (p=0.008) and vice versa for the catholic and protestant religious domination. Whether religion would be a critical factor sociodemographically in the

management of diabetes mellitus is an area that requires more exploration to make a viable conclusion in regard.

Past studies have reported outcomes on SDFs as is in this study. Finding by Obirikorang, et al, (2016) are in tandem with the current study on the various demographic factors. The past study reported that the mean age of the general type 2 diabetic (T2D) patients was 55.28 ± 14.71 years. A higher proportion (46.9 %) of them was between the ages of 40–59 years. There were more female (61.5 %) than male (38.5 %). 73.8 % were married. 97.7 % had no socio-economic income, 78.5 % were unschooled, and 71.5 % had less than 5 year's duration of T2D. Other than on education where the unschooled were of a high percentage in comparison to the current study where those who had no education were 7% as reported at KNH, the other sociodemographic are comparably within the percentage range.

The foregoing analysis on the sociodemographic factors of patients overall in Kenya and by hospital is essential in relation to the dynamics of the communication interactions between the healthcare providers and the patients on diabetes mellitus management practices as will be seen later in the chapter. This is augmented well by Baltaci et al, 2013 study that for satisfaction with patient-physician communication, statistically significant differences were observed in patients' sociodemographic features such as marital status, education level, income level, occupation and gender but not existence of chronic diseases and age groups. This hence highlights the salient role the socio demographic characteristics play in healthcare provider patient communication.

4.2.3. Socio Demographic Characteristics of Healthcare Providers

Table 4.5: Socio demographic characteristics of healthcare providers at Kenyatta National Hospital and MP Shah Hospital

Variable	Overall (n=21) n (%)	KNH (n=11) n (%)	MP Shah (n=10) n (%)	P value
Gender				
Male	6 (28.8)	3 (27.3)	3 (30.0)	1.000
Female	15 (71.4)	8 (72.7)	7 (70.0)	
Age in years				
Mean (SD)	42.5 (9.0)	48.6 (8.0)	35.9 (3.9)	**<0.001**
Min – Max	30-59	37-59	30-42	
Category, n (%)				
<30	0	0	0	**0.007**
30-34	3 (14.3)	0	3 (30.0)	
35-39	8 (38.1)	3 (27.3)	5 (50.0)	
40-44	2 (9.5)	0	2 (20.0)	
45-49	2 (9.5)	2 (18.2)	0	
50-54	2 (9.5)	2 (18.2)	0	
>=55	4 (19.0)	4 (36.4)	0	
Work duration in years				
Median (IQR)	2.5 (2.0-14.5)	10.0 (4.0-21.0)	2.0 (2.0-2.5)	**0.001**
Min – Max	1.5-45.0	2.0-45.0	1.5-3.0	

Source: Field Data (2019)

As in table 4.5, a total of twenty-one (21) healthcare providers (HCPs) with an average age of 42.5 years were studied, eleven (11) HCPs from Kenyatta National Hospital and ten (10) HCPs from MP Shah Hospital. The average age at Kenyatta National Hospital for HCPs was 48.6 years which was significantly higher than the average age of 35.9 years for HCPs at MP Shah hospital ($p<0.001$). The majority of HCPs (71.4%) were females, a finding similarly replicated at the two hospitals

though with Kenyatta National Hospital having eight (8) females, hence insignificantly but proportionately more than those at MP Shah Hospital of seven (7) females. In regard to age group category, the majority of HCPs at KNH were above 55 years of age, followed by those in age group 35-39years.

At MP Shah Hospital, the majority were in the age group 35-39years followed by those in the age group 30-34 years. There were significantly more HCPs in given age groups at MP Shah Hospital than KNH and vice versa, p=0.007**.** The median duration of working for healthcare providers at Kenyatta National Hospital was ten (10) years which was significantly higher in comparison with that of healthcare providers at MP Shah Hospital of two (2) years, p=0.001.

But what could possibly explain these differences between KNH, a public Hospital and MP Shah, a private Hospital. It could be in the fact that in public facilities, employment is rather permanent and pensionable with a projected retirement age, hence healthcare provider feel secure. While in the private hospitals, the terms of employment are contractual in most instances subject to renewal and termination of service could happen without much notice by either party. Another reason could be that the healthcare providers in private hospitals are more likely to seek greener pastures where the remunerations are better and therefore unlikely to stay with an employee for long.

These findings are reinforced by Scott, Holte and Witt (2020) who noted that physicians preferred to work in the public sector even though the value of working in the public sector was very small. Those with relatively low earnings preferred public sector work and those with high earnings preferred private sector work. Additionally, Mohammad, 2014 found that public hospital physicians were not motivated to improve their communication skills as they realized that their communication skills were not linked to their income level. Thus, they were unlikely to change their attitude and behavior and had to work in other hospitals as well to be able to afford living expenses.

4.3. Clinical Characteristics / Outcomes

In this section, the patients' activities in regard to the daily demands of diabetes mellitus with the resulting effects - medical / psychological - and the outcomes in view of communication interactions with the healthcare providers are analysed and discussed. This characteristics / outcomes are to great extend a revelation of their relation to the impact of healthcare provider patient communication on the management practices overtime as shall be shown later in this chapter/thesis.

4.3.1. Age of diagnosis / treatment and or management / duration attended DM clinic

Table 4.6: Age of diagnosis / Treatment and or Management / Duration attended DM clinic among patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n (%)	Female (n=190) n (%)	P value
Age of diagnosis				
Mean (SD)	46.3 (15.1)	47.8 (14.4)	45.5 (15.5)	0.188
Duration with diabetes				
Median (IQR)	11 (5-19)	12 (5-21)	11 (5-18)	0.420
Category				
1-5 years	85 (27.2)	36 (29.3)	49 (25.8)	0.125
6-10 years	64 (20.4)	22 (17.9)	42 (22.1)	
11-15 years	54 (17.3)	15 (12.2)	39 (20.5)	
>15 years	110 (35.1)	50 (40.7)	60 (31.6)	
On any treatment/management	312 (99.7)	123 (100)	189 (99.5)	1.000
Yes	1 (0.3)	0	1 (0.5)	
No				
Dietary therapy				
Yes	232 (74.4)	96 (78.0)	136 (72.0)	0.229
No	80 (25.6)	27 (22.0)	53 (28.0)	
Exercises				
Yes	225 (72.1)	89 (72.4)	136 (72.0)	0.939
No	87 (27.9)	34 (27.6)	53 (28.0)	
Drug treatment				
Yes	299 (95.8)	118 (95.9)	181 (95.8)	0.942
No	13 (4.2)	5 (4.1)	8 (4.2)	
Monitoring of glycaemic control	245 (78.5)	96 (78.0)	149 (78.8)	0.869
Yes	67 (21.5)	27 (22.0)	40 (21.2)	
No				
Clinic follow up attendance	287 (92.0)	111 (90.2)	176 (93.1)	0.360
Yes	25 (8.0)	12 (9.8)	13 (6.9)	
No				
Duration attending DM clinic				
Median (IQR)	8.0 (4.0-16.0)	8.0 (4.0-17)	8.0 (3.0-15)	0.738
Duration				
1-5	115 (36.7)	51 (41.5)	64 (33.7)	0.122
6-10	74 (23.6)	22 (17.9)	52 (27.4)	
11-15	43 (13.7)	14 (11.4)	29 (15.3)	
>15	81 (25.9)	36 (29.3)	45 (23.7)	

Source: Field Data (2019)

As shown in table 4.6, the mean age of diagnosis of diabetes mellitus in patients at KNH was 46.3 years. The male patients were diagnosed at an older age (47.8 years) than the female patients (45.5 years). The median duration of illness with diabetes mellitus was 11 years for the entire study population of 313 patients while by gender, 12 years for males and 11 years for females respectively.

The majority of patients (35.1%) had had diabetes mellitus for duration of more than fifteen (15) years. All except one (1) of the patients were on diabetes treatment or management (99.7%); 74.4% being on dietary therapy, 72.1% on exercises and 95.8% on drugs. Monitoring of glycaemic control was done among 78.5% of the patients. 92% had regular follow up attendance at the clinic. The median duration attending DM clinic by the patients was 8.0 (4.0-16.0) years. There was no significant difference between male and female patients in regard to the clinical / medical outcomes at KNH.

Table 4.7: Age of diagnosis / treatment and or management /duration attended DM clinic among patients at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (n=43) n (%)	Female (n=44) n (%)	P value
Age of diagnosis				
Mean(SD**)**	47.0 (11.1)	48.7 (8.7)	45.4 (13.0)	0.161
Duration with diabetes				
Median (IQR)	7 (3-12)	7 (2-14)	7 (3-11)	0.993
Duration				
1-5 years	34 (39.1)	19 (44.2)	15 (34.1)	0.190
6-10 years	27 (31.0)	10 (23.3)	17 (38.6)	
11-15 years	11 (12.6)	4 (9.3)	7 (15.9)	
>15 years	15 (17.2)	10 (23.3)	5 (11.4)	
On any treatment/management				
Yes	87 (100)	-	-	
No				
Dietary therapy				
Yes	71 (81.6)	36 (83.7)	35 (79.5)	0.615
No	16 (18.4)	7 (16.3)	9 (20.5)	
Exercises				
Yes	67 (77.0)	34 (79.1)	33 (75.0)	0.652
No	20 (23.0)	9 (20.9)	11 (25.0)	
Drug treatment				
Yes	85 (97.7)	42 (97.7)	43 (97.7)	1.000
No	2 (2.3)	1 (2.3)	1 (2.3)	
Monitoring of glycaemic control	77 (88.5)	39 (90.7)	38 (86.4)	0.739
Yes	10 (11.5)	4 (9.3)	6 (13.6)	
No				
Clinic follow up attendance	78 (89.7)	38 (88.4)	40 (90.9)	0.739
Yes	9 (10.3)	5 (11.6)	4 (9.1)	
No				
Duration attending DM clinic	2.0 (1.5 – 3.0)	2.0 (1.5-2.6)	2.0 (2.0-4.0)	0.436
Median (IQR)				
Duration	75 (86.2)	38 (88.4)	37 (84.1)	0.493
1-5 years	10 (11.5)	4 (9.3)	6 (13.6)	
6-10 years	1 (1.1)	0	1 (2.3)	
11-15 years	1 (1.1)	1 (2.3)	0	
>15 years				

Source: Field Data (2019)

As in table 4.7, the mean age of diagnosis of diabetes in patients at MP Shah Hospital was 47.0 years. The male patients were diagnosed at an older age (48.7 years) than the female patients (45.4 years). The median duration of illness with diabetes mellitus was 7 years for the entire patient sample and similarly so by gender.

The majority of patients (39.1%) had had diabetes mellitus for duration of between 1 to 5 years. All patients were on diabetes treatment or management (100%); 81.6% being on dietary therapy, 77% on exercises and 97.7% on drugs. Monitoring of glycaemic control was done among 88.5% of the patients, 89.7% had regular follow up attendance at the clinic. The median duration attending DM clinic was 2.0 (1.5 – 3.0) that was similarly observed by gender. There was no significant difference between male and female patients in relation to the clinical / medical outcomes at MP Shah Hospital.

Table 4.8: Comparison of age of diagnosis / treatment and or management / duration attended diabetes mellitus clinic among patients between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) n (%)	MP Shah (n=87) n (%)	P value
Age of diagnosis			
Mean(SD)	46.3 (15.1)	47.0 (11.1)	**0.002**
Duration with diabetes			
Median (IQR)	11 (5-19)	7 (3-12)	**<0.001**
Category			
1-5 years	85 (27.2)	34 (39.1)	**0.002**
6-10 years	64 (20.4)	27 (31.0)	
11-15 years	54 (17.3)	11 (12.6)	
>15 years	110 (35.1)	15 (17.2)	
On any treatment/management			
Yes	312 (99.7)	87 (100)	1.000
No	1 (0.3)	0	
Dietary therapy			
Yes	232 (74.4)	71 (81.6)	0.162
No	80 (25.6)	16 (18.4)	
Exercises			
Yes	225 (72.1)	67 (77.0)	0.362
No	87 (27.9)	20 (23.0)	
Drug treatment			
Yes	299 (95.8)	85 (97.7)	0.539
No	13 (4.2)	2 (2.3)	
Monitoring of glycaemic control			
Yes	245 (78.5)	77 (88.5)	**0.037**
No	67 (21.5)	10 (11.5)	
Clinic follow up attendance			
Yes	287 (92.0)	78 (89.7)	0.491
No	25 (8.0)	9 (10.3)	
Duration attending DM clinic			
1-5 years	115 (36.7)	75 (86.2)	**< 0.001**
6-10 years	74 (23.6)	10 (11.5)	
11-15 years	43 (13.7)	1 (1.1)	
>15 years	81 (25.9)	1 (1.1)	
Median (IQR)	8.0 (4.0-16.0)	2.0 (1.5 – 3.0)	**< 0.001**

Source: Field Data (2019)

In table 4.8, patients at MP Shah Hospital were diagnosed at a significantly older age (p=0.002) and a significantly higher proportion of them monitored their glycaemic control (p=0.037) compared to the patients at KNH. On the other hand, patients at KNH had had diabetes for a significantly longer duration than those at MP Shah Hospital, p<0.001 with a median duration with diabetes of 11 (5-19) years for KNH and 7 (3-12) years for MP Shah Hospital. This is consistent with Arambewela et al, 2018 findings whereby the mean age and disease duration were 58.3 ± 10.3 and 10.8 ± 7 years, respectively.

Proportionately and significantly more patients had had diabetes for a duration of 11-15 years and >15 years at KNH in comparison to MP Shah hospital while on the other hand for duration of 1-5 years and 6-10 years at MP Shah Hospital in comparison to KNH (p=0.002). The patients at KNH had been on follow up for diabetes for a significantly longer duration than those at MP Shah Hospital (p<0.001) with a median duration of 8 years for KNH and 2 years for MP Shah Hospital. There was no significant difference in all the other clinical/medical outcomes between the two hospitals.

Past study findings on clinical / medical outcomes in regard to diabetes mellitus management practices do concur on some of the findings as reported above. On dietary therapy, Dworatzek et al, (2013) documented that nutrition therapy can improve glycemic control and when used with other components of diabetes care, can further improve clinical and metabolic outcomes. This would result in reduced hospitalization rates and this was seen in the patients' clinical and medical outcomes in the current study with favourable scores of 74.4% for Kenyatta National Hospital (KNH) and 81.6% for MP Shah Hospital. It is thus an indication that a majority of patients engaged in dietary therapy, a finding that is in tandem with the high score ratings by patients at both hospital.

According to Wabe, Angamo, & Hussein (2011), adherence rate for medication of diabetes vary between 36% and 93% worldwide and this, though a little low reflects well with the current study findings of 95.8% for KNH and 97.7% for MP Shah hospital. The researcher in that study stressed on the need for regular appraisal of

drug prescribing and better monitoring of patient adherence with prescribed anti diabetic drugs and other diabetes self-management practices.

However, some past studies differ with the current study findings on nutrition and medication. Garcia-Pérez et al, 2013 intimated that despite strong clinical recommendations for individuals with a history of diabetes to adopt a healthier lifestyle, adherence to improved diet and exercise was poor. Mulder et al, 2014 weighed in with the argument that changing diet is often experienced as the most difficult part of managing diabetes and that adhering to physical activity guidelines can be equally difficult. The researcher further noted that at least 60% of diabetic patients were insufficiently active and acknowledged that perhaps even more worrying was that approximately 40% of people with diabetes take less than 80% of prescribed drugs, with an average adherence of 58%.

Wermeling et al, 2014 averred of the most serious problem according to study participants was the incompatibility of the dietary recommendations with daily life and their views of eating culture. As a consequence the researcher argued for healthcare providers to explore their patients' capabilities of self-management in open communication and accept their wish to protect nutrition as part of their culture. This thereby presupposed cultural competence on the part of the healthcare provider when discussing dietary therapy with the patients.

Studies on physical activity /exercise differ in their findings when compared with findings of this study that showed outcomes of 72.1% for KNH and 77% for MP Shah Hospital given that the study participants had attended the two hospitals for durations of one year or more as in the past studies. Mori et al, 2011 found that 50% of participants with diabetes dropped out of an exercise program within 3 months, and only 10% were still exercising 1 year later. Garcia-Pérez et al, 2013 was of the view that despite evidence for the benefits of exercise, adherence to long-term exercise programs varied between 10% and 80%, particularly in the long term, that gave an average of 45% and given the percentage range, then the study finding compares fairly well with the current study findings.

Parajuli, Saleh, Thapa & Ali, 2014 on physical activity reported nonadherence of 42.1%, with still only 21.3% of the study population having good adherence level and the remaining 36.6% only poorly adherent. Other than the study by Mori et al, 2011 where still no reason was noted for the low percentage finding, the other studies involved only type 2 diabetes, what probably could explain for the differences when related to the current study that did not differentiate patients by type of diabetes mellitus.

On follow up clinic attendance, Chew et al, (2015) reported that 5.4% were lost to follow-up and 0.4% patients had died, meaning that 94.2% of the participants in the study adhered to clinic attendance follow ups as scheduled. This finding favourably compares with the current study findings of 92% at the Kenyatta National Hospital and 89.7% at MP Shah Hospital as presented earlier. According to Dworatzek et al, 2013, compared with patients who were under active follow-up, men who were neither on insulin nor on antiplatelet agents, having higher HbA1c, higher LDL-C and complications were all associated with follow up nonattendance (FUNA). This does put weight on the critical need of clinic follow ups adherence and why communicating this aspect to a patient is paramount.

4.3.2. Other Medical Condition(s) and/or Complication(s)

According to Abejew, Belay & Kerie, 2015, the common causes of diabetic complications are poor control of diabetes either due to nonadherence, poor attitude towards the disease and its complications, unhealthy diet, insufficient physical activity and due to poor management by the health care professionals. Thus, this calls for prevention which is regarded the most cost effective than treatment and management of diabetic complications. This then places communication between the patients and the healthcare providers at the very core of ensuring optimal diabetes mellitus management practices.

The findings in this section brings out what patients reported in the course of management of diabetes mellitus over the duration as from the time of diagnosis to the very time as they interacted with the healthcare providers, hence gives a baseline overview of the ensuing outcome in regard. The analysis of outcome on other

medical condition(s) and/or complication(s) shall also be discussed later in this section together with findings on monitoring of glycaemic control to see how they relate and compare. This is because it is informative of the occurrences of the other medical conditions and or complication in regard to good or poor glycaemic control in the patients.

Table 4.9: Other medical conditions and / or complications among patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n %	Female (n=190) n %	P value
Other medical condition				
Yes	214 (68.4)	91 (74.0)	123 (64.7)	0.086
No	99 (31.6)	32 (26.0)	67 (35.3)	
Hypertension				
Yes	165 (77.5)	68 (74.7)	97 (78.9)	0.409
No	48 (22.5)	23 (25.3)	26 (21.1)	
Heart disease				
Yes	19 (8.9)	13 (14.3)	6 (4.9)	**0.017**
No	195 (91.1)	78 (85.7)	117 (95.1)	
Kidney disease				
Yes	14 (6.5)	7 (7.7)	7 (5.7)	0.558
No	200 (93.5)	84 (92.3)	116 (94.3)	
Stroke				
Yes	11 (5.1)	2 (2.2)	9 (7.3)	0.122
No	203 (94.9)	89 (97.8)	114 (92.7)	
Sexual dysfunction				
Yes	30 (14.0)	29 (31.9)	1 (0.8)	<
No	184 (86.0)	62 (68.1)	122 (99.2)	**0.001**
Foot ulcer				
Yes	13 (6.1)	5 (5.5)	8 (6.5)	0.760
No	201 (93.9)	86 (94.5)	115 (93.5)	
Eye disease				
Yes	68 (31.8)	29 (31.9)	39 (31.7)	0.980
No	146 (68.2)	62 (68.1)	84 (68.3)	
Amputation				
Yes	8 (3.7)	2 (2.2)	6 (4.9)	0.471
No	206 (96.3)	89 (97.8)	117 (95.1)	
Others				
Yes	23 (10.7)	12 (13.2)	11 (8.9)	0.322
No	191 (89.3)	79 (86.8)	112 (91.1)	
Treatment for medical conditions / complications				
Yes	187 (59.7)	80 (65.0)	109 (57.4)	0.175
No	126 (40.3)	43 (35.0)	81 (42.6)	

Source: Field Data (2019)

In table 4.9 above, 68.4% of the patients at KNH reported having other medical conditions and/or complications besides diabetes mellitus and was higher in male (74%) than female (64.7%) patients. Hypertension was the most commonly reported at 77.6% followed by eye disease (31.8%). Heart disease was reported among 8.9% of the patients being significantly higher (14.3%) in males than females (4.9%), p=0.017. Sexual dysfunction was reported by 14% and was significantly higher in males (31.9%) than females (0.8%), p<0.001. Over half (59.7%) of the patients were on treatment for the reported medical conditions and/or complications and was higher in male (65%) than female patients (57.4%). No significant differences were noted in the other medical conditions and/or complications at KNH.

Table 4.10: Duration with other medical condition and /or complications at Kenyatta National Hospital

	Duration in years				
	<1 year	**1-2 years**	**3-4 years**	**>5 years**	**Don't remember**
Other Medical Condition(s) and/or Complication(s)	**No (%)**	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Hypertension	6 (3.6)	20 (12.1)	19 (11.5)	117 (70.9)	3 (1.8)
Heart disease	1 (5.3)	5 (26.3)	5(26.3)	8 (42.1)	
Kidney disease	1 (7.1)	3 (21.4)	5(35.7)	5 (35.7)	
Stroke	0	4 (36.4)	3 (27.3)	3(27.3)	1 (9.1)
Sexual dysfunction	1 (3.3)	9 (30.0)	4 (13.3)	16 (53.3)	
Foot ulcer	1 (7.7)	6 (46.2)	2 (15.4)	4 (30.8)	
Eye disease	2 (2.9)	16 (23.5)	13 (19.1)	35 (51.5)	2 (2.9)
Amputation	0	2 (25.0)	1 (12.5)	3 (37.5)	2 (2.9)
Others	1 (4.3)	7 (30.4)	2 (8.7)	6 (26.1)	7 (30.4)

Source: Field Data (2019)

Table 4.10 shows that the majority of patients who had had other medical conditions and/or complications for durations of more than 5 years were in regard to

hypertension with 70.9% (117 patients), sexual dysfunctions with 53.3% (16 patients), eye disease with 51.5% (35 patients), heart disease with 42.1% (8 patients) and amputation with 37.5% (3 patients); for kidney disease, the duration was of 3-4 years and >5 years with 35.7% (5 patients) in each; stroke for 1-2 years with 36.4% (4 patients), foot ulcers for 1-2 years with 46.2% (6 patients), and 1-2 years for others with 30.4% (7 patients) and 15 patients in total could not remember the duration of medical conditions and /or complications.

Table 4.11: Other medical conditions and/or complications among patients at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (n=43) n (%)	Female (n=44) n (%)	P value
Other medical condition				
Yes	43 (49.4)	21 (48.8)	22 (50.0)	0.914
No	44 (50.6)	22 (51.2)	22 (50.0)	
Hypertension				
Yes	25 (58.1)	12 (57.1)	13 (59.1)	0.897
No	18 (41.9)	9 (42.9)	9 (40.9)	
Heart disease				
Yes	2 (4.7)	2 (9.5)	0	0.233
No	41 (95.3)	19 (90.5)	22 (100)	
Kidney disease				
Yes	5 (11.6)	4 (19.0)	1 (4.5)	0.185
No	38 (88.4)	17 (81.0)	21 (95.5)	
Stroke				
Yes	2 (4.7)	1 (4.8)	1 (4.5)	1.000
No	41 (95.3)	20 (95.2)	21 (95.5)	
Sexual dysfunction				
Yes	8 (18.6)	7 (33.3)	1 (4.5)	**0.021**
No	35 (81.4)	14 (66.7)	21 (95.5)	
Foot ulcer				
Yes	2 (4.7)	2 (9.5)	0	0.233
No	41 (95.3)	19 (90.5)	22 (100)	
Eye disease				
Yes	11 (25.6)	6 (28.6)	5 (22.7)	0.661
No	32 (74.4)	15 (71.4)	17 (77.3)	
Amputation				
Yes	1 (2.3)	1 (4.8)	0	0.488
No	42 (97.7)	20 (95.2)	22 (100)	
Others				
Yes	7 (16.3)	2 (9.5)	5 (22.7)	0.412
No	36 (83.7)	19 (90.5)	17 (77.3)	
Treatment for medical conditions / complications				
Yes	34 (39.1)	2 (9.5)	19 (43.2)	0.124
No	53 (60.9)	19 (90.5)	25 (56.8)	

Source: Field Data (2019)

In table 4.11, 49.4% of the patients had other medical conditions with majority (60.5%) reporting hypertension. Eye disease and sexual dysfunction were reported in 25.6% and 18.6% of the patients respectively. Sexual dysfunction was significantly higher in males (33.3%) than females (4.5%), p=0.021. Patients on treatment for the

medical conditions and/or complications were 39.1%. No significant difference was noted in regard to other medical conditions and/or complications between the genders at the hospital.

Table 4.12: Duration with other medical conditions and/or complications at MP Shah Hospital

	Duration in years				
	<1 year	**1-2 years**	**3-4 years**	**>5 years**	**Don't remember**
Other Medical Condition(s) and/or Complication(s)	**No (%)**	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Hypertension	0	7 (28.0)	0	15 (88.0)	3 (12.0)
Heart disease	0	2 (100.0)	0	0	
Kidney disease	0	1 (20.0)	1 (20.0)	1 (20.0)	2 (40.0)
Stroke	1 (50.0)	1(50.0)	0	0	
Sexual dysfunction	1 (12.5)	2 (25.0)	4 (50.0)	0	1 (12.5)
Foot ulcer	0	1 (50.0)	0	1 (50.0)	
Eye disease	0	6 (54.5)	1 (9.1)	3 (27.3)	1 (9.1)
Amputation	0	0	1 (100.0)	0	
Others	0	0	4 (57.1)	3 (42.9)	

Source: Field Data (2019)

In table 4.12, in regard to duration with the medical condition and/or complication: for more than 5 years duration was reported for hypertension with 88% (15 patients); 3-4 years for sexual dysfunctions with 50% (4 patients), 3-4 years for amputation with 100% (1 patient), 1-2 years and > 5years for foot ulcers with 50% and one(1) patient in each, 1-2 years, 3-4 years and >5 years for kidney disease with 20% and one (1) patient in each, 1-2 years for heart disease with 100% (2 patients), 1-2 years for eye disease with 54.5% (6 patients), < 1 year and 1-2 years for stroke with 50% and one (1) patient in each and 3-4 years for others with 57.1% (4 patients) and there

were 7 patients in total who could not remember the duration of the medical conditions and /or complications.

Table 4.13: Comparisons of other medical conditions and/or complications among patients between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) n (%)	MP SHAH (n=87) n (%)	P value
Any other medical condition			
Yes	214 (68.4)	43 (49.4)	< **0.001**
No	99 (31.6)	44 (50.6)	
Hypertension			
Yes	166 (77.6)	26 (60.5)	**0.019**
No	48 (22.4)	17 (39.5)	
Heart disease			
Yes	19 (8.9)	2 (4.7)	0.543
No	195 (91.1)	41 (95.3)	
Kidney disease			
Yes	14 (6.5)	5 (11.6)	0.332
No	200 (93.5)	38 (88.4)	
Stroke			
Yes	11 (5.1)	2 (4.7)	1.000
No	203 (94.9)	41 (95.3)	
Sexual dysfunction			
Yes	30 (14.0)	8 (18.6)	0.439
No	184 (86.0)	35 (81.4)	
Foot ulcer			
Yes	13 (6.1)	2 (4.7)	1.000
No	201 (93.9)	41 (95.3)	
Eye disease			
Yes	68 (31.8)	11 (25.6)	0.422
No	146 (68.2)	32 (74.4)	
Amputation			
Yes	8 (3.7)	1 (2.3)	1.000
No	206 (96.3)	42 (97.7)	
Others			
Yes	23 (10.7)	7 (16.3)	0.303
No	191 (89.3)	36 (83.7)	
Treatment for medical conditions /complications			
Yes	187 (59.7)	34 (39.1)	< **0.001**
No	126 (40.3)	53 (60.9)	

Source: Field Data (2019)

Table 4.13 indicate that the patients with other medical conditions and/or complications were significantly higher at KNH (68.4%) than at MP Shah Hospital

(49.4%), ($p<0.001$). Patients reporting hypertension were significantly higher at KNH (77.6%) than MP Shah Hospital (60.5%), ($p=0.019$). Occurrences of all the other medical conditions and/or complications of heart disease, stroke, sexual dysfunction, kidney disease, foot ulcers, eye disease, amputation and others not specifically stated were not significantly different between the two hospitals. Patients reporting of being on treatment for other medical conditions and/or complications was significantly higher at KNH than MP Shah Hospital ($p<0.001$).

Past studies tend to relate reasonably with above findings. Abejew, Belay & Kerie, 2015 reported that more than half of the study sample (59.7%) of the patients had experienced at least one complication. This affirms the current study finding on those who had experienced any other medical condition or complication that was an average of 59.4% of the overall total sample. The percentages of patients with complications at each of the hospital were within that range. Hypertension (43.3%) prevalence among patients was lower than in the current study. Visual (eye) disturbance (28.9%) was comparably within the range with an average of 28.7% of the two hospitals total sample.

Obirikorang, et al, 2016 study outcome contrasts in some areas with the current study on the proportion of complication by diabetic patients. Diabetic foot (foot ulcer) (51.5 %) was quite high compared to the current study with hypertension (35.4 %) being quite low. Sexual dysfunctions represented by hypoactive sexual arousal (25.4 %) and arousal disorder (21.5 %) were comparable though a little higher than in the present study. Retinopathy (17.7 %) was well within range of the current study outcome that was slightly higher. Heart disease (9.2 %), and nephropathy (kidney disease) (5.4 %) findings were within the range of the present study.

The above findings though with slight variance do compare well with Arambewela et al, 2018 on presence of the complications of stroke, diabetic retinopathy (eye disease), nephropathy (kidney disease), diabetic foot(foot ulcer), and lower extremity amputation (LEA) that were 1.1%, 26.1%, 50.8%, 2.6%, and 1.3%, respectively. Prevalence of hypertension was 77.6% that accurately affirms the current study outcome. Occurrence of CAD (like stroke), diabetic foot, and LEA (amputation) was

significantly higher among males when compared to females as is in the case at MP Shah Hospital and vice versa for KNH where the findings differed. Thus, in respect, the current study does highlight the major burden of diabetes mellitus complications in this DM population.

4.3.3. Psychological Problem and/or Life Been Affected

Young-Hyman et al, 2016 found that the complex environmental, social, behavioral and emotional factors do greatly influence living with diabetes mellitus and also achieving satisfactory medical outcomes and psychological well-being. Thus, individuals with diabetes are challenged with complex, multifaceted issues when integrating diabetes care into daily life, an aspect that shall be discussed and demonstrated in the data as analysed below.

Table 4.14: Psychological problems experienced and/or life been affected by patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n (%)	Female (n=190) n (%)	P value
Psychological problem and/or life affected				
Yes	165 (52.7)	58 (47.2)	107 (56.3)	0.113
No	148 (47.3)	65 (52.8)	83 (43.7)	
Lifestyle changes				
Yes	106 (64.2)	35 (60.3)	71 (66.4)	0.442
No	59 (35.8)	23 (39.7)	36 (33.6)	
Financial effects				
Yes	114 (69.1)	45 (77.6)	69 (64.5)	0.082
No	51 (30.9)	13 (22.4)	38 (35.5)	
Marital conflict				
Yes	16 (9.7)	14 (24.1)	2 (1.9)	**< 0.001**
No	149 (90.3)	44 (75.9)	105 (98.1)	
Family conflict				
Yes	10 (6.1)	2 (3.4)	8 (7.5)	0.497
No	155 (93.9)	56 (96.6)	99 (92.5)	
Anxiety				
Yes	62 (37.6)	21 (36.2)	41 (38.3)	0.789
No	103 (62.4)	37 (63.8)	66 (61.7)	
Depression				
Yes	34 (20.6)	11 (19.0)	23 (21.5)	0.701
No	131 (79.4)	47 (81.0)	84 (78.5)	

Source: Field Data (2019)

As shown table 4.14 above, 52.7% of the patients at KNH reported psychological problems or life having been affected due to diabetes mellitus. These were mainly lifestyle changes (64.2%) and financial effects (69.1%). A substantial proportion of patients experienced anxiety (37.6%) and depression (20.6%). There were no significant differences between male and female patients in most of the experienced psychological problems and/or life having been affected as a result of diabetes mellitus. However, marital conflict was significantly higher as experienced by male (24.1%) compared to female (1.9%) patients, $p<0.001$.

Table 4.15: Duration with psychological problems and/or life been affected by patients at Kenyatta National Hospital

	Duration in years				
	<1 year	**1-2 years**	**2-3 years**	**3-4 years**	**>5 years**
Psychological Problem and/or Life Been Affected	**No (%)**	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Lifestyle changes	5 (4.8)	14 (13.3)	3 (2.9)	13 (12.4)	70 (66.7)
Financial effects	8 (7.0)	10 (8.8)	6 (5.3)	14 (12.3)	76 (66.7)
Marital conflict	0	1 (6.3)	1 (6.3)	2 (12.5)	12 (75.0)
Family conflict	0	2 (20.0)	2 (20.0)	6 (60)	0
Anxiety	13 (21.3)	9 (14.8)	3 (4.9)	7 (11.5)	29 (47.5)
Depression	5 (14.7)	5 (14.7)	1 (2.9)	6 (17.6)	17 (50.0)

Source: Field Data (2019)

The highest duration of psychological problems experienced and/or life been affected by patient as appears in table 4.15 was more than five years in regard to lifestyle changes at 66.7% (70 patients), financial effects at 66.7% (76 patients), marital conflict at 75% (12 patients), anxiety at 47.5% (29 patients) and depression at 50% (17 patients) while it was 3-4 years for family conflict of 60% (6 patients).

Table 4.16: Psychological problems experienced and/or life affected by patients at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (n=43) n %	Female (n=44) n %	P value
Psychological problem and/or life affected	51 (58.6)	23 (53.5)	28 (63.6)	0.337
Yes	36 (41.4)	20 (46.5)	16 (36.4)	
No				
Lifestyle changes				
Yes	41 (80.4)	21 (91.3)	20 (71.4)	0.091
No	10 (19.6)	2 (8.7)	8 (28.6)	
Financial effects				
Yes	38 (74.5)	17 (73.9)	21 (75.0)	0.929
No	13 (25.5)	6 (26.1)	7 (25.0)	
Marital conflict				
Yes	9 (17.6)	4 (17.4)	5 (17.9)	1.000
No	42 (82.4)	19 (82.6)	23 (82.1)	
Family conflict				
Yes	5 (9.8)	2 (8.7)	3 (10.7)	1.000
No	46 (90.2)	21 (91.3)	25 (89.3)	
Anxiety				
Yes	21 (41.2)	8 (34.8)	13 (46.4)	0.400
No	30 (58.8)	15 (65.2)	15 (53.6)	
Depression				
Yes	10 (19.6)	3 (13.0)	7 (25.0)	0.480
No	41 (80.4)	20 (87.0)	21 (75.0)	

Source: Field Data (2019)

In table 4.16, it was noted that 58.6% of the patients at MP Shah Hospital had psychological problems and/or life had been affected due to diabetes mellitus. The effects were mainly lifestyle changes (80.4%) and financial effects (74.5%) with a substantial proportion reporting anxiety (41.2%) and depression (19.6%). There were no significant differences between male and female patients in the experienced psychological problems and/or life having been affected.

The above findings at KNH and MP Shah Hospital closely reflect Penckofer, Ferrans, Velsor-Friedrich & Savoy, 2007 that approximately 25% of persons with diabetes have depression, and the rate of depression in women with diabetes is double than that of men with diabetes. The prevalence of anxiety in persons with diabetes was reported to be as high as 30% to 40% showing consistency with this study finding. The research study still indicated that women with diabetes had significantly higher levels of anxiety than men (55% vs 33%, $P < .0001$), a finding not in line with the current study outcome where the female gender had insignificantly higher levels than the male gender.

Katon, 2008 in a meta-analysis research study demonstrated that 11% of patients with diabetes met the criteria for comorbid major depressive disorder (MDD) and 31% experienced significant depressive symptoms; in addition, the prevalence of depression in patients with diabetes was significantly higher in women than men (28% and 18%, respectively; $P <0.0001$). This differs with the current study on gender where though proportionately more female patients than the male patients had depression; it was not significant. It should however be noted that the prevalence differences in Katon study was due to categorization of depression by types.

Table 4.17: Duration with psychological problems and/or life been affected by patients at MP Shah Hospital

	Duration in years				
	<1 year	**1-2 years**	**2-3 years**	**3-4 years**	**>5 years**
Psychological Problem and/or Life Been Affected	**No (%)**	**No (%)**	**No (%)**	**No (%)**	**No (%)**
Lifestyle changes	1 (2.5)	5 (12.5)	3 (7.5)	9 (22.5)	22 (55.0)
Financial effects	4 (10.5)	6 (15.8)	8 (21.1)	20 (52.6)	0
Marital conflict	2 (22.2)	2 (22.2)	2 (22.2)	3 (33.3)	0
Family conflict	1 (20.0)	1 (20.0)	1 (20.0)	2 (40.0)	0
Anxiety	5 (25.0)	2 (10.0)	4 (20.0)	2 (10.0)	7 (35.0)
Depression	2 (20.0)	3 (30.0)	1 (10.0)	4 (40.0)	0

Source: Field Data (2019)

As in table 4.17, the highest duration of psychological problems experienced and/or life been affected by patients was of more than five years in regard to lifestyle changes with 55% (22 patients) and anxiety with 35% (7 patients). It was 3-4 years for financial effects with 52.6% (20 patients), marital conflict with 33.3% (3 patients) and family conflict with 40% (2patients) as well as for depression with 40% (4 patients).

Table 4.18: Comparison of psychological problems experienced and/or life been affected by patients between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) n (%)	MP SHAH (n=87) n (%)	P value
Psychological problem or effect			
Yes	165 (52.7)	51 (58.6)	0.328
No	148 (47.3)	36 (41.4)	
Lifestyle changes			
Yes	106 (64.2)	41 (80.4)	**0.031**
No	59 (35.8)	10 (19.6)	
Financial effects			
Yes	114 (69.1)	38 (74.5)	0.459
No	51 (30.9)	13 (25.5)	
Marital conflict			
Yes	16 (9.7)	9 (17.6)	0.121
No	149 (90.3)	42 (82.4)	
Family conflict			
Yes	10 (6.1)	5 (9.8)	0.354
No	155 (93.9)	46 (90.2)	
Anxiety			
Yes	62 (37.6)	21 (41.2)	0.644
No	103 (62.4)	30 (58.8)	
Depression			
Yes	34 (20.6)	10 (19.6)	0.877
No	131 (79.4)	41 (80.4)	

Source: Field Data (2019)

The occurrence of psychological problems and/or life been affected following diagnosis and subsequent management of diabetes mellitus as in table 4.18 was not significantly different between patients at KNH and MP Shah Hospital. However, on the specific problems or life effects, no significance differences were noted in almost

all the areas except in lifestyle changes in which proportionately and significantly more patients reported psychological problems and/or life had been affected at MP Shah Hospital (80.4%) as compared to KNH (64.2%), p=0.031.

This means that patients at MP Shah Hospital had to make huge adjustments in their lifestyles. This is more likely to be explained by nature of communication in regard to the management of diabetes mellitus with their healthcare providers as will likely be shown by the results on the various communication variables later on. Financial effects were also reported by a majority of patients with a higher proportion of 74.5% at MP Shah Hospital in comparison to 69.1% at KNH. Marital conflicts, family conflicts, anxiety and depression were reported by a very low percentage of patients, though with proportionately more patient at MP Shah Hospital as compared to KNH with the exception of depression.

The overall findings at KNH and MP Shah Hospital though higher than Balhara, 2011 finding of up to 45% of the cases of mental disorder and severe psychological distress going undetected among patients with diabetes mellitus tend to allude to the high prevalence of psychological effects as in this current study population. Gebre, Anand & Assefa, 2020 revealed the magnitude of depression among DM patient to be 41.5% which was high compared to the finding of this study.

On the other hand, Darwish et al, 2018 outcome concur with the current study. It revealed that about 18%–25% of people with T2DM met DSM criteria for a major depressive episode, prevalence at least double that is found in the general population. Though, it should be taken into consideration that the study population was of mainly of type 2 DM unlike the current study which did not delineate the patient into types of diabetes mellitus. Garcia-Pérez et al, 2013 study findings noted that communication between patients and healthcare providers resolved patient distress, again an indication of the role of communication in healthcare practice in DM management.

4.3.4. Monitoring of Glycaemic Control

In this section, the findings were to establish the glycaemic control viz-a-viz random blood sugar, fasting blood sugar and glycated haemoglobin as recorded at the time of diagnosis, to the second (previous) measure of one (1) year ago, to the most recent (today's) measure. This was to realise the blood sugar levels of within normal range (good control) and above normal range (poor control) in lieu of the standard established normal blood sugar range measures.

Thus, the earlier analysed findings in this chapter on clinical/medical outcomes are further discussed in regard to the nature of blood sugar control among patients at KNH and MP Shah Hospital as shown in table 4.22, 4.23 and 4.24 below in relation to the finding of monitoring of glycaemic control of patients as analysed earlier in table 4.6, 4.7 and 4.8.

The current study did bring out findings as already noted in table 4.8 which showed that a high percentage of patients monitored their glycaemic control, 78.5% at Kenyatta National Hospital and 88.5% at MP Shah Hospital. These findings have slight variance in regard to the management of diabetes mellitus at the two hospitals and are reflected in the findings on blood sugar control parameters at the two hospitals as shown later in table 4.23 in this section. Though first, a description of the general blood sugar measure findings of patients at the two hospitals shall be done hitherto as of the analysed results tabulated in tables 4.19, 4.20, and 4.21 below.

4.3.4.1. Random / Fasting blood sugar / Glycated Hemoglobin Measurements

Table 4.19: Random / Fasting blood sugar / Glycated Hemoglobin of patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n (%)	Female (n=190) n (%)	P value
Random Blood Sugar Measure				
First (at diagnosis) measure(n=266)	20.2 (11.0)	21.8 (13.3)	19.1 (9.2)	**0.048**
Second (one year ago) measure (n=295)	9.1 (4.4)	9.1 (4.9)	9.1 (4.0)	0.867
Today's (most recent) measure (n=301)	9.7 (5.2)	8.9 (4.1)	10.2 (5.7)	**0.031**
Fasting blood sugar level				
Previous measure (one year ago) (n=127)	7.1 (3.2)	7.2 (4.1)	7.1 (2.5)	0.923
Today's (most recent) measure (n=129)	6.8 (2.8)	6.8 (2.6)	6.9 (2.9)	0.923
Glycated hemoglobin				
Previous measure (one year ago) (n=164)	8.6 (3.7)	8.2 (3.8)	8.8 (3.6)	0.374
Today's (most recent) measure (n=154)	8.4 (2.9)	8.1 (2.7)	8.6 (8.0)	0.354

Source: Field Data (2019)

In table 4.19, the overall mean of first measure of RBS at the time of diagnosis was 20.2mmol/l, and observed to be significantly higher in male (mean 21.8mmol/l) than in female (mean 19.1mmol/l) patients, p=0.048. The mean of most recent RBS (at time of data collection or today's) measure was 9.7 mmol/l, being significantly higher in female (mean 10.2 mmol/l) than in male (mean 8.9 mmol/l) patients,

p=0.031. The mean of the second measure (one year ago) was 9.1 mmol/l, hence there was no significant difference by gender. The means of the previous FBS and HbA1c were 7.1mmol/l and 8.6% respectively while that of the most recent FBS and HbA1c were 6.8 mmol/l and 8.4% respectively and with no significant difference by gender

Table 4.20: Random / Fasting blood sugar / Glycated Hemoglobin of patients at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (n=43) n %	Female (n=44) n %	P value
Random Blood Sugar Measure				
First(at diagnosis) measure (n=76)	17.5 (6.7)	17.5 (6.9)	17.5 (6.6)	0.997
Second(one year ago) measure (n=81)	9.8 (6.3)	10.7 (8.2)	9.0 (3.7)	0.239
Today's (most recent) measure (n=71)	7.5 (2.8)	7.7 (3.2)	7.3 (2.4)	0.592
Fasting blood sugar level				
Previous measure (one year ago) (n=83)	7.8 (2.6)	7.6 (2.7)	7.9 (2.6)	0.88
Today's (most recent) measure (n=83)	6.4 (1.6)	6.1 (1.6)	6.6 (1.5)	0.163
Glycated hemoglobin				
Previous measure (one year ago) (n=87)	8.8 (2.5)	8.5 (2.5)	9.1 (2.5)	0.266
Today's (most recent) measure (n=83)	7.8 (2.0)	7.4 (1.9)	8.2 (1.9)	0.071

Source: Field Data (2019)

As shown in table 4.20, the means of the first measure RBS was 17.5mmol/l with the second measure RBS being 9.8mmol/l. The previous measure of FBS was 7.8mmol/l and that of HbAIc 8.8%. The most recent RBS, FBS and HbA1c measures among patients were 7.5 mmol/l, 6.4 mmol/l and 7.8% respectively. The means of all the blood sugar level measures for patients at MP Shah Hospital had no significant differences by gender.

Table 4.21: Comparison of random / Fasting blood sugar / Glycated Haemoglobin of patients between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH Overall (n=313) n (%)	MP SHAH Overall (n=87) n (%)	P value
Random Blood Sugar Measure			
First (at diagnosis) measure	20.2 (11.0)	17.5 (6.7)	**0.043**
Second (one year ago) measure	9.1 (4.4)	9.8 (6.3)	0.222
Today's (most recent) measure	9.7 (5.2)	7.5 (2.8)	< **0.001**
Fasting blood sugar level			
Previous measure (one year ago)	7.1 (3.2)	7.8 (2.6)	0.117
Today's (most recent) measure	6.8 (2.8)	6.4 (1.6)	0.164
Glycated hemoglobin			
Previous measure (one year ago)	8.6 (3.7)	8.8 (2.5)	0.566
Today's (most recent) measure	8.4 (2.9)	7.8 (2.0)	0.084

Source: Field Data (2019)

The mean scores of RBS as shown in table 4.21 were within the normal in all measures apart from the first RBS measures taken at diagnosis that were way above the normal with a mean of 20.2 (SD11.0) at KNH and a mean of 17.5(SD 6.7)) at MP Shah Hospital. The first measures (one year ago) of FBS, 7.1(SD 3.2) at KNH; 7.8 (2.6) at MP Shah and Glycated hemoglobin (HbAIC) of 8.6% at KNH; 8/4% at MP Shah were also above the normal at both hospitals. Today's (most recent) measures

of FBS 6.8(SD 2.8) at KNH; 6.4(SD 1.6) at MP Shah were within normal range while that of HbAIC 8.4% at KNH; 7.8% at MP Shah were above normal.

Comparisons between the two hospitals noted that the mean score of today's (most recent) measure of RBS was significantly higher among patients at KNH than those at MP Shah Hospital, $p<0.001$. Similarly, there was significant difference on the mean score of the first measure (at diagnosis) of RBS, being higher at KNH than at MP Shah Hospital ($p=0.043$). This means the score ratings of random blood sugar control on these two measures were lower among patients at MP Shah Hospital than at KNH. All the other blood sugar measures of FBS and HbAIC were not significantly different between the two hospitals with findings of within normal blood sugar levels on today's (most recent) measure of FBS, though with an indication of above normal blood sugar levels on the first measures (one year ago) of FBS and HbAIC, but with today's (most recent) measure of HbAIC being above normal blood sugar levels.

4.3.4.2. Glycaemic Control in Patients

In this section, the foregoing blood sugar measures as reported by patients are analysed further to delineate the proportion of patients who were within good control and poor control. This is in regard to the standard normal blood sugar parameters of the three types of measures as tabulated in the table and discussed below.

Table 4.22: Random / Fasting blood sugar / Glycated Haemoglobin control in patients at Kenyatta National Hospital

Variable	Overall (n=313) n (%)	Male (n=123) n (%)	Female (n=190) n (%)	P value
RBS				
Normal (<11.1 mmol/l)	224 (74.4)	93 (79.5)	131 (71.2)	0.108
High (>=11.1 mmol/l)	77 (25.6)	24 (20.5)	53 (28.8)	
FBS				
Normal (<7 mmol/l)	72 (55.8)	26 (53.1)	46 (57.5)	0.622
High (>=7 mmol/l)	57 (44.2)	23 (46.9)	34 (42.5)	
HbA1C				
Normal (< 6.5DCCT %)	37 (34.0)	14 (22.6)	23 (25.0)	0.730
High (>=6.5DCCT %)	117 (76.0)	48 (77.4)	69 (75.0)	

Source: Field Data (2019)

As in table 4.22, 224(74.4%) patients at KNH had their RBS parameters within the normal range with proportionately more male (79.5%) than the female (71.2%) patients compared to the ones whose blood sugar levels were above the normal range (25.6%). 72(55.8%) of the patients had their FBS levels within the normal range with 57(44.2%) being above the normal range, with proportionately more female patients having the parameters within the normal range than the male patients. For HbAIC, 117(76%) of the patients were above the normal range with proportionately more male than female patients above the normal range as compared to those within the normal range of 37(34%). Though the foregoing results as reported, there was no significant difference by gender.

Table 4.23: Random / Fasting blood sugar / Glycated Haemoglobin at MP Shah Hospital

Variable	Overall (n=87) n (%)	Male (n=43) n (%)	Female (n=44) n (%)	P value
RBS				
Normal (<11.1 mmol/l)	61 (85.9)	30 (83.3)	31 (88.6)	0.735
High (>=11.1 mmol/l)	10 (14.1)	6 (16.7)	4 (11.4)	
FBS				
Normal (<7 mmol/l)	58 (69.9)	31 (75.6)	27 (64.3)	0.261
High (>=7 mmol/l)	25 (30.1)	10 (24.4)	15 (35.7)	
HbA1C				
Normal (< 6.5DCCT %)	20 (24.1)	14 (32.6)	6 (15.0)	0.062
High (>=6.5DCCT %)	63 (75.9)	29 (67.4)	34 (85.0)	

Source: Field Data (2019)

No significant differences were observed by gender in the blood sugar parameter measurements as appears in table 4.23 above. 61(85.9%) of patients had their RBS levels within the normal range as compared with 10(14.1%) patients whose parameters were above. Proportionately more female than male patients had the RBS within normal range.

In regard to FBS, 58(69.9%) of patients were in the normal range whereas 25(30.1%) were above, with proportionately more male than the female patients having had the FBS in the normal range. The HbAIC outcome for patients showed that 63(75.9%) of the patients were above the normal range with 20(24.1%) being within the normal range with more female than male patients having had the HbAIC above normal range.

Table 4.24: Comparison of Random / Fasting blood sugar / Glycated Haemoglobin control in patients between KNH and MP Shah Hospital

Variable	KNH n (%)	MP Shah n (%)	P value
RBS			
Normal (<11.1 mmol/l)	224 (74.4)	61 (85.9)	**0.040**
High (>=11.1 mmol/l)	77 (25.6)	10 (14.1)	
FBS			
Normal (<7 mmol/l)	72 (55.8)	58 (69.9)	**0.040**
High (>=7 mmol/l)	57 (44.2)	25 (30.1)	
HbA1C			
Normal (< 6.5DCCT %)	37 (24.0)	20 (24.1)	0.990
High (>=6.5DCCT %)	117 (76.0)	63 (75.9)	

Source: Field Data (2019)

In table 4.24, the monitoring of glycaemic control in patients showed that on RBS, 74.4% of patients at KNH and 85.9% at MP Shah Hospital were well within the normal blood sugar range. While on FBS, 55.9% at KNH and 69.9% at MP Shah Hospital were within the normal range. In regard, proportionately and significantly more patients at MP Shah Hospital were within the normal blood sugar range than those at KNH on both RBS and FBS and viceversa for those with high blood sugar levels (p=0.040). Though no significant difference was noted in regard to HbAIC, most of patients had parameters above the normal range at the two hospitals, 76% at KNH and 75.9% at MP Shah Hospital.

But as can be noted from the findings as discussed above on blood sugar control, the HbAIC finding show that majority of the patients were poorly controlled in spite of the findings on other blood sugar measures of RBS and FBS and the reported monitoring of glycaemic control by patients. This did bring in another aspect of what the findings were as a result and in regard to other medical conditions and / or complication after having been diagnosed with diabetes mellitus as earlier presented and described. Just as reported in other studies, research findings of this study did

isolate the various kinds of other medical conditions and/or complications developed following diagnosis and subsequent management of diabetes mellitus as already be analysed and reported earlier in the chapter.

These findings just as earlier reported by patients on the monitoring of glycaemic control in table 4.6, 4.7 and 4.8 are fairly comparable with the percentages on blood sugar control findings, hence having a concurrence in regard to RBS but fairly above for the FBS. As for HbAIC, a high percentage of patient studied were within poor control range, 76% at KNH and 75.9% at MP Shah Hospital, a finding that is contrary to the monitoring of glycaemic control findings as reported by the patients at KHN (78.5%)) and MP Shah hospital (88.5%) as shown in table 4.8. This is because it would be expected that if the patients monitored their blood sugars, then equally most of them would be in the normal ranges which is not the case. This then means monitoring your blood sugar levels does not translate to being within the normal control range.

The findings are comparable to Mwavua et al, 2016 study who found that the level of glycemic control, as documented by HbA1c levels was poor and less than 20 % of clients were well controlled. Too, Mulder et al, 2014 found that less than 20% of T2DM patient reach all three targets for blood glucose (HbA1C), lipids levels, and blood pressure. What this present study is telling us is that more focus needs to be placed on HbAIC as a measure of glycaemic control as it is becoming one main reliable measure of blood sugar control in practice. It should also be noted that HbAIC is not usually monitored by patients while away from the hospital and only done when they attend the designated follow-ups clinics. This is largely due to cost implications and the unavailability of the service in the nearby healthcare facilities from where these patients come from. In addition, the test cannot be done by the patients themselves while at home even when their clinic dates are of long durations in between. Though, this unusual outcome on HbAIC could still be explained by the fact that the monitoring of glycaemic control as reported by patients is a general outcome on blood sugar control or glycaemic control and not specific to any particular of its parameters. However, this finding is supported by Chew et al, 2015 study findings on HbAIC that stated that having higher HbA1c and complications were associated with

follow up non-attendance. Mulder et al, 2014 concurred and reported that many type 2 diabetes mellitus patients were found to have difficulties reaching optimal blood glucose control with less than 20% of T2DM patient reaching all three targets for blood glucose (HbA1C), lipids levels, and blood pressure. Mwavua, 2016 study at a Tertiary Referral Hospital and a Regional Hospital in Central Kenya reported that the level of glycemic control, as documented by HbA1c levels was poor and comparable at both facilities as less than 20 % of clients were well controlled.

Hence in the present study as reported above, HbAIC results were within poor control in patients at both hospitals, a possible indicator for the would-be reasons as to the presence of other medical conditions / complications and psychological problems as reported by the patients. Past research study findings do allude to an almost similar concurrence on the significance of glycaemic control. Leroux et al (2002) put forth that glycemic control was a primary goal for diabetic patients. According to Hapunda, Abubakar, van de Vijver and Pouwer (2015), this tend to prevent acute and chronic complications of diabetes; this was achieved when treatment and care was optimized by patients with diabetes and their health care team by achieving and/or maintaining a good level of glycemic control.

Aikens, Bingham and Piette (2005) noted that diabetes-specific provider patient communication was associated with glycemic control with Parchman et al, 2009 stressing that communication competence of the primary care physician was associated with A1c levels in patients with type 2 diabetes. Garcia-Pérez et al, 2013 postulated that patients who were more informed about treatment options and decisions improved adherence and glycemic control and showed that medication nonadherence was associated with higher HbA1c, blood pressure, and LDL cholesterol levels.

4.3.5. Patient Satisfaction in the Nature of Communication with Healthcare Providers

This section will go on to establish how the patients felt about the communication dynamics with the healthcare providers they had interacted with overtime and to what degree of satisfaction this nature of communication was as noted in the tables 4.25,

4.26 and 4.27 below. This was first done at each of the hospitals and subsequently comparisons made between them. This is of critical importance in realizing the general effect on diabetes mellitus management before delving into the various aspects or domains of communication on the healthcare provider patient communication variables as shall be discussed later in the chapter. The findings in this section will to great extend inform the outcome on the independent variables as predictors on the response variable of diabetes mellitus management practices. This will probably lead to a realization of what in general the patients' reported on satisfaction with the healthcare providers on one hand and on the other the actual output of the predictor variables on the response variable.

Table 4.25: Patient satisfaction in the nature of communication with healthcare providers at Kenyatta National Hospital

	Overall (n=313) n (%)	**Male (n=123) n (%)**	**Female (n=190) n (%)**	**P value**
Satisfaction with nature of communication				
Satisfied	285 (91.1)	117 (95.1)	168 (88.4)	**0.042**
Not satisfied	28 (8.9)	6 (4.9)	22 (11.6)	
Degree of satisfaction				
Extremely satisfied	95 (30.4)	35 (28.5)	60 (31.6)	0.743
Satisfied	190 (60.7)	82 (66.7)	108 (56.8)	
Neutral	25 (8.0)	6 (4.9)	19 (10.0)	
Dissatisfied	3 (1.0)	0	3 (1.6)	

Source: Field Data (2019)

As in table 4.25, at KNH, 91.1% of the patients were satisfied, with proportionately more male patients (95.1%) being significantly satisfied with the nature of communication with their healthcare providers than the female patients (88.4%), (p=0.042). Even though most patients, 60.7% were in the degree of being satisfied,

with both male and female in this category there was no significance difference noted in the various degrees of satisfaction. Proportionately more female patients (31.6%) were extremely satisfied than the male patients (28.5%). The findings show that a majority of patients were happy and comfortable with the way the healthcare providers communicated with them in course of managing diabetes mellitus overtime as over 90% were in the category of satisfied and extremely satisfied. None of the patients was extremely dissatisfied with proportionately fewer patients being dissatisfied, mainly the female gender (1.6%). Proportionately fewer patients were in the neutral category overral (8%) with more female (10%) than male (4.9%) patients.

Table 4.26: Patient satisfaction in the nature of communication with the healthcare providers at MP Shah Hospital

	Overall (n=87) n (%)	**Male (n=43) n (%)**	**Female (n=44) n (%)**	**P value**
Satisfaction with nature of communication				
Satisfied	83 (95.4)	42 (97.7)	41 (93.2)	0.317
Not satisfied	4 (4.6)	1 (2.3)	3 (6.8)	
Degree of satisfaction				
Extremely satisfied	38 (43.7)	18 (41.9)	20 (45.5)	0.133
Satisfied	45 (51.7)	24 (55.8)	21 (47.7)	
Neutral	3 (3.4)	1 (2.3)	2 (4.5)	
Dissatisfied	1 (1.1)	0	1 (2.3)	

Source: Field Data (2019)

At MP Shah Hospital, though 95.4% of the patients were satisfied as in table 4.26 above, there was no significance difference between the male (97.7%) and female (93.2%) patients in the nature of communication (p=0.317). There was no significant difference noted in all the degrees of satisfaction, though most patients, 51.7 % were

in the degree of satisfied, with a majority of both being males (55.8%) and females (47.7%) in this category. Proportionately more female patients (45.5%) were extremely satisfied than the male patients (41.9%).

None of the patients was extremely dissatisfied with the nature of communication by the healthcare providers. Only 1.1% of the patients, and who were of the female gender (2.3%) were in the degree of dissatisfied. 3.4% of the patients were in the neutral category with proportionately more female patients (2.3%) then the female patients (4.5%). The findings do show that generally the majority of patients found the way the healthcare providers communicated with them encouraging and likely contributing positively to the management of diabetes mellitus as disease condition overtime.

Table 4.27: Comparison of the patient satisfaction in the nature of communication with the healthcare providers between Kenyatta National Hospital and MP Shah Hospital

	KNH (n=313) n (%)	**MP SHAH (n=87) n (%)**	**P value**
Satisfaction with nature of communication			
Satisfied	285 (91.1)	83 (95.4)	0.113
Not satisfied	28 (8.9)	4 (4.6)	
Degree of satisfaction			
Extremely satisfied	95 (30.4)	38 (43.7)	0.060
Satisfied	190 (60.7)	45 (51.7)	
Neutral	25 (8.0)	3 (3.4)	
Dissatisfied	3 (1.0)	1 (1.1)	

Source: Field Data (2019)

In table 4.27, the majority of the patients were satisfied with the nature of communication between them and the healthcare providers, being proportionately higher at MP Shah Hospital (95.4%) than at KNH (91.1%). There was no significant

difference in satisfaction of the nature of communication with the healthcare providers and in all degrees of satisfaction between KNH and MP Shah Hospitals. The majority of patients were in the degree of being satisfied with proportionately more at KNH (60.7) than MP Shah Hospital (51.7%). This was followed by those in the degree of extremely satisfied, with proportionately more at MP Shah Hospital (43.7%) than at KNH (30.4%). There were no patients in the degree of extremely dissatisfied. Minority of the patients were in the degree of dissatisfied, 1% at KNH and 1.1% at MP Shah Hospital. Proportionately more patients were in the degree of neutral at KNH (8%) than at MP Shah Hospital (3.4%). What this then means is that in general, the patients at both hospitals were equally happy with the way healthcare providers interacted and communicated, though proportionately being more at MP Shah Hospital than at KNH.

These findings do greatly contrast with some past studies. Montague et al, 2013 study suggested that 85% of patients changed or considered changing their physician due to poor communication skills. This show that there was low degree of satisfaction in the nature of communication with the healthcare providers' as only 15% were thereby satisfied as they did not consider changing their healthcare provider. By type of hospital, Adhikary et al, 2018 study found that patients were satisfied with the healthcare received in Bangladesh and the level of satisfaction varied by facility type. In private facilities the satisfaction level was found to be the highest (73%) with the lowest level of satisfaction in primary care facilities (52%). This is hitherto in support of the current study outcome of satisfaction by type of hospital.

4.4. Patients Outcome on Communication with Healthcare Providers

This section begins with an analysis of the verbal language use, nonverbal communicative behaviour, noise, environmental context and demographic characteristics as patients communicated with the healthcare providers during their interaction in the management of diabetes mellitus as a disease condition. The section also presents the outcome on diabetes mellitus management practices of the patients rating themselves in view of communication they had had with the

healthcare providers as from the time of diagnosis to the point in time of this research study data collection.

The section presents analysis on association of the independent variables with the dependent variable to determine the relationship first by simple linear regression. Multiple linear regression analysis is then done to establish the predictor variables on the dependent variable and in essence test the hypotheses as stated to either reject or fail to reject them. The presentation of analysed data will first be done for Kenyatta National Hospital (KNH) and MP Shah Hospital as separate healthcare entities followed by comparisons between them.

4.4.1. Healthcare provider patient verbal language use on diabetes management practices in selected hospitals in Kenya

The National Academies of Sciences, Engineering, and Medicine, 2018 argued that if a patient did not speak the language of his or her healthcare provider, multiple adverse effects on the patient's healthcare might occur. The patient's inability to understand a provider's diagnosis or treatment plan can lead to poor patient satisfaction, poor compliance, and underuse of services. This section describes findings of objective one on verbal language use in regard to communication between the patients and healthcare providers (HCPs) during interactions in the management of diabetes mellitus as follows.

Table 4.28: Healthcare provider patient verbal language use at Kenyatta National Hospital

Variable	Overall (n=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
I understood the language in which the healthcare providers used while speaking with me during our interaction.	4.4 (0.6)	4.4 (0.5)	4.4 (0.6)	0.752
The healthcare providers spoke to me in vocabulary/words that I could understand easily.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.606
The healthcare providers spoke at a pace/speed that enabled me to follow what was being discussed	4.3 (0.6)	4.3 (0.5)	4.3 (0.6)	0.669
The healthcare providers spoke to me in a way and nature of voice language that communicated caring and concern.	4.3 (0.6)	4.3 (0.5)	4.3 (0.6)	0.878
The healthcare providers encouraged me to equally participate in the discussion/conversation to the extent I wished during our interaction.	4.4 (0.6)	4.4 (0.6)	4.4 (0.6)	0.667
The healthcare providers' pronunciations of words in sound as spoken by the healthcare provider enabled me to follow what was discussed.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.223
I was comfortable with the loudness in language voice pitch as spoken by the healthcare providers during our interactions.	4.3 (0.6)	4.3 (0.5)	4.3 (0.6)	0.834
The changing in language and word voice as spoken by the healthcare provider was in a way and manner that left me feeling that I was being attended to well	4.3 (0.6)	4.2 (0.6)	4.3 (0.6)	0.526
Overall Verbal language score	**83.0 (12.5)**	**82.6 (12.1)**	**83.3 (12.7)**	**0.648**

Source: Field Data (2019)

Patients at Kenyatta National Hospital **(**KNH) rated verbal language use highly with mean scores of more than four (4.0) in all the eight (8) areas in the domain as in table 4.28. Overall, the mean score on the verbal language use domain for healthcare provider patient communication was 83.0 (SD 12.5) with the rating by the female patients (mean, 83.3 (SD 12.7)) being higher than that by the male patients (mean, 82.6 (SD 12.1)).

There was no significant difference observed by gender overall and for the individual areas in the domain. This was of indication that the patients at KNH were generally more satisfied with the verbal language use in the way the healthcare providers communicated with them overall and on the specific areas of verbal language use.

Whereas the mean score rating was same in almost all the specific components of verbal language use, the female patients had a higher score rating (mean, 4.3 (SD 0.6)) than the male patients (mean, 4.2 (SD 0.6)) on the component of; the changing in language and word voice as spoken by the healthcare provider was in a way and manner that left patients feeling that they were being attended to well as regard voice inflection. It was therefore an indication that the female patients were happier and more satisfied than the male patients in this area of communication while interacting with HCPs.

Table 4.29: Healthcare provider patient verbal language use at MP Shah Hospital

Variable	Overall (n=87) Mean (SD)	Male (n=43) Mean(SD)	Female (n=44) Mean (SD)	P value
I understood the language in which the healthcare providers used while speaking with me during our interaction.	4.6 (0.5)	4.6 (0.5)	4.7 (0.5)	0.458
The healthcare providers spoke to me in vocabulary/words that I could understand easily.	4.5 (0.5)	4.5 (0.5)	4.5 (0.5)	0.766
The healthcare providers spoke at a pace/speed that enabled me to follow what was being discussed	4.5 (0.5)	4.4 (0.5)	4.6 (0.5)	0.142
The healthcare providers spoke to me in a way and nature of voice language that communicated caring and concern.	4.6 (0.6)	4.6 (0.5)	4.5 (0.6)	0.917
The healthcare providers encouraged me to equally participate in the discussion/conversation to the extent I wished during our interaction.	4.6 (0.6)	4.5 (0.6)	4.6 (0.6)	0.531
The healthcare providers' pronunciations of words in sound as spoken by the healthcare provider enabled me to follow what was discussed.	4.5 (0.5)	4.4 (0.5)	4.5 (0.6)	0.377
I was comfortable with the loudness in language voice pitch as spoken by the healthcare providers during our interactions.	4.6 (0.5)	4.5 (0.5)	4.6 (0.5)	0.266
The changing in language and word voice as spoken by the healthcare provider was in a way and manner that left me feeling that I was being attended to well	4.4 (0.6)	4.3 (0.7)	4.5 (0.6)	0.205
Overall Verbal language score	**88.1 (10.9)**	**86.9 (10.4)**	**89.3 (11.4)**	**0.318**

Source: Field Data (2019)

Almost similar findings as for KNH were noted at MP Shah Hospital as in table 4.29 where patients rated verbal language use with high mean scores of more than four (4.0) in all the eight (8) facets in the domain. Overall, the mean score on the verbal language domain for healthcare provider patient communication was 88.1 (SD 10.9) with there being no significant difference by gender in the rating whereby the mean score by the female patients (mean, 89.3 (SD 11.4)) was higher than that by the male patients (mean, 86.9 (SD 10.4)).

On the individual areas of verbal language use, the rating by female patients was higher in most of the facets except on component; the healthcare providers spoke to me in a way and nature of voice language that communicated caring and concern in regard to voice tone in which the male patients rating of HCPs was of a higher mean score, 4.6 (SD 0.5) in comparison to that of the female patients with a mean score, 4.5 (SD 0.6). This depicted the high level of satisfaction for the HCPs on the voice tone by the male patients, an indication that they found it quite comforting and inviting as a verbal language communication indicator. The score rating on the component; the way healthcare providers spoke to patients in vocabulary/words that the patients could understand easily as regards terms (vocabulary) was similar by both the male and female patients, mean score 4.5 (0.5), an indication of the comparatively equal levels of satisfaction by patients of either gender.

Table 4.30: Comparison of healthcare provider patient verbal language use between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
I understood the language in which the healthcare providers used while speaking with me during our interaction.	4.4 (0.6)	4.6 (0.5)	**< 0.001**
The healthcare providers spoke to me in vocabulary/words that I could understand easily.	4.3 (0.6)	4.5 (0.5)	**< 0.001**
The healthcare providers spoke at a pace/speed that enabled me to follow what was being discussed	4.3 (0.6)	4.5 (0.5)	**0.015**
The healthcare providers spoke to me in a way and nature of voice language that communicated caring and concern.	4.3 (0.6)	4.6 (0.6)	**< 0.001**
The healthcare providers encouraged me to equally participate in the discussion/conversation to the extent I wished during our interaction.	4.4 (0.6)	4.6 (0.6)	**0.029**
The healthcare providers' pronunciations of words in sound as spoken by the healthcare provider enabled me to follow what was discussed.	4.3 (0.6)	4.5 (0.5)	**0.021**
I was comfortable with the loudness in language voice pitch as spoken by the healthcare providers during our interactions.	4.3 (0.6)	4.6 (0.5)	**< 0.001**
The changing in language and word voice as spoken by the healthcare provider was in a way and manner that left me feeling that I was being attended to well	4.3 (0.6)	4.4 (0.6)	0.061
Overall Verbal language score	**83.0 (12.5)**	**88.1 (10.9)**	**< 0.001**

Source: Field Data (2019)

When the two hospital were compared as noted in table 4.30, overall patients rated the verbal language use in healthcare provider patient communication significantly higher at MP Shah Hospital (mean, 88.1 (SD 10.9)) than at KNH (mean, 83.0 (12.5)), ($p<0.001$). The rating at MP Shah Hospital was significantly high in all the specific categories except on the component; the changing in language and word voice as spoken by the healthcare provider was in a way and manner that left patients feeling that they were being attended to well as regards voice inflection where though the rating by MP Shah Hospital (mean, 4.4 (0.6)) was higher than at KNH (mean, 4.3 (0.6)) there was no significant difference, $p=0.061$.

In regard to findings on the components of; the patients understood the language in which the healthcare providers used while speaking with them during our interaction as concerns language; the way healthcare providers spoke to patients in vocabulary/words that the patients could understand easily as regards terms (vocabulary); the healthcare providers spoke to patients in a way and nature of voice language that communicated caring and concern as regards voice tone and that the patients were comfortable with the loudness in language voice pitch as spoken by the healthcare providers during interactions as for speech volume, there were significantly higher mean score ratings at MP Shah Hospital than at KNH, $p < 0.001$. Also on the areas where; the healthcare providers spoke at a pace/speed that enabled patients to follow what was being discussed in regard to speech rate ($p=0.015$); the healthcare providers encouraged patients to equally participate in the discussion/conversation to the extent they wished during interaction as for the participation in discussion (balanced conversion) ($p=0.029$) and on the healthcare providers' pronunciations of words in sound as spoken by the healthcare provider enabled patients to follow what was discussed in regard to speech sounds ($p=0.021$) were rated significantly higher at MP Shah Hospital than at KNH.

Healthcare provider patient communication at MP Shah Hospital was therefore rated better across all the areas that contributed to verbal language use than at KNH. The findings tend to suggest that the patients were more satisfied and positively agreeable with the nature of verbal language use in the communication with healthcare providers at MP Shah Hospital as compared to the patients at Kenyatta National

Hospital. This suggests that HCPs at MP Shah Hospital unlike those at KNH did put in a little more effort in balancing out the way they conversed with the patients during the healthcare communication interactions. It therefore means the HCPs at MP Shah Hospital brought out more on how to manage diabetes mellitus as a condition so as to enable patients understand much better what they were dealing with.

The overall score ratings on verbal language use at the two hospitals were high, a revelation by the patients of the degree of satisfaction they had for the HCPs, a finding that is in congruence with the research outcome by Abdulhadi, Al-Shafaee, Wahlström and Hjelm (2013) on language concordance, which was noted to be associated with decreased communication errors, increased patient satisfaction and adherence with medications and follow-ups. As in other past research findings in this area; Partida (2012) noted that shared language between patients and healthcare providers enabled gathering of information for diagnosis, explaining treatment strategies, and ensuring understanding and joint decision-making. This also meant that the language of communication by the HCPs was at the level of the listener, who is not able to assess the providers' scientific knowledge, but had to understand what was discussed as documented by Kourkouta and Papathanasiou (2014).

The present study does show that there was satisfaction with participation in discussion (balanced conversion) between the patients and the healthcare providers with patients at MP Shah Hospital being more satisfied than those at KNH. In his research, Abdulhadi et al (2007), found that encouraging the patient to ask questions was not only a method of information seeking, but also a mechanism of patient participation in the medical dialogue which is positively associated with patients' satisfaction and health outcomes. The researcher went on to further state that promoting the exchange of information between the doctor and the patient was the main purpose of medical communication and a facilitating mechanism for a patient-centred approach.

Uncertainty reduction theory argument the findings in the present study on verbal language use as it avers of information exchange to being a basic human function in

which individuals request, provide, and exchange information with the goal of reducing uncertainty. This is ensconced in its interactive strategies, which are dialogic and conversational in nature, together with the passive and active strategies that tend to reinforce dialogue. This is especially so in that with increased frequency of dialogue it builds coalitions between healthcare providers and patients (Bylund, Peterson and Cameron, 2012). As regard participation in discussion (balanced conversion), in addition to other areas of verbal language use in communication find appropriate articulation in this theory in enriching communication interactions between healthcare providers and patients.

4.4.2. Healthcare provider patient nonverbal communicative behaviour (NVCB) on diabetes management practices in selected hospitals in Kenya

This section describes findings on nonverbal communicative behaviour in regard to communication between the patients and HCPs during their interactions in the management of diabetes mellitus. According to Khan et al, 2014, positive, effective, and sensitive nonverbal behavior helps to strengthen the doctor-patient bond as this tend to have a significant impact on patients during consultative interactions and the findings below will demonstrate this in regard to managing diabetes mellitus.

Table 4.31: Healthcare provider patient nonverbal communicative behaviour at Kenyatta National Hospital

Variable	Overall (n=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
The healthcare providers are usually in a hurry when providing medical care or treatment and do not spend enough of time with me.	4.4 (0.7)	4.4 (0.7)	4.4 (0.7)	0.541
The body language of the healthcare providers communicated caring and concern.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.862
The healthcare providers sat in an appropriate manner and physical distance in relation to me during our interaction.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.977
I was encouraged and comfortable by the way the healthcare providers were sitting/standing in regard to body posture while attending to me.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.916
The healthcare providers looked at me, did not seem distracted, attended to my physical comfort, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.4 (0.6)	4.4 (0.6)	4.4 (0.6)	0.695
The healthcare providers kept quiet for reasonable amount of time to listen to what I said during our interactions.	4.4 (0.7)	4.4 (0.7)	4.4 (0.7)	0.975
The healthcare provider maintained appropriate gaze from the way they looked at me during our interaction.	4.4 (0.6)	4.4 (0.6)	4.4 (0.6)	0.530
The touch by the healthcare provider was appropriate whenever I was examined and did seek my permission first.	4.5 (0.7)	4.3 (0.7)	4.3 (0.7)	0.427
The healthcare providers' face expressions encouraged me to keep talking about my disease condition.	4.4 (0.6)	4.3 (0.6)	4.4 (0.6)	0.670
The healthcare providers' spoke in a voice that showed patience and calmness while attending to me.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.873
The general body, hand and head movements by the healthcare providers while attending to me were appropriate during our interactions.	4.3 (0.6)	4.3 (0.6)	4.3 (0.6)	0.648
I had to wait for too long from the time I got to the clinic to be attended to by the healthcare providers.	3.4 (1.2)	3.6 (1.2)	3.2 (1.3)	**0.014**
Overall score on Non-verbal communicative behavior	**81.6 (12.8)**	**82.0 (13.0)**	**81.3 (12.7)**	**0.639**

Source: Field Data (2019)

As shown in table 4.31, patients at KNH rated healthcare providers positively in terms of nonverbal communicative behavior with an overall mean score rating of 81.6 (SD 12.8). There was a higher rating by the male patients (mean, 82.0 (SD 13.0)) than that by the female patient (mean, 81.3 (SD 12.7)) but with no significant

difference by gender. The score rating was high across all the twelve (12) facets by more than a mean score of 4.0 except on the aspect; patients had to wait for too long from the time they got to the clinic to be attended to by the healthcare providers with an overall mean score rating of 3.4 (SD 1.2).

Ratings by gender revealed similar mean scores by both the male and female patients across all the facets on NVCB except on area of; the healthcare providers' face expressions encouraged me to keep talking about my disease condition, in which the female gender had higher score rating than the male gender but with no significant difference and on; waiting time before being attended to, in which there was a significantly higher score rating by the male patient gender (mean, 3.6 (1.2)) as compared to that by the female patient gender (mean, 3.2 (1.3)), p=0.014. The similar mean score ratings on the other areas of NVCB indicate the equivalent gender parity on satisfaction with the HCPs during their healthcare communication interactions.

The lower mean score rating on waiting time before the patients were attended to does show that patients at Kenyatta National Hospital generally felt that from the time they arrived at the hospital's diabetic center to the time they were attended to by the healthcare providers was relatively long than expected. The female patient gender was even less satisfied on this aspect of time than the male patient gender. It is an aspect that needs to be addressed by getting more information on why the patients, more so the female gender are not satisfied and is likely to cause distress in this patients in the long run and thereby impact on DMMPs.

This finding lends some credence to Abdulhadi et al, 2007 study outcome that long waiting time of up to four or five hours' despite being given appointments was an issue that was raised spontaneously by almost all the patients and was expressed as stressful and unacceptable.

Table 4.32: Healthcare provider patient nonverbal communicative behaviour at MP Shah Hospital

Variable	Overall (n=87) Mean (SD)	Male (n=43) Mean (SD)	Female (n=44) Mean (SD)	P value
The healthcare providers are usually in a hurry when providing medical care or treatment and do not spend enough of time with me.	4.5 (0.6)	4.5 (0.6)	4.6 (0.6)	0.515
The body language of the healthcare providers communicated caring and concern.	4.5 (0.6)	4.4 (0.6)	4.6 (0.6)	0.123
The healthcare providers sat in an appropriate manner and physical distance in relation to me during our interaction.	4.5 (0.6)	4.4 (0.7)	4.6 (0.5)	0.083
I was encouraged and comfortable by the way the healthcare providers were sitting/standing in regard to body posture while attending to me.	4.5 (0.6)	4.4 (0.6)	4.6 (0.5)	**0.047**
The healthcare providers looked at me, did not seem distracted, attended to my physical comfort, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.7 (0.6)	4.6 (0.6)	4.8 (0.5)	0.160
The healthcare providers kept quiet for reasonable amount of time to listen to what I said during our interactions.	4.4 (0.7)	4.3 (0.8)	4.6 (0.5)	**0.034**
The healthcare provider maintained appropriate gaze from the way they looked at me during our interaction.	4.6 (0.5)	4.5 (0.6)	4.6 (0.5)	0.385
The touch by the healthcare provider was appropriate whenever I was examined and did seek my permission first.	4.3 (0.8)	4.2 (0.8)	4.3 (0.9)	0.548
The healthcare providers' face expressions encouraged me to keep talking about my disease condition.	4.5 (0.5)	4.5 (0.5)	4.5 (0.5)	0.768
The healthcare providers' spoke in a voice that showed patience and calmness while attending to me.	4.5 (0.5)	4.5 (0.5)	4.6 (0.5)	0.481
The general body, hand and head movements by the healthcare providers while attending to me were appropriate during our interactions.	4.4 (0.7)	4.3 (0.6)	4.5 (0.8)	0.327
I had to wait for too long from the time I got to the clinic to be attended to by the healthcare providers.	3.6 (1.1)	3.8 (1.1)	3.5 (1.1)	0.273
Overall score on Non-verbal communicative behavior	**85.5 (11.1)**	**84.0 (11.6)**	**87.0 (10.6)**	**0.216**

Source: Field Data (2019)

At MP Shah Hospital as in table 4.32, overall, nonverbal communicative behavior was rated highly (mean, 85.5 (SD 11.1)) with the rating by the female patients

(mean, 87.0 (10.6)) higher than that of the male patients (mean, 84.0 (11.6)) but with no significant difference by gender. The rating was high across all the facets with more than mean scores of 4.0 except on when patients had to wait for too long from the time they got to the clinic to be attended to by the healthcare providers, (mean, 3.6 (SD 1.1)) and reflected in patients' gender though with a slightly higher rating by male patients (mean, 3.8 (1.1)) than that by the female patients (mean, 3.5 (1.1)) with no significant difference by gender (p=0.273).

The score ratings by the female patients were higher in almost all areas of NVCB than for the male patients except on communication areas where; the healthcare providers' face expressions (facial expressions) encouraged the patients to keep talking about their disease condition in which there was a similar mean score for both genders (mean, 4.5 (SD 0.5)) and; on waiting time before the patients were attended to as already described above.

There was no significant difference between the female and male patients' scores across the facets in NVCB except on area whereby; the patients were encouraged and were comfortable by the way the healthcare providers were sitting/standing while attending to them as regards body posture where there was significantly higher score rating by the female patients (mean 4.6 (SD 0.5)) than by male patients (mean 4.4 (SD 0.6)), p=0.047 and also in the area in which; the healthcare providers kept quiet for reasonable amount of time to listen to what the patients said during their interactions in account to silence which was significantly higher by the female patients (mean 4.6 (SD 0.5)) as compared to the male patients (mean4.3 (SD 0.7)), p =0.034.

On body posture and silence, the low scores by male patients could be an indication of the less satisfaction by the male patients in these two areas in regard to healthcare providers' nature of nonverbal communication while interacting with them. Indeed, findings by Kourkouta and Papathanasiou (2014) noted that what of course in any case should be avoided by the caregivers was silence and indifference to the questions of the patient as in the best cases, the patient will leave disappointed and in the worst really indignant with healthcare providers.

According to Travaline, Ruchinskas, D'Alonzo, Jr. (2005), body position can greatly affect the quality of one-to-one communication between the patient and physician. Mickel, McGuire and Gross-Gray (2013) in their research stated that nonverbal behaviors that include interruptions and silence that are thought to imply power or dominance have been reported as negatively impacting patient outcomes. This does show how critically important body posture and silence are in communication in healthcare when it comes to patient provider interaction and does give valuable weight to the findings on these two areas at MP Shah hospital as particularly score rated by the male patients for the HCPs.

Table 4.33: Comparison of healthcare provider patient nonverbal communicative behaviour between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
The healthcare providers are usually in a hurry when providing medical care or treatment and do not spend enough of time with me.	4.4 (0.7)	4.5 (0.6)	0.073
The body language of the healthcare providers communicated caring and concern.	4.3 (0.6)	4.5 (0.6)	**< 0.001**
The healthcare providers sat in an appropriate manner and physical distance in relation to me during our interaction.	4.3 (0.6)	4.5 (0.6)	**0.004**
I was encouraged and comfortable by the way the healthcare providers were sitting/standing in regard to body posture while attending to me.	4.3 (0.6)	4.5 (0.6)	**0.018**
The healthcare providers looked at me, did not seem distracted, attended to my physical comfort, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.4 (0.6)	4.7 (0.6)	**< 0.001**
The healthcare providers kept quiet for reasonable amount of time to listen to what I said during our interactions.	4.4 (0.7)	4.4 (0.7)	0.586
The healthcare provider maintained appropriate gaze from the way they looked at me during our interaction.	4.4 (0.6)	4.6 (0.5)	0.053
The touch by the healthcare provider was appropriate whenever I was examined and did seek my permission first.	4.5 (0.7)	4.3 (0.8)	0.941
The healthcare providers' face expressions encouraged me to keep talking about my disease condition.	4.4 (0.6)	4.5 (0.5)	0.068
The healthcare providers' spoke in a voice that showed patience and calmness while attending to me.	4.3 (0.6)	4.5 (0.5)	**0.008**
The general body, hand and head movements by the healthcare providers while attending to me were appropriate during our interactions.	4.3 (0.6)	4.4 (0.7)	0.401
I had to wait for too long from the time I got to the clinic to be attended to by the healthcare providers.	3.4 (1.2)	3.6 (1.1)	0.061
Overall score on Non-verbal communicative behavior	**81.6 (12.8)**	**85.5 (11.1)**	**0.010**

Source: Field Data (2019)

In making comparisons between the two hospitals as shown in table 4.33, the overall mean scores for nonverbal communicative behavior was significantly higher at MP Shah Hospital (mean, 85.5 (11.1)) than at KNH (mean, 81.6 (12.8)) (p=0.010). This hence gives a general picture of how satisfied the patients were with the healthcare providers at MP Shah Hospital. It depict that healthcare providers nonverbal communicative behaviour at MP Shah hospital unlike for their counterparts at KNH was quite appealing to the patients and this in a way fostered better diabetes mellitus management practices to a great extent.

Does this then mean nonverbal communicative behaviour communication was unsatisfactory at KNH! In response it would be postulated that the communication though not as satisfactory as among patients at MP Shah hospital, the score rating at KNH shows that the patients were still satisfied but not to a level and extend as expected and expressed by the patients when compared to the patients at MP Shah hospital.

Also significantly higher scores were computed at MP Shah Hospital than at KNH in regard to the following areas: the body language of the healthcare providers communicated caring and concern (p=0.001); the healthcare providers sat in an appropriate manner and physical distance in relation to me during our interaction as regards proximity (physical distance) (p=0.004); the patients were encouraged and comfortable by the way the healthcare providers were sitting/standing while attending to them as regards body posture (p=0.018); the healthcare providers looked at the patients, did not seem distracted, attended to patients physical comfort, had genuine interest in patients as a person, and listened patiently and carefully to what the patients had to say as concerns attention (p=0.001) and the healthcare providers' spoke in a voice that showed patience and calmness while attending to patients in relation to tone of voice (p=0.008) as compared to those of KNH.

This finding as reported do show that patients at MP Shah hospital were agreeable, more satisfied and much happier in the preceding five (5) areas in regard to their communication interactions with the healthcare providers unlike the patients at KNH

whose mean score ratings though relatively high indicated that the HCPs nature of communication was not as satisfying.

On the consultation process in which there was high ratings with no significance difference between the two hospitals, uncertainty reduction theory gets its application in defusing uncertainties during the communication interactions between the patients and the healthcare providers. This is especially at the time of diagnosis and thereafter. Uncertainty reduction follows a pattern of developmental stages in communication interactions that is controlled by communication rules and norms at the entry stage (Berger & Calabrese 1975). It then tends to more free communication in the personal phase with decisions on future interaction plans coming in at the exit phase (Berger, 1986) and seems likely to have been the case in this research study given the findings at the two health facilities.

To support these findings further, Travaline, Ruchinskas, D'Alonzo, Jr. (2005) argued that at the very least, the attentive physician will have a more satisfied patient and too, the physician's body language also speak volumes to the patient. The researcher still further noted that for both the physician and patient, images of body language and facial expressions were likely be remembered longer after the encounter than any memory of spoken words. This was a clear indication of the powerfully satisfying effect of this nonverbal communicative behaviour variable when healthcare providers interacted with the patients, hence the differences in outcome on healthcare providers' nonverbal communicative behaviour as displayed at the two hospitals.

Regarding waiting time before being attended to as one of the aspect in nonverbal communicative behaviour, the mean scores computed in comparing KNH and MP Shah Hospital were generally low. Though the case, the rating by patients was higher at MP Shah Hospital (mean 3.6(SD1.1)) than at KNH (mean 3.4(SD1.2)), with no significance difference between them. This is an indication that patients at MP Shah Hospital were more satisfied with this nonverbal communicative behaviour as played out in comparison to patients at Kenyatta National Hospital as they did not have to wait for a longer time to be attended to as the patients at KNH. Though still the

insignificant findings on time taken before being attended to clearly show that it was not an issue at all to patients at both hospitals.

In addition, the ratings by patients at MP Shah hospital were higher in almost all areas of NVCB except when patients reported that; the touch by the healthcare provider was appropriate whenever they were examined and did seek patients permission first which was rated higher by KHN patients (mean, 4.5 (0.7)) than as by the MP Shah hospital patients (mean, 4.3 (0.8)). This showed that patients at KNH were more satisfied with the HCPs in the way they examined them by hand touch and so forth. On the aspect that; the healthcare providers kept quiet for reasonable amount of time to listen to what the patients said during their interactions in reference to silence, the score ratings, were the same by both the KNH and MP Shah Hospital patients (mean score, 4.4 (0.7)), hence coming out as being an expression of similar levels of satisfaction for the HCPs.

As in the present study, Beck, Daughtridge and Sloane (2002) documented of no association having been found for the amount of physician touch and physician-patient distance as a nonverbal communication indicator. Though the case, the current study findings on physical distance differ in that patients' ratings were quite high with HCPs at MP Shah Hospital having been rated with significantly higher mean scores in comparison with the HCPs at KNH. This is a likely indication that there is an association in regard to physical distance. Conversely, Khan et al, 2014 study results demonstrated the importance of touch in addition to eye contact during the physician's consultancy. This researcher noted that patients do require, from their doctors, a comforting touch on shoulder and regular but brief eye contacts to demonstrate his/her attention towards the patients.

The present study results suggest concurrence with Mickel, McGuire and Gross-Gray (2013) findings in regard to physician proximity and lean, tone of voice, expressiveness and body position. This are significantly linked to patient satisfaction and compliance and that physician speed and volume of talking correlated with patient satisfaction levels. The study further noted that physicians with previous malpractice claims were significantly connected to ratings of lower concern in tone

of physician voice and higher dominance; areas that were rated highly by patients in the current study.

Abdulhadi et al (2007) and Travaline, Ruchinskas, D'Alonzo, Jr. (2005) found that patients' encounters with healthcare professionals who were friendly and welcoming were considered as satisfying to patients with diabetes as score ratings in this study indicate. Abdulhadi et al (2007) argued that attentive listening; eye contact with less gazes; uninterrupted consultation; and consultation lengths are important factors for a good patient-doctor communication and relationship. This is a clear show of the relevance of this past finding on the score ratings as presented above, hence the level of satisfaction by patients on these communication aspects in NVCB as well.

Though insignificant in this study, according to Montague et al (2013), the length of visit and the eye contact between clinician and patient play a key role in the consultation. But contrary to the current study on touch by the healthcare provider, the researcher stated that increasing social touch during the health encounter does not increase patient ratings as expected, but that social touch can lead to better patient assessment of clinician in moderation. In addition, greater clinician listening was associated with greater patient satisfaction as revealed by Henry et al (2012) as is noted by the high mean score ratings in this study. Another study found out that affiliative nonverbal behavior of the physician was related to higher patient satisfaction as put forth by Mast (2007) and as is in this present study, the mean score ratings were high on some of these behaviours such as the extend of proximity from the HCPs.

4.4.3. Healthcare provider patient communication in regard to noise during interaction on diabetes mellitus management practices in selected hospitals in Kenya

In this section, findings on noise in healthcare provider patient communication will be presented and discussed in regard to diabetes mellitus management practices. Prevalence of noise in healthcare facilities has been studied and reported by researchers on its effect in various ways. Juang et al, 2010 argued that it was therefore very important that medicare givers should provide a quiet and favourable

environment for the patients since unwanted sound could have a negative impact on patient outcomes. Findings as analysed below are a pointer of the need to address noise levels from whatever sources in our medical treatment institutions.

Table 4.34: Noise in healthcare provider patient communication at Kenyatta National Hospital

Variable	Overall (n=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the healthcare providers and me.	1.6 (0.8)	1.5 (0.7)	1.6 (0.8)	0.660
I was feeling quite unwell to the extent that I was not able to comfortably participate in the discussions during the interactions with the healthcare providers.	1.6 (0.8)	1.6 (0.8)	1.7 (0.9)	0.216
My mind was filled up with thoughts that affected the communication I had with the healthcare providers.	1.7 (0.9)	1.6 (0.7)	1.7 (0.9)	0.056
I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions.	1.7 (0.9)	1.7 (0.9)	1.7 (0.9)	0.987
Overall Noise Score	**16.0 (17.2)**	**14.6 (14.8)**	**16.8 (18.6)**	**0.275**

Source: Field Data (2019)

As results show in table 4.34, patients at Kenyatta National Hospital had low ratings of below average for noise with an overall mean score of 16.0 (SD 17.2), hence patients did experience low noise levels at the hospital. In addition, there is clear indication that there was more noise experienced by the female patients (mean, 16.8 (SD 18.6)) than by the male patients (mean, 14.6 (SD 14.8)) overall and in every type of noise except for the component; I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions in regard to semantic noise where the score rating was similar (mean, 1.7) by both genders. There were no significant differences on noise by gender at the health facility.

From the findings, noise was not really an issue at this hospital during communication interactions between the patients and the healthcare providers and if at all it had effect on the communication then it was minimal and probably tolerable. As seen in the analysis findings of the current study, Miller, 2006 espoused that a considerable body of research had documented the effects of noise on patient outcomes. The researcher observed that noise had been proven to have a negative influence on patient recovery times and with the frequent interruptions and distractions, noise often resulted in medication errors, one of today's most challenging issues in delivering care. Though insignificant, it is however possible that even as little as the noise is at KNH, its effect could come in the way of provider patient communication and affect DMMPs overtime.

Table 4.35: Noise in healthcare provider patient communication at MP Shah Hospital

Variable	Overall (n=87) Mean (SD)	Male (n=43) Mean (SD)	Female (n=44) Mean (SD)	P value
There was noise within the diabetic clinic / hospital surrounding that interfered with the communication between the healthcare providers and me.	1.9 (1.1)	1.8 (1.0)	2.0 (1.2)	0.380
I was feeling quite unwell to the extent that I was not able to comfortably participate in the discussions during the interactions with the healthcare providers.	2.0 (1.1)	2.0 (0.9)	2.1 (1.2)	0.774
My mind was filled up with thoughts that affected the communication I had with the healthcare providers.	2.0 (1.0)	2.0 (0.9)	2.1 (1.2)	0.606
I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions.	2.3 (1.1)	2.3 (1.1)	2.4 (1.2)	0.728
Overall Noise Score	**26.7 (23.7)**	**25.1 (20.2)**	**28.1 (26.9)**	**0.561**

Source: Field Data (2019)

At MP Shah Hospital as in table 4.35, patients had relatively low score ratings of below average on noise with an overall mean score of 26.7(SD 23.7) with the male

patients having a lower mean score of 25.1 (SD 20.2) than the female patients who had a mean score of 28.1 (SD 26.9). The male patients had lower mean scores compared to the female patients in all types of noise suggesting that the male patients experienced less noise than the female patients at this health facility. There was no significant difference by gender for the patients at the hospital, p=0.561 overall and in all the types of noises.

With below average noise levels at Kenyatta National Hospital and with average levels at MP Shah Hospital, the question that then comes up is whether it had any effect on diabetes mellitus management practices during healthcare provider patient communication interactions. In answering the question, the researcher would note that whatever level of noise could correspondily have its effects but how significant would the effects be to have an unfavourable outcome will be revealed later in the forthcoming discussion on regression analysis. Therefore, the effects noise has during the healthcare provider patient communication interactions though not high as the current study shows at the two hospitals are real and ought to be taken into consideration.

Table 4.36: Comparisons of noise in healthcare provider patient communication between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH(n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the healthcare providers and me.	1.6 (0.8)	1.9 (1.1)	**< 0.001**
I was feeling quite unwell to the extent that I was not able to comfortably participate in the discussions during the interactions with the healthcare providers.	1.6 (0.8)	2.0 (1.1)	**< 0.001**
My mind was filled up with thoughts that affected the communication I had with the healthcare providers.	1.7 (0.9)	2.0 (1.0)	**0.002**
I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions.	1.7 (0.9)	2.3 (1.1)	**< 0.001**
Overall Noise Score	**16.0 (17.2)**	**26.7 (23.7)**	**< 0.001**

Source: Field Data (2019)

The comparison of findings on noise between Kenyatta National Hospital and MP Shah Hospital as in table 4.36 indicates that noise was rated significantly higher at MP Shah Hospital (mean, 26.7 (23.7)) than at KNH (mean, 16.0 (17.2)), ($p < 0.001$). Patients at MP Shah Hospital experienced significantly more noise in the components: there was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the healthcare providers and me in

regard to physical noise ($p < 0.001$); I was feeling quite unwell to the extent that I was not able to comfortably participate in the discussions during the interactions with the healthcare providers as for physiological noise ($p < 0.001$); my mind was filled up with thoughts that affected the communication I had with the healthcare providers in relation to psychological noise ($p=0.002$) and; I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions in regard to semantic noise ($p < 0.001$) when compared to the patients at KNH.

Thence, what this means from the foregoing analysis above is that there was more noise at MP Shah Hospital in comparison to KNH in overall and all types of noise during healthcare provider patient communication in the management of diabetes mellitus. Therefore, patients at MP Shah Hospital were likely to be more sensitive to whatever kind of noise as in the types of noise than patients at KNH during communication as they interacted with the healthcare providers. Why would this be the case with the consideration that MP Shah Hospital is a highly regarded private healthcare facility and only the opposite if at all would be expected? Further research in view of these differences suffices so as to discover the possible foundational basis of the occurrences.

If in regard to the findings where patients at MP Shah Hospital experienced greater noise, then there is concurrence with the study by Pfeiffer, 1973 who noted that the greater the noise, the more difficult it becomes to communicate clearly. As such and for this reason it is important for the communicator to find ways of eliminating or reducing sources of distracting noise, a responsibility that fall largely on the healthcare providers and to some extend the patients. Then, of critical importance is what effect the noise had on the diabetes mellitus management practices at the two hospitals and this affirms findings by Joseph and Ulrich, 2007, that high noise levels negatively impact patient health and well-being and may slow the process of healing among patients.

The researcher in the current study would attribute the findings at MP Shah Hospital in relation to KNH to the probable circumstances around the patients in regard to their socio economic status. How the patients get to the hospital, their surroundings in terms of where they live, shop, work and so forth because these circumstances do exhibit an environment that is likely to inure them to certain circumstances that others would find unusual. It would therefore be deduced that if the patients are most of the time exposed to noisy environmental circumstances then they would not find an environment with similar or even less of the noise to be an issue at all unless the noise levels are quite and exceedingly higher than usual. Another likely reason could be the shifting and creation a diabetic centre at KNH in its own location away from the main hospital building where it was adjacent to other clinics and departments in the hospital.

Therefore, noise level of whatever magnitude will interfere with provider patient communication and have effect on management practices in the long run, hence impact on the overall health DM outcome. Infact, Salonen and Morawska, 2013, found out that among patients, reduced noise levels reduce annoyance, improve satisfaction, decrease psychological and physiological stress, reduce emotional exhaustion, improve better communication, enhance patient privacy and confidentiality, and improve safety.

Chew, Shariff-Ghazali and Fernandez, 2014, noted that patients with diabetes mellitus (DM) were at high risk of decreased psychological well-being due to strained coping with changed life routine right from the time of diagnosis. The researcher further reported that the proportion of the people with DM who were likely to have depression and diabetes-related distress (DRD) was 13.8% and 44.6%, respectively, with overall poor quality of life at 12.2%. In adults, children and adolescents with DM, depression was related to poorer glycemic control, a range of diabetes complications, increased health care costs, worsened functional disability, re-hospitalization and early mortality. Those with psychological distress at the time of diagnosis had a higher risk of cardiovascular events and death than those without psychological distress.

In addition, Reiling, Hughes and Murphy (2008) averred that noise can reduce overall perceived patient satisfaction. They argued that it interferes with communication, creates distractions, affects cognitive performance and concentration, and contributes to stress and fatigue and that particularly sensitive are mental activities involving working memory and can also adversely impact healing. The preceding elements as discussed by the cited researchers allude to the effects of the various types of noises as analysed and put forth in the current study findings in this section and is in concurrence as to the effect on the management practices of diabetes mellitus.

4.4.4. Healthcare provider patient communication environmental context during interaction on diabetes management practices in selected hospitals in Kenya

According to O'Halloran, Worrall & Hickson, 2011, environmental factors influence communication between patients and their healthcare providers in hospitals and this is seen more on the ability of patients and healthcare providers to communicate. Environmental context is of critical value in communication and could either enhance or interfere with it. The findings presented in this section will bring out how it relates to communication in the course of the management of diabetes mellitus.

Table 4.37: Healthcare provider patient communication on environmental context at Kenyatta National Hospital

Variable	Overall (N=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
The hospital/healthcare providers' offices- physical environment / consultation room have everything needed to provide complete care.	4.4 (0.7)	4.4 (0.7)	4.4 (0.8)	0.536
The healthcare providers were non-judgmental and treated me as they would want to be treated did not talk down to me and were personable.	4.4 (0.6)	4.4 (0.6)	4.4 (0.6)	0.645
The healthcare providers carried and introduced self in a respectful manner, used my proper name, obtained information in a systematic and orderly process.	4.2 (1.0)	4.2 (1.0)	4.2 (1.0)	0.639
The healthcare providers acted too businesslike, impersonal and in a carefree manner towards me.	4.1 (1.0)	3.9 (1.1)	4.1 (0.9)	0.052
The healthcare providers treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.5 (0.7)	4.4 (0.6)	4.5 (0.7)	0.701
The healthcare providers were cooperative as they did not ignore what I told them, provided reassurance and guidance if necessary.	4.5 (0.6)	4.5 (0.5)	4.5 (0.7)	0.732
The healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.9 (1.2)	3.9 (1.2)	3.9 (1.3)	0.958
The healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information I was expecting to receive about my health.	4.5 (0.7)	4.5 (0.6)	4.5 (0.7)	0.765
The healthcare provider had respect for culture and their values/beliefs did not affect the communication with me.	4.3 (0.9)	4.2 (0.9)	4.4 (0.8)	0.128
Overall Environmental Context Score	**82.7 (15.3)**	**82.1 (14.2)**	**83.2 (16.0)**	**0.534**

Source: Field Data (2019)

At Kenyatta National Hospital as in table 4.37, the high overall mean score rating in relation to environmental context was 82.7(SD15.3, an indication that the patients at KNH found communication within the environmental context quite favourable during their interaction with the healthcare providers. The rating by the female patients (mean, 83.2 (16.0)) was slightly higher than that by the male patients (mean, 82.1 (14.2)) but with no significant difference by gender, p=0.534.

The environmental context at KNH was rated high by patients with mean scores of more than 4.0 across all the nine (9) areas except on the area where the patients found that; the healthcare providers encouraged open communication, were patient and did not hold their view over the patients and vice versa during the interactions as to the presence or lack of competitiveness, mean score of 3.9(SD1.2), hence rated lower and consequently reflected similarly among the male and female patients.

Ratings were similar for both genders on almost all the areas of environmental context except in the components of; the healthcare providers acted too businesslike, impersonal and in a carefree manner towards patients, thereby depicting informality; the healthcare providers treated the patients in a very friendly, courteous manner and showed a compassionate attitude toward them, being a gesture of friendliness and; the healthcare provider had respect for culture and their values/beliefs did not affect the communication with patients that concerned cultural dimension in which the female patients' ratings were higher than those for male patients.

Table 4.38: Healthcare provider patient communication on environmental context at MP Shah Hospital

Variable	Overall (n=87) Mean (SD)	Male (n=43) Mean (SD)	Female (n=44) Mean (SD)	P value
The hospital/healthcare providers' offices- physical environment / consultation room have everything needed to provide complete care.	4.7 (0.5)	4.7 (0.5)	4.8 (0.6)	0.523
The healthcare providers were non-judgmental and treated me as they would want to be treated did not talk down to me and were personable.	4.5 (0.6)	4.4 (0.7)	4.6 (0.5)	0.135
The healthcare providers carried and introduced self in a respectful manner, used my proper name, obtained information in a systematic and orderly process.	4.5 (0.7)	4.5 (0.6)	4.6 (0.8)	0.483
The healthcare providers acted too businesslike, impersonal and in a carefree manner towards me.	4.2 (1.0)	4.3 (0.8)	4.1 (1.2)	0.335
The healthcare providers treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.7 (0.7)	4.7 (0.5)	4.6 (0.9)	0.494
The healthcare providers were cooperative as they did not ignore what I told them, provided reassurance and guidance if necessary.	4.7 (0.6)	4.6 (0.5)	4.7 (0.6)	0.411
The healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.8 (1.3)	3.7 (1.4)	3.9 (1.3)	0.508
The healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information I was expecting to receive about my health.	4.5 (0.8)	4.5 (0.7)	4.4 (0.9)	0.567
The healthcare provider had respect for culture and their values/beliefs did not affect the communication with me.	4.2 (1.1)	3.9 (1.1)	4.4 (0.9)	**0.015**
Overall Environmental Context Score	**85.5 (13.5)**	**84.4 (12.7)**	**86.6 (14.2)**	**0.452**

Source: Field Data (2019)

As shown in table 4.38, environmental context at MP Shah Hospital was rated high with an overall mean score of 85.5(SD13.5). The rating by the female patients (mean, 86.6 (SD 14.2)) was slightly higher than that by the male patients (mean, 84.4(SD 12.7))) but with no significant difference by gender, p=0.452. The mean score rating was more than 4.0 across all the nine (9) facets except on the area where; the patients found that the healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions as to the presence or lack of competitiveness where the patients delivered a mean score of 3.8 (SD1.3) and was reflected on both gender with the male patients having a lower rating (mean score, 3.7(SD 1.4)) as compared to the female patients (mean score, 3.9(SD 1.3)). This did show that the competitiveness from the HCPs during communication interactions was generally not that high according to the patients.

From the findings, it can be seen that the female patients' ratings were higher on almost all the areas of environmental context except in the areas where; the healthcare providers acted too businesslike, impersonal and in a carefree manner towards me depicting informality; the healthcare providers treated the patients in a very friendly, courteous manner and showed a compassionate attitude toward them being a gesture of friendliness and; the healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information the patient was expecting to receive about their health in regard to health information that were rated higher by the male patients.

There was no significant difference in almost all the areas except on the component where; the healthcare provider had respect for culture and their values/beliefs did not affect the communication with patients as a cultural dimension where the score rating was significantly higher by the female patients (mean 4.4(SD 0.9)) than the male patients (mean 3.9(SD 1.1)), p=0.015. Even though in overall, cultural dimension was scored highly by the patients, the finding on the female patients at MP Shah Hospital suggested that they found the healthcare providers more culturally competent unlike their male patient counterparts.

The findings on cultural competence as seen in studies done previously are in line with this study outcome. Caballero (2007) noted that improving healthcare providers' cultural competence may help improve the quality of care provided and may ultimately reduce health care disparities. The researcher further found out that increased cultural competence may also improve patient provider trust and communication, as well as help patients adhere to prevention and treatment plans. The study then concluded that cultural competence could lead to a much more pleasant and productive healthcare provider patient interaction.

This does underscore the critical significance of cultural competence and the more reason as to why the lower rating by the male gender patients should be looked into to find out why it is so and therefore what could be done to improve on this area of communication in regard. Indeed, Patel, Datye & Jaser, 2018 established that a better understanding of patients' cultural beliefs, values, and traditions also improved communication and could increase disclosure of personal health information. However, the researcher highlighted the lack of culturally competent communication among healthcare providers and their patients required to provide optimal care among culturally diverse populations.

Table 4.39: Comparison of healthcare provider patient communication on environmental context between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
The hospital/healthcare providers' offices - physical environment / consultation room have everything needed to provide complete care.	4.4 (0.7)	4.7 (0.5)	**<0.001**
The healthcare providers were non-judgmental and treated me as they would want to be treated did not talk down to me and were personable.	4.4 (0.6)	4.5 (0.6)	0.188
The healthcare providers carried and introduced self in a respectful manner, used my proper name, obtained information in a systematic and orderly process.	4.2 (1.0)	4.5 (0.7)	**0.010**
The healthcare providers acted too businesslike, impersonal and in a carefree manner towards me.	4.1 (1.0)	4.2 (1.0)	0.110
The healthcare providers treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.5 (0.7)	4.7 (0.7)	**0.011**
The healthcare providers were cooperative as they did not ignore what I told them, provided reassurance and guidance if necessary.	4.5 (0.6)	4.7 (0.6)	**0.006**
The healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.9 (1.2)	3.8 (1.3)	0.480
The healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information I was expecting to receive about my health.	4.5 (0.7)	4.5 (0.8)	0.713
The healthcare provider had respect for culture and their values/beliefs did not affect the communication with me.	4.3 (0.9)	4.2 (1.1)	0.130
Overall environmental context score	**82.7 (15.3)**	**85.5 (13.5)**	**0.123**

Source: Field Data (2019)

In making comparisons between the two hospitals as in table 4.39, overall, environmental context was rated higher by patients at MP Shah Hospital as compared to those at KNH. There was no significant difference in the mean scores between the two hospitals, p=0.123, meaning that generally the patients at the two hospitals were satisfied on this aspect of environmental context of healthcare provider patient communication in the management of diabetes mellitus.

Score ratings by patients at MP Shah Hospital were higher than those of KNH in most of the areas of environmental context. This were in the components in which; the healthcare providers were non-judgmental and treated me as they would want to be treated did not talk down to me and were personable that relates to status relationships and; the healthcare providers acted too businesslike, impersonal and in a carefree manner towards patients depicting informality in which there were no significance differences.

In addition, there were significantly higher mean scores by patients at MP Shah Hospital as compared to those given by the patients at KNH in the areas of: in the hospital / healthcare providers' offices-physical environment / consultation room had everything needed to provide complete care as regards physical (consultation room) environment, p<0.001; the healthcare providers carried and introduced self in a respectful manner, used my proper name, obtained information in a systematic and orderly process as in a show of formality, p=0.010; the healthcare providers treated the patients in a very friendly, courteous manner and showed a compassionate attitude toward them as a gesture of friendliness, p=0.011 and; the healthcare providers were cooperative as they did not ignore what patients told them, provided reassurance and guidance if necessary as for cooperativeness, p=0.006.

The mean score ratings were similar at both hospitals in areas of: the healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information I was expecting to receive about my health as for health information (mean, 4.5). Whereas on the area of; the patients found that the healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions depicting competitiveness and; the healthcare

provider had respect for culture and their values/beliefs did not affect the communication with patients as on cultural dimension were rated higher by the patients at Kenyatta National Hospital than as by patients at MP Shah Hospital but with no significant differences.

The theoretical underpinning of accommodation processes of convergence and divergence of communication accommodation theory would be argued to come into play as concerns these findings. Convergence was realized between the patients and HCPs at MP Shah Hospital on formality, friendliness and cooperativeness including the aspect of physical environment (consultation room) and vice versa in regard to Kenyatta National Hospital. This finding as analysed above do then suggests that the patients at MP Shah Hospital found the physical (consultation room) environment more favourable, comfortable and inviting. Formality was well observed by the healthcare providers during the interactions, with friendliness being exhibited as well as noticed and cooperativeness was as forthcoming as anticipated by patients in comparison to what the patients at Kenyatta National Hospital reported as depicted by the ratings in the study finding.

Accordingly, in relating to past studies, Joseph & Ulrich, 2007 observed that poorly designed environments can result in private conversations between patients and healthcare providers being overheard by unintended listeners, resulting in unacceptable breaches of confidentiality and therefore affect communication dynamics between the patients and the HCPs. This is demonstrable and as the situation showed at KNH, the consultation rooms were mostly partitioned by curtains, small in size and appeared congested unlike at MP Shah Hospital where they are walled with a lockable door, properly ventilated and quite spacious.

The outcome on physical (consultation room) environment concur with findings by Kieft, de Brouwer, Francke and Delnoij (2014) in a study by the Picker Institute Europe which revealed that among the quality aspects was attention to physical and environmental needs. Indeed Salonen & Morawska (2013) documented that in the late 19th century, Florence Nightingale had suggested that patients would recover more quickly if they were cared for in an environment that had natural light,

ventilation, cleanliness and basic sanitation, and hence, an environment that was conducive. This two study findings demonstrate the case for the contrasts between KNH and MP Shah Hospital as discussed above.

4.4.5. The moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya

This section presents findings on the moderating effect of demographic characteristics in regard to healthcare provider patient communication. This will be discussed in tandem with findings of the healthcare providers' sociodemographic characteristics that brings out the distribution in terms of age, gender and the duration worked at the diabetes and endocrinology clinics of Kenyatta National Hospital and MP Shah Hospital as earlier analysed in table 4.5. This is because the patients were rating the healthcare providers on age and gender and what effect it had on the diabetes mellitus management practices during the healthcare provider patient communication interactions.

Table 4.40: The moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices at Kenyatta National Hospital

Variable	Overall (n=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
Age				
I was satisfied with young healthcare providers during our communication interactions.	3.8 (1.0)	3.8(1.0)	3.8(1.0)	0.978
I was satisfied with older healthcare providers during our communication interactions.	4.1 (0.9)	4.0 (0.9)	4.2 (0.9)	0.090
Gender				
I was satisfied with the female healthcare providers during our communication interactions.	4.0 (1.0)	3.9 (0.9)	4.0 (1.0)	0.861
I was satisfied with male healthcare providers during our communication interactions.	4.1 (0.9)	4.0 (0.9)	4.1 (0.9)	0.132
Socio economic status				
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my financial status.	2.7 (1.3)	2.9 (1.2)	2.7 (1.3)	0.231
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my quality of life.	3.2 (1.2)	3.3 (1.1)	3.2 (1.2)	0.745
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my level of assets.	3.2 (1.2)	3.2 (1.1)	3.2 (1.2)	0.921
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my ability to save.	2.7 (1.3)	2.8 (1.2)	2.6 (1.3)	0.201

Source: Field Data (2019)

In table 4.40 above, patients at Kenyatta National Hospital rated highly their satisfaction for older healthcare providers (HCPs), mean 4.1(SD 0.9). This was reflected in the score ratings by patients of both the female, mean 4.2(SD 0.9) as well

as male, mean 4.0 (SD 0.9) gender respectively, an indication that patients had a preference for the older HCPs.

Overall, high satisfaction was also given by the patients for HCPs of the male gender (mean, 4.1(SD 0.9)). When examined further, it was noted that indeed the mean scores for the male gender HCPs were much higher as given by the male (mean, 4.0 (SD 0.9)) as well as the female patients, mean 4.1 (SD 0.9) than for the female HCPs, hence showing a higher preference for the male gender HCPs. In respect, the female patients mean score ratings were higher than those by male patients in all the categories of age and gender for the healthcare providers except for the younger healthcare providers where the rating was similar (mean score, 3.8(SD 1.0)).

Socio economic status in overall had averagely low ratings with the lowest satisfaction mean scores observed in the financial status and the ability save with a mean, 2.7 (SD 1.3) in each of the areas. The highest score rating on quality of life (mean, 3.2 (SD 1.2)) as well as level of assets with (mean, 3.2 (SD 1.2)).

On gender the mean score ratings were highest on the quality of life (mean, 3.3(SD 1.1)) by the male patients while the level of assets and quality of life with mean, 3.2(SD 1.2)) for each by the female patients. The lowest mean score rating was on ability to save (mean, 2.8 (SD 1.2)) with rating on financial status of mean, 2.9 (SD 1.2) by the male patients. The lowest score rating by female patients was on the ability to save (mean, 2.6 (SD 1.3)) with the rating on financial status of mean, 2.7(SD 1.3).

From the findings it could be said that the male patients were better than the female patients on all the SES aspects except on the level of assets. There was no significant difference by gender as rated by the patients on the demographic characteristics of age, gender and socio economic status at Kenyatta National Hospital.

Table 4.41: The moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices at MP Shah Hospital

Variable	Overall (n=87) Mean (SD)	Male (n=43) Mean (SD)	Female (n=44) Mean (SD)	P value
Age				
I was satisfied with young healthcare providers during our communication interactions.	4.0 (0.9)	3.8 (1.0)	4.1 (0.7)	0.082
I was satisfied with older healthcare providers during our communication interactions.	4.2 (0.8)	4.2 (1.0)	4.3 (0.7)	0.539
Gender				
I was satisfied with the female healthcare providers during our communication interactions.	4.1 (1.0)	4.1 (1.1)	4.2 (0.8)	0.524
I was satisfied with male healthcare providers during our communication interactions.	4.0 (0.9)	3.9 (1.1)	4.1 (0.8)	0.304
Socio economic status				
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my financial status.	3.2 (1.1)	3.3 (1.0)	3.1 (1.2)	0.383
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my quality of life.	3.5 (1.0)	3.5 (1.0)	3.5 (1.0)	0.871
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my level of assets.	3.5 (1.0)	3.5 (1.1)	3.5 (1.0)	0.875
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my ability to save.	3.3 (1.0)	3.4 (1.0)	3.1 (1.0)	0.198

Source: Field Data (2019)

As shown in table 4.41, patients at MP Shah hospital showed high satisfaction with healthcare providers (HCPs) of all age groups and either gender as indicated by the mean score ratings. Though, it was observed that the overall mean scores were a little

higher for the older HCPs, mean 4.2(0.8) and female HCPs, mean 4.1(1.0). The rating was respectively higher for the older HCPs and the female HCPs as rated by either the male or female patients, hence showing preference for the older and female gender HCPs during their communication interactions. In respect, the female patients mean score ratings were higher than those by male patients in all the categories of age and gender for the HCPs.

Socio economic status delivered averagely low scores in overall, with the lowest satisfaction seen in relation to financial status, mean 3.2 (SD1.1) followed by the ability to save, mean 3.3 (SD1.0). The highest score rating (mean, 3.5 (SD 1.0)) was in both quality of live and level of assets. In regard to gender, the male as well as female patients rated themselves highest on quality of life and ability to save with similar score rating (mean, 3.5).

The lowest mean score rating was in financial status (mean, 3.3 (SD 1.0)) followed by the ability to save (mean, 3.4 (SD 1.0)) by the male patients whereas the lowest score rating by female patients was on financial status and ability to save (mean, 3.1). There were no significant differences observed in all areas of demographic characteristics of age, gender and socio economic status in regard to the satisfaction mean scores as rated by patients. There was a differing preference for male / female healthcare providers by both the male and female patients at both hospitals in this current study as shown in table 4.40 and table 4.41.

The finding hence gets credence from Roter, Hall & Aoki (2002) who documented that gender had stimulated a good deal of interest as a possible source of variation in interpersonal aspects of medical practice. Though not in complete support of the current study findings, the researchers noted that female physcians facilitate more open and equal exchange and a different therapeutic milieu from that of male physcians. Female primary physcians engaged in more communication that could be considered patient centered and had longer visits than their male colleagues. This then triggers the need to deeply research further on the gender factors that are likely to be the reasons on this variance as the implication on management outcomes for the patients with the condition could be dire.

Table 4.42: Comparison of the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
Age			
I was satisfied with young healthcare providers during our communication interactions.	3.8 (1.0)	4.0 (0.9)	0.137
I was satisfied with older healthcare providers during our communication interactions.	4.1 (0.9)	4.2 (0.8)	0.324
Gender			
I was satisfied with the female healthcare providers during our communication interactions.	4.0 (1.0)	4.1 (1.0)	0.128
I was satisfied with male healthcare providers during our communication interactions.	4.1 (0.9)	4.0 (0.9)	0.540
Socio economic status			
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my financial status.	2.7 (1.3)	3.2 (1.1)	**0.002**
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my quality of life.	3.2 (1.2)	3.5 (1.0)	**0.044**
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my level of assets.	3.2 (1.2)	3.5 (1.0)	**0.023**
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my ability to save.	2.7 (1.3)	3.3 (1.0)	**< 0.001**

Source: Field Data (2019)

When it came to comparisons it was clear that there were no significant differences in the satisfaction of patients at both Kenyatta National Hospital and MP Shah Hospital in relation to the age and gender of the healthcare providers as shown in

table 4.42. It was evident from the score ratings that the patients at the two hospitals in regard to age were more satisfied with and preferred interacting with older healthcare providers than young healthcare providers. This could be explained by the findings on the age distribution of the of HCPs at the two hospitals as earlier discussed since it was noted that the majority of the HCPs were above thirty five (35) years of age with only three (3) being below thirty five (35) years, an age below which one would be considered to be younger.

When it came to gender of the HCPs, patients at the two hospitals showed a difference. Patients at KNH gave male HCPs a higher score, mean 4.1(SD0.9), hence had a likely preference for male HCPs and those at MP Shah hospital gave the female HCPs a higher score, mean 4.1 (SD1.0), hence with a likely preference for the female HCPs. Why this differing occurrence between the two hospitals! This could be explained not only by the fact that as appears in table 4.5 on socio demographic characteristics, that most of HCPs interacting with patients at MP Shah Hospital were of the female gender that was similarly captured at KNH. But most likely the difference could also be explained by the personal attributes of either gender at these hospitals' in the probable way they interacted with the patients in regard to the interactive approaches while communicating with the patients.

The findings in the current study tend to augur well with past studies. Scheiber et al, 2014 documented that the patient doctor gender concordance/discordance was associated with agreement/disagreement on advice given during the consultation, hence physicians needed to be conscious of their own demographic characteristics and perceptions. The researcher further noted that a better agreement was observed for female concordant dyads on advice given on nutrition and exercise, and that female doctors appeared to facilitate agreement with their patients on advice given on nutrition.

Cooper and Roter, 2013 stated that as compared with women, men had been shown to engage in less nonverbal communication than women. The researcher went on to put forth that although male and female physicians did not differ in how much biomedical information they conveyed, the male engaged in less verbal and

nonverbal communicative behaviour than female physicians. This was to the extent that male physicians' behavior and attitudes were less patient centered than those of female physicians, hence there may be implications for overall quality of care and health outcomes.

On socio economic status, patients at MP Shah Hospital had significantly higher satisfaction in regard to their financial status (p=0.002), quality of life (p=0.044), level of assets (p=0.023) and ability to save (p=0.001) than their counterparts at Kenyatta National Hospital (KNH). What this meant was that the socio economic status of patients at KNH in regard to diabetes mellitus condition tended to be affected in all the four areas of the demographic characteristic leaving them at a much worse level than they were previously.

Mulder et al, 2014 asserted that all in all, poor health behavior modification following diagnosis places diabetic patients at an increased risk of disease progression, impacting their quality of life as demonstrated by findings at the two hospitals. Cooper and Roter, 2013 on the other hand additionally noted that patients' social class was a significant predictor of how many explanations are volunteered by doctors and that physicians spontaneously offered more explanations to patients of higher-class backgrounds during visits than to other patients.

Could such findings probably be an explanation for the differences that are depicted between Kenyatta National Hospital and MP Shah Hospital on the socio economic status? The researcher would hence implore for more research on this aspect as a moderator in healthcare provider patient communication on DMMPs.

Accordingly Arpey, Gaglioti and Rosenbaum, 2017 argued that there was evidence that socioeconomic status (SES) affects individual’s health outcomes and the health care they receive. The researchers pointed out that those patients of lower SES were more likely to have worse self-reported health, lower life expectancy and suffer from more chronic conditions like diabetes mellitus when compared with those of higher SES. The current study outcomes do attest to the past research findings in regard to patients dealing with diabetes mellitus.

In trying to answer the above question while relating the above findings on how patients rated themselves on socioeconomic status, it is worth noting that with the MP Shah hospital patients rating themselves significantly better than the patients at Kenyatta National Hospital, it is a finding that is well supported by the findings on their socio demographic factors of marital status, education level and occupation as discussed hitherto at the beginning of chapter 4.

4.4.6. Diabetes mellitus management practices (DMMPs) in healthcare provider patient communication

Singh et al, 2017 did point out that higher quality of healthcare experiences, providers' visits within past year and annual routine checkups as measures of health utilization predicts improved patient-centered provider communication. These are some of the salient requirements in diabetes mellitus management practices for optimal satisfactory outcome among patients and relate to the findings that follow.

This section presents data analysis on the various management practices of diabetes mellitus in regard to patients' communication interactions with the healthcare providers at Kenyatta National Hospital and MP Shah Hospital and what effect the communication had on the practices in the long run in dealing with diabetes mellitus as a disease condition. The patients rated themselves on how they had performed so far in the course of time from the time of diagnosis to the point of data collection.

Table 4.43: Diabetes mellitus management practices in patients at Kenyatta National Hospital

Variable	Overall (N=313) Mean (SD)	Male (n=123) Mean (SD)	Female (n=190) Mean (SD)	P value
I do follow and adhere to the dietary food intakes as discussed with the healthcare providers.	4.4 (0.8)	4.4 (0.8)	4.5 (0.9)	0.618
I take the medicines according to the instruction and as prescribed by the healthcare providers.	4.6 (0.6)	4.7 (0.5)	4.6 (0.7)	0.510
I do engage in regular physical activities/ exercises as discussed with the healthcare providers.	4.2 (1.0)	4.2 (1.0)	4.3 (1.0)	0.886
I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions.	4.7 (0.6)	4.6 (0.6)	4.7 (0.6)	0.293
I do check my blood sugar levels in monitoring of the glycaemic control while at home on a regular basis as discussed with the healthcare providers.	4.5 (0.8)	4.4 (0.8)	4.5 (0.8)	0.703
Overall diabetes management practices	**87.4 (15.6)**	**87.0 (15.3)**	**87.6 (15.8)**	**0.741**

Source: Field Data (2019)

In table 4.43, the rating of diabetes mellitus management practices by patients at KNH was high. The overall mean score was 87.4(SD15.6), with a slightly higher mean score rating by the female patients (87.6 (15.8)) than that by the male patients (87.0 (15.3)). The female patients' score ratings were higher in most of the areas of DMMPs except on the component; I take the medicines according to the instruction and as prescribed by the healthcare providers in regard to medication therapy which was rated higher by the male patients (mean, 4.7 (0.5)) as compared to the female patients (mean, 4.6 (0.7)).

There were no significant differences in score ratings by gender overall and in all areas of the management practices. Therefore, overall it can be said that patients at KNH were able to engage in the required diabetes mellitus management practices as discussed during the communication interactions with the healthcare providers and thereby achieved to a high percentage the ultimate goal of satisfaction in communication as a vital ingredient in diabetes mellitus management practices and outcomes.

Table 4.44: Diabetes mellitus management practices at MP Shah Hospital

Variable	Overall (N=87) Mean (SD)	Male (n=43) Mean (SD)	Female (n=44) Mean (SD)	P value
I do follow and adhere to the dietary food intakes as discussed with the healthcare providers.	4.4 (0.9)	4.4 (0.9)	4.3 (1.0)	0.784
I take the medicines according to the instruction and as prescribed by the healthcare providers.	4.7 (0.5)	4.7 (0.5)	4.6 (0.6)	0.340
I do engage in regular physical activities/ exercises as discussed with the healthcare providers.	4.4 (0.8)	4.4 (0.8)	4.3 (0.8)	0.858
I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions.	4.5 (0.6)	4.5 (0.6)	4.6 (0.6)	0.543
I do check my blood sugar levels in monitoring of the glycaemic control while at home on a regular basis as discussed with the healthcare providers.	4.5 (0.7)	4.4 (0.8)	4.6 (0.5)	0.194
Overall diabetes management practices	87.3 (12.7)	87.1 (12.5)	87.5 (13.1)	0.882

Source: Field Data (2019)

At MP Shah Hospital as shown in table 4.44, the rating of diabetes mellitus management practices among patients was equally high with an overall mean score rating of 87.3(SD15.6) that is well reflected in the male (mean, 87.1 (12.5)) as well as in the female gender (mean, 87.5 (13.1)).

The male patients' ratings were higher in most of the areas of DMMPs except on the components of; I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions as regards clinic attendance follow ups and; I do check my blood sugar levels in monitoring of the glycaemic control while at home on a regular basis as discussed with the healthcare providers in relation to monitoring of glycaemic control which were rated higher by the female patients with mean, 4.6 (0.6)) and mean, 4.6 (0.5) than by the male patients with score ratings of mean, 4.5 (0.6) and mean, 4.4 (0.8) in the two areas respectively.

There was no significant difference in score rating by gender overall as well as on the individual areas of DMMPs. It can therefore be deduced that the high score rating by male patients at both hospitals on medication therapy could be an indication of their high preference for this management practice as a better way in the treatment of diabetes and why they were more likely to engage in this practice than in the other DMMPs. It is also important to note that the male patients' score ratings were higher in most of the DMMPs at MP Shah Hospital as compared to the female patients whereas at Kenyatta National Hospital the female patients score ratings were higher in most of the DMMPs in comparison to the male patients; why there would be this kind of variation need to be investigated on further to realise the likely contributing factors on the differences between the two hospital settings.

Table 4.45: Comparison of diabetes mellitus management practices between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=313) Mean (SD)	MP Shah (n=87) Mean (SD)	P value
I do follow and adhere to the dietary food intakes as discussed with the healthcare providers.	4.4 (0.8)	4.4 (0.9)	0.463
I take the medicines according to the instruction and as prescribed by the healthcare providers.	4.6 (0.6)	4.7 (0.5)	0.774
I do engage in regular physical activities/ exercises as discussed with the healthcare providers.	4.2 (1.0)	4.4 (0.8)	0.351
I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions.	4.7 (0.6)	4.5 (0.6)	**0.025**
I do check my blood sugar levels in monitoring of the glycaemic control while at home on a regular basis as discussed with the healthcare providers.	4.5 (0.8)	4.5 (0.7)	0.388
Overall diabetes management practices	**87.4 (15.6)**	**87.3 (12.7)**	**0.957**

Source: Field Data (2019)

In making comparisons as noted in table 4.45, it is clear that even though the overall mean score rating was slightly higher in diabetes mellitus management practices at Kenyatta National Hospital as compared to MP Shah Hospital, no significant difference was observed, p=0.957. The score ratings by the patients at MP Shah Hospital were higher on the components of; I take the medicines according to the

instruction and as prescribed by the healthcare providers in regard to medication therapy and of; I do engage in regular physical activities/ exercises as discussed with the healthcare providers as for the physical activities/exercises as compared to patient at Kenyatta National Hospital. The researcher supposes that the high scores on medication therapy by MP Shah Hospital could be due to the readily available medicines at the hospital facility. More so the medicines are dispensed at the very diabetic clinic where there is a pharmacy and also the possible reason of patients' ability at this hospital to afford in spite of the costs.

As for physical activity/exercises, the plausible reason could be that at MP Shah Hospital clinic there is an exercise doctor who the patients consult and are most likely taken through the various ways on how to adopt to the practice as part of the management practices unlike at KNH. Ratings with similar mean scores by patient were observed on dietary therapy (mean, 4.4) and monitoring of glycaemic control (mean, 4.5) at both hospitals.

However, patients rated the component; I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions in regard to clinic attendance follow ups significantly higher at Kenyatta National Hospital (4.7(SD 0.6)) than at MP Shah Hospital (4.5(SD 0.6)), p=0.025. This suggests that patients at Kenyatta National Hospital unlike the ones at MP Shah hospital tend to adhere more to the given appointment clinic attendance follow up dates. Why this could be the case would be in the most likely reason of the health cost of treatment/management involved, with the cost of being attended to at KNH likely to be lower than that at MP Shah Hospital. Given this observation, the researcher would implore for more research on this aspect for solid evidence to it.

The findings at both hospitals are in harmony with Heisler et al, 2002 study which noted that ratings of providers' communication effectiveness were more important in predicting diabetes self-management and that higher ratings in provider communication (PCOM) were associated with higher self-management among patients.

4.4.7. Regression Analysis

In this section, the nature of relationship between healthcare provider patient communication and diabetes mellitus management practices was analysed to find out the association and also how significant the relationship was between the independent and dependent variables. This was first done in regard to all the patient participants to get the entire outcome of the study sample and then at the two separate hospitals to get the outcome at each of them.

Diabetes management practices score was first analysed individually with each of the independent variables (IV) by simple linear regression to determine the effect of each variable on its own on the outcome variable. Afterwards, analysis was performed with all the IVs combined by multiple linear regression model 1 to sieve out those variables that would still have significant relationship with the outcome variable. Finally this was done with all the IVs together with the moderating variables by multiple linear regression model 2 to assess the moderating effect on the outcome variable.

4.4.7.1. Simple Linear Regression

Simple linear regression was performed to establish the relationship between each of the independent variables individually and diabetes mellitus management practices as follows. Were the independent variables individually on their own predictors of the dependent variable in regard to the relationship outcome between them? This is what the analysis in this section seeks to bring out.

Also in this section, the relationship between the demographic characteristics and diabetes mellitus management practices are presented and discussed. This is to find out if there is any impact of the moderating effects of the demographic factors of age, gender and socioeconomic status during the communication interaction between the patients and healthcare providers on diabetes mellitus management practices and this will also be done in the overall and by the type of hospital.

4.4.7.1.1. Healthcare provider patient communication (HCPPC) and diabetes mellitus management practices (DMMPs) in overall

Table 4.46: Simple linear regression between HCPPC and DMMPs

Variable	β (95% CI)	P value
Verbal language use	0.39 (0.28, 0.51)	< **0.001**
Nonverbal communicative behavior	0.50 (0.39, 0.61)	< **0.001**
Noise	-0.28 (-0.35, -0.21)	< **0.001**
Environmental context	0.56 (0.48, 0.65)	< **0.001**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.46, verbal language use (VLU) use was found to be significantly and positively associated to diabetes mellitus management practices among patients, [β=0.39 (95% CI (0.28, 0.51)), p<0.001]. Similarly, there was positive significant relationship between diabetes mellitus management practices and nonverbal communicative behavior (NVCB) [β=0.50, (95% CI (0.39, 0.61)), p<0.001] and the environmental context (EC) [β=0.56 (95% CI (0.48, 0.65)), p<0.001]. Noise (N) had significantly negative relationship with diabetes mellitus management practices of the patients, [β= -0.28 (95% CI (-0.35, -0.21)), p<0.001].

These findings are of the indication that verbal language use, non-verbal communicative behavior and the environmental context not only favourably and positively influenced but also had significantly positive effect on diabetes mellitus management practices among patients during communication with the healthcare providers. A unit increase in VLU, NVCB and EC had corresponding increase in DMMPs among the patients. On the other hand, noise had significantly negative effect on diabetes mellitus management practices. This means that for a unit increase in noise there was corresponding decrease in the DMMPs among the patients. Therefore, the IVs were independently significant predictors of the response variable.

4.4.7.1.2. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) by Hospital

Table 4.47: Simple linear regression between HCPPC and DMMPs by Hospital

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Verbal language use	0.40 (0.27, 0.53)	< **0.001**	0.43 (0.19, 0.66)	< **0.001**
Nonverbal communicative behavior	0.52 (0.40, 0.64)	< **0.001**	0.45 (0.23, 0.68)	< **0.001**
Noise	-0.36 (-0.46, -0.27)	< **0.001**	-0.16 (-0.27, -0.05)	**0.005**
Environmental context	0.59 (0.50, 0.68)	< **0.001**	0.45 (0.27, 0.63)	< **0.001**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

Correspondingly as appears in table 4.47, similar relationships were found when the analysis was stratified in regard to Kenyatta National Hospital and MP Shah Hospital patients. Significant positive relationship was found among patients in regard to diabetes mellitus management practices and verbal language use, [β = 0.40 (95% CI (0.27, 0.53)), < 0.001] at KNH and [β = 0.43 (95% CI (0.19, 0.66)), < 0.001] at MP Shah Hospital. Therefore, a unit increase in verbal language resulted in improvement in DMMPs overall, at KNH and MP Shah Hospital.

Though there is paucity of data on composite nature of research on the healthcare provider patient communication variables as is in this study, there are studies with findings that are comparable to findings as above. Partida, 2012, Kourkouta & Papathanasiou, 2014 and Hacker et al, 2012 found out in their findings that language concordance fosters diabetes mellitus management practices. Infact Hacker et al, 2012 noted that patients who received 100% of their primary care visits with

language concordant providers were least likely to have diabetes-related emergency department visits compared to other groups (p<0001) in the following 6 months, suggesting that these groups may have the most to benefit from language-concordant providers, a finding that is well reflected in this current study on verbal language.

Significant positive relationship was found among patients in regard to diabetes mellitus management practices and nonverbal communicative behavior, [β = 0.52 (95% CI (0.40, 0.64)), < 0.001] at KNH and [β = 0.45 (95% CI (0.23, 0.68)), < 0.001] at MP Shah Hospital. This was of indication that a unit increase in NVCB lead to improvement in DMMPs. Additionally, significant positive relationship was found among patients in regard to diabetes mellitus management practices and environmental context, [β =0.59 (95% CI (0.50, 0.68)), < 0.001 at KNH and [β = 0.45 (95% CI (0.27, 0.63)), < 0.001] at MP Shah Hospital. A unit increase in EC brought about improvement in DMMPs.

The current study outcome on EC are in line with O'Halloran, Worrall & Hickson, 2010 report of there being many environmental factors that influence communication between patients and their healthcare providers. Additionally, Salonen & Morawska, 2013 elucidated that patients would recover more quickly if they were cared for in an environment that was conducive to the patients with Kieft, de Brouwer, Francke and Delnoij, 2014 study having revealed among the quality aspects, attention to physical and environmental needs.

As for the noise variable, there was significant negative relationship with diabetes mellitus management practices, [β = -0.36 (95% CI (-0.46, -0.27)), < 0.001] at KNH and [β = -0.16 (95% CI (-0.27, -0.05)), p= 0.005] at MP Shah Hospital. This shows that a unit increase in noise led to a decrease in DMMPs. These outcomes agree with Salonen, Heidi & Morawska, Lidia, 2013 that among patients, noise is one of the features of the ambient environment that patients complain about most frequently.

The findings also concur with Chew, Shariff-Ghazali & Fernandez, 2014 study outcome that patients with diabetes mellitus (DM) were at high risk of decreased psychological well-being in addition to effects by other types of noises which were already present in the patients at the time of diagnosis, due to strained coping with

changed life routine right from the time of diagnosis and likely had a decrease in the DM outcome. Research study by Juang et al, 2010 and in accordance to expression by the medical care staff, the patients and visitors, significant correlations were found in relation to experience of noise levels from different noise sources.

Therefore, apart from the noise variable, the other three variables of verbal language use, nonverbal communicative behaviour and environmental context in healthcare provider patient communication had favourable and positive influence on DMMPs. As such had positive significant effect on diabetes mellitus management practices at Kenyatta National Hospital and MP Shah Hospital respectively. On the other hand, noise had negative significant effect and therefore negative influence on diabetes mellitus management practices. Again, as in the overrall outcome above, by hospital, the IVs independently predicted the response variable. Considered individually, the predictor variables other than noise were responsible for patients' good performance in the DM management practices overall and at either of the two hospitals.

4.4.7.1.3. Demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in overall

Table 4.48: Simple linear regression between demographic characteristics and DMMPs overall

Variable	β (95% CI)	P value
Age		
Young healthcare providers	3.9 (2.4-5.3)	**<0.001**
Older healthcare providers	3.7 (2.1-5.3)	**<0.001**
Gender		
Female healthcare providers	4.7 (3.3-6.1)	**<0.001**
Male healthcare providers	2.7 (1.1-4.3)	**0.001**
Socio economic status		
Financial status	- 0.8 (-0.4-1.9)	0.196
Quality of life	2.2 (0.9-3.4)	0**.001**
Level of assets	1.5 (0.3-2.8)	**0.019**
Ability to save	1.4 (0.3-2.6)	**0.016**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In accordance with the analysis, age and gender were found to have significantly positive relationship with diabetes mellitus management practices as in table 4.48. These were; for age, [β=3.9 (95% CI (2.4-5.3)), p<0.001] for the young HCPs and [β=3.7 (95% CI (2.1-5.3)), p<0.001] for the older HCPs. Similarly, for gender, [β=4.7, (95% CI (3.3-6.1)), p<0.001] for the female HCPs and [β=2.7 (95% CI (1.1-4.3)), p=0.001] for the male HCPs respectively. The findings show that a unit increase on age and gender was responsible for improvement in DMMPs. Socio economic status was found to have a significant positive relationship with diabetes management practices of the patients on the quality of life, [β=2.2, (95% CI (0.9-3.4)), p=0.001], level of assets, [β=1.5 (95% CI (0.3-2.8)), p=0.019 and the ability to save, [β=1.4 (95% CI (0.3-2.6)), p=0.016]. There was negative relationship in regard

to financial status but with no significant effect, [β= -0.8, (95% CI (-0.4-1.9)), p=0.196]. In context therefore, it shows that while other aspects of SECs had significant positive relationship on diabetes mellitus management practices during communication between the patients and the healthcare providers, financial status did have a negative influence with no significant effect in regard. Therefore a unit increase in quality of life, level of assets and ability to save was equally responsible for improvement in DMMPs unlike financial status in which a unit increase brought about a decrease in DMMPs.

4.4.7.1.4. Demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices by Hospital

Table 4.49: Simple linear regression between demographic characteristics and DMMPs by Hospital

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Age				
Young healthcare providers	3.8 (2.2-5.5)	**<0.001**	4.2 (1.2-7.3)	**0.007**
Older healthcare providers	3.7 (1.9-5.5)	**<0.001**	3.7 (0.5-6.9)	**0.024**
Gender				
Female healthcare providers	5.1 (3.5-6.8)	**<0.001**	3.3 (0.6-6.0)	**0.017**
Male healthcare providers	2.6 (0.8-4.5)	**0.006**	2.9 (0.04-5.8)	**0.047**
Socio economic status				
Financial status	0.9 (-0.5-2.2)	0.212	0.5 (-2.0-2.9)	0.701
Quality of life	2.3 (0.9-3.7)	**0.002**	1.6 (-1.3-4.4)	0.276
Level of assets	1.9 (0.4-3.3)	**0.014**	0.1 (-2.6-2.8)	0.926
Ability to save	2.0 (0.7-3.3)	**0.003**	-1.6 (-4.3-1.0)	0.229

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

When it came to regression analysis testing by type of hospital as shown in table 4.49, age was found to be significantly and positively related to diabetes mellitus management practices at both hospitals. Similarly, there was significant positive relationship between diabetes mellitus management practices and gender at both health facilities. Hence a unit increase on age and gender led to increase in DMMPs.

On socio economic status, at KNH there was significant positive relationship with diabetes mellitus management practices on quality of life, [β=2.3, (95% CI (0.9-3.7)), p=0.002], level of assets, [β=1.9 (95% CI (0.4-3.3)), p=0.014] and ability to save, [β=2.0 (95% CI (0.7-3.3)), p=0.003]. Whereas there was a positive with no significant relationship in regard to financial status, [β= -0.9, (95% CI (-0.5-2.2)), p=0.212]. Just as in the overral outcome, a unit increase in quality of life, level of assets and ability to save was equally responsible for improvement in DMMPs unlike financial status in which a unit increase brought about a decrease in DMMPs.

At MP Shah Hospital, positive with no significant relationship was found between all the SESs and diabetes management practices of the patients except on ability to save in which there was a negative with no significant relationship. This thus meant that socio economic status had an insignificant relationship with the diabetes mellitus management practices at MP Shah Hospital. A unit increase in all the SES indicators to not lead to any improvement in DMMPs with the SESs of ability to save having an inverse effect though insignificant.

This study like that by Singh et al, 2017 highlights demographic characteristics inclusive of race, ethnicity, age and gender as significant factors that influence patient-centered provider communication. The findings herein are also consistent with Arpey, Gaglioti and Rosenbaum 2017 of there being evidence that socioeconomic status (SES) affects individual's health outcomes and the health care they receive. The researcher observed that patients of lower SES are more likely to have worse self-reported health, lower life expectancy and suffer from more chronic conditions when compared with those of higher SES. They are also likely to receive fewer diagnostic tests and medications for many chronic diseases and have limited access to health care due to cost and coverage.

4.4.7.2. Multiple Linear Regression Model 1 (Adjusted – Communication Variables)

In this section, the healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise and environment context as predictors were all considered together in the multiple linear regression model 1 analysis in order to determine their level of influence on diabetes mellitus management practices.

4.4.7.2.1. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) in overall

The model was further adjusted for the healthcare provider patient communication variables to determine the independent predictors of DMMPs among patients (model 1) overall. Forward stepwise regression method was used to generate the model. Thus, the independent effect of the predictor variables was brought out in the analysis as follows.

Table 4.50: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.579[a]	0.335	0.328	12.29705

a. Predictors (Constant): verbal language use, nonverbal communicative behaviour, noise, environmental context

Source: Field Data (2019)

From table 4.50, the value of R was 0.579, an indication that verbal language use, nonverbal communicative behaviour, noise and environment context as predictors had an influence on DMMPs. From these results, 33.5% variations of DMMPs were as a result of the four independent variables. An analysis of variance (ANOVA) was also done to ascertain whether the four independent variables were significant predictors of DMMPs as summarized in table 4.51 below.

Table 4.51: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30062.880	4	7515.720	49.701	**0.000**[b]
	Residual	59730.870	395	151.217		
	Total	89793.750	399			

a. Dependent Variable: Diabetes mellitus management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context

Source: Field Data (2019)

From table 4.51, the ANOVA findings [F (4, 395) =49.701, P<0.05)] of the significance value of p= 0.000 depicted that there existed significant influence of the predictor variables, nay, verbal language use, nonverbal communicative behaviour, noise and environment context on the response variable, nay diabetes mellitus management practices.

Table 4.52: Multiple regression model 1 (Adjusted communication variables) between HCPPC and DMMPs in overall

Variable	β (95% CI)	P value
Verbal language use	0.04 (-0.09, 0.17)	0.552
Nonverbal communicative behavior	0.15 (0.03, 0.27)	**0.016**
Noise	-0.07 (-0.14, 0.01)	0.080
Environmental context	0.45 (0.35, 0.56)	**<0.001**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From further regression analysis as in table 4.52 above, overall, nonverbal communicative behaviour [β=0.15, (95% CI (0.03, 0.27)), p=0.016] and environmental context [β=0.45, (95% CI (0.35, 0.56)), p<0.001] were statistically

significant on adjustment using stepwise method (model 1). This means each of the two variables had statistically significant positive effect on diabetes mellitus management practices. There was positive improvement in DMMPs as depicted by the regression coefficients with every unit increase in nonverbal communicative behaviour and also environmental context. The finding on nonverbal communicative behaviour gets support from Khan et al, 2014 study that positive, effective, and sensitive nonverbal behavior helps to strengthen the doctor-patient bond.

4.4.7.2.2. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) by Hospital

The model was further adjusted for the healthcare provider patient communication variables to determine the independent predictors of DMMPs among patients (model 1) by hospital. Forward stepwise regression method was used to generate the model. Thus, the independent effect of the predictor variables was brought out in the analysis as follows.

Table 4. 1: Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
M.P.Shah Hospital	0.483[a]	0.233	0.195	11.39921
KNH	0.603[b]	0.363	0.355	12.52436

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context

Source: Field Data (2019)

From table 4.53, the value of R was 0.483 for MP Shah hospital an indication that verbal language use, nonverbal communicative behaviour, noise and environment context as predictors had influence on diabetes mellitus management practices and that a 23.3% variation of DMMPs were as a result of the four independent variables.

The value of R of 0.603 for KNH revealed that the four independent variables as predictors had influence on DMMPs and hence a 36.3% variation of diabetes mellitus management practices were as a result of independent variables.

An analysis of variance (ANOVA) was done to ascertain whether verbal language use, nonverbal communicative behaviour, noise and environment context were a significant predictor of diabetes mellitus management practices and the results were summarized as in Table 4.54 below.

Table 4.54: ANOVA[a]

Clinic	Model		Sum of Squares	df	Mean Square	F	Sig.
M.P.Shah Hospital	1	Regression	3234.988	4	808.747	6.224	**0.000[b]**
		Residual	10655.242	82	129.942		
		Total	13890.230	86			
KNH	1	Regression	27590.145	4	6897.536	43.973	**0.000[c]**
		Residual	48312.731	308	156.860		
		Total	75902.875	312			

a. Dependent Variable: Diabetes management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context

Source: Field Data (2019)

From Table 4.54, the ANOVA finding of [F (4, 82) =6.224, p=0.000)] at MP Shah with the significance value of p=0.000 and [F (4,308) =43.973, p=0.000)] at KNH with the significance value of p=0.000. This depicted that there existed significant influence of the predictor variables of verbal language use, nonverbal communicative behaviour, noise and environment context on the response variable of diabetes mellitus management practices. All the independent variables were then correlated to the dependent variable to determine the predictor variables value on diabetes mellitus management practices overtime and this is summarised in table 4.55 that follow with the attendant discussions.

Table 4.55: Multiple regression model 1 (Adjusted- communication variables) between HCPPC and DMMPs by Hospital

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Verbal language use	0.05 (-0.10, 0.19)	0.513	0.09 (-0.21, 0.39)	0.552
Nonverbal communicative behavior	0.20 (0.08, 0.33)	**0.002**	0.03 (0.37, 0.42)	0.899
Noise	-0.08 (-0.18, 0.02)	0.128	-0.03 (-0.15, 0.10)	0.680
Environmental context	0.50 (0.39, 0.61)	**<0.001**	0.45 (0.27, 0.63)	**<0.001**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As in table 4.55 above by hospital, the finding on multiple linear regression model 1 was varied. In regard findings on verbal language use were not statistically significant, an indication it did not bring about an enhanced improvement in DMMPs. Therefore, the patients' health outcome was nondependent on it.

Abdulhadi, Al-Shafaee, Wahlström and Hjelm, 2013 observation on language concordance between patients and physicians are in support of current study outcome. The researchers noted that shared understanding of advice and availability of interpreters were elements of support in the consultation and were associated with decreased communication errors, increased patient satisfaction and adherence with medications and follow-ups. Therefore, the current study findings are in congruence with the other past study findings in the various varying aspects as simple linear regression and multiple linear regression model 1 brought out.

Nonverbal communicative behaviour [β=0.20, (95% CI (0.08, 0.33)), p=0.002] was statistically significant in relation to DMMPs at KNH and not at MP Shah Hospital. This implies that NVCB at KNH unlike MP Shah Hospital brought about improved DMMPs. Therefore, patients at KNH found the HCPs nonverbal communicative behaviour more appealing during their interaction than the patients at MP Shah Hospital. On this aspect, HCPs at KNH performed better than their counterparts on this aspect of communication. The plausible reasons could be that in regard to nonverbal communicative behaviour, patients found HCPs at KNH more positively expressive on this as they engaged them unlike the HCPs at MP Shah Hospital.

Beck, Daughtridge and Sloane, 2002 findings align to the current study findings on NVCB in that physician behavior can enhance favorable patient outcomes, such as understanding and adherence to medical regimens and overall satisfaction. The researchers intimated that sixteen specific nonverbal behaviors had been found to be significantly associated with outcomes of interest and that in other instances no association was found for some behaviors such as amount of physician touch, and physician-patient distance; areas of NVCB earlier analysed and discussed in the chapter.

Too, environmental context [β=0.50, (95% CI (0.39, 0.61)), p<0.001] at Kenyatta National Hospital with environmental context [β=0.45, (95% CI (0.27, 0.63)), p<0.001] at MP Shah Hospital were statistically significant on adjustment using stepwise method (model 1). Therefore, the two variables had significantly positive effect, hence influence on DMMPs at KNH with similar observation at MP Shah Hospital in regard to environmental context. The outcome on EC reinforces the argument that the environmental context at the two hospitals led to improvement in DMMPs. As such, none of the facilities could be said to be better than the other on this aspect of HCPPC, though it is apparent from the regression coefficients that for a unit increase in the predictor variable, there was marginally better improvement in the response variable at KNH in comparison to MP Shah Hospital.

The case for KNH in regard to the significant effect of the environmental context could be explained by the relocation of the diabetic center to a more spacious stand-

alone unit with almost all the services touching on DM available. This is unlike the DM clinic previous location that was in the main hospital setup and was shared with other different clinics and as such was always congested. For MP Shah Hospital, the diabetic center is spacious, mainly for diabetes mellitus patients with almost all services given within it. This aspect at both hospitals could be the more likely reasons as to why patients rating of EC were significant effect on the DM management practices.

Abdulhadi et al, 2006 argued that improving the work situation and further improvement in the organizational efficiency of diabetes services positively impacted diabetes management. The study outcome found in overall 52% of the doctors' consultations were not optimal and that some important aspects for a positive consultation environment were fulfilled in only about half of the doctors' consultations: the quality of the nurses' consultations was sub-optimal in about 75% of 85 consultations regarding aspects of consultation environment, care and information. This finding by the researcher though not indicating whether there was significant effect or not on still does underscore the critical importance of environmental context in diabetes management.

Findings on noise though with negative relationship were not statistically significant on diabetes mellitus management practices. In his study, Joseph and Ulrich, 2007 noted that noise or sounds impacts patients in many different ways. That high noise levels negatively impacted patient health and well-being and may slow the process of healing among patients. Ryherd and Waye, 2012 were of similar view that hospital noise was a serious issue that can negatively affect patient. It is thus imperative to note that noises in most instances do impact diabetes management in an inverse way to the detriment of the patient and in the process hampers desired health outcomes what is a likely reality in the current study.

There is paucity of information on previous studies specific to the HCPPC aspects and DMMPs on the occurrences of better outcome at public hospitals in comparison to private hospitals in some instances as found in this study. Though the case, related past studies on communication were found to largely contrast with this finding.

Adhikary, 2018 study found the satisfaction level to be highest among patients for the healthcare givers in private facilities than in the public facilities. Also, Soysal & Yağar, 2017 study determined that in general, practioner participants observed a better level of communication in private hospitals compared to public hospitals. The researcher however observed that patients in public institutions had higher level of satisfaction in the level of communication with the doctors which to some extend mirrors the outcome in the current study. The study also found that the physical structures (environmental context) of public hospitals and private hospitals were assessed almost the same, a finding that concurs with the present study at the two hospitals.

4.4.7.3. Multiple Linear Regression Model 2 (Fully Adjusted with Moderating Variables)

In this section, healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise, environmental context as predictors of diabetes mellitus management practices together with the demographic characteristics were considered in the analysis. This was first done for each independent variable together with the moderating variables; then all the independent variables with the moderating variables. This was to determine the moderating effect of the demographic characteristics on the communication variables. Multiple linear regression model 2 analysis was performed overall and by hospital and found out the following.

4.4.7.3.1. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) with each independent variable overall

In this section, each of the individual independent variable together with the demographic characteristics are considered in the overall analysis as follows.

Table 4.56: Multiple regression model 2 (fully adjusted with moderating variables) between verbal language use and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.30 (0.18, 0.42)	**<0.001**
Age		
Young healthcare providers	0.96 (-1.26, 3.18)	0.395
Older healthcare providers	1.34 (-1.30, 3.98)	0.320
Gender		
Female healthcare providers	3.69 (1.26, 6.12)	**0.003**
Male healthcare providers	-2.71 (-5.38, -0.03)	**0.047**
Socio economic status		
Financial status	-1.57 (-3.28, 0.15)	0.074
Quality of life	0.49 (-1.34, 2.32)	0.598
Level of assets	-0.35 (-2.25, 1.56)	0.721
Ability to save	1.75 (0.09, 3.41)	**0.038**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.56, verbal language use [β=0.30, (95% CI (0.18, 0.42)), p<0.001] remained statistically significant even in consideration of the demographic characteristics. The demographic characteristics of the female healthcare providers [β=3.69, (95% CI (1.26, 6.12)), p<0.003]; male healthcare provider [β= -2.71, (95% CI (-5.38, -0.03)), p<0.047] and ability to save [β=1.75, (95% CI (0.09, 3.41)), p<0.038] were statistically significant. A higher score in verbal language use and female healthcare providers was associated with significant improvement in DMMPs. While a unit increase in the male healthcare provider resulted in a decrease in DMMPs. However, only the female providers' gender and ability to save had positive significant moderating effect on verbal language use while the male healthcare had negative significant moderating effect on verbal language use; the rest of demographic characteristics had no significant moderating effect on verbal language use.

Table 4.57: Multiple regression model 2 (fully adjusted with moderating variables) between nonverbal communicative behaviour and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Nonverbal communicative behaviour	0.42 (0.31, 0.53)	**<0.001**
Age		
Young healthcare providers	0.39 (-1.76, 2.55)	0.719
Older healthcare providers	0.97 (-1.58, 3.53)	0.454
Gender		
Female healthcare providers	3.47 (1.12, 5.81)	**0.004**
Male healthcare providers	-2.33 (-4.92, 0.26)	0.077
Socio economic status		
Financial status	-1.51 (-3.17, 0.14)	0.073
Quality of life	0.75 (-1.01, 2.52)	0.403
Level of assets	-0.12 (-1.96, 1.72)	0.899
Ability to save	1.60 (0.003, 3.20)	**0.050**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in the table 4.57, nonverbal communicative behaviour [β=0.42, (95% CI (0.31, 0.53)), p<0.001] remained statistically significant even in consideration of the demographic characteristics. The demographic characteristics of the female healthcare providers [β=3.47, (95% CI (1.12, 5.81)), p<0.004] and ability to save [β=1.60, (95% CI (0.003, 3.20)), p<0.050] were statistically significant. A higher score in the variables was associated with significant improvement in diabetes mellitus management practices. However, other than the regress in the beta coefficient, all the other demographic characteristics had no significant moderating effect on the nonverbal communicative behaviour in regard to DMMPs except the female healthcare providers' gender and the socioeconomic status aspect of ability to save.

Table 4.58: Multiple regression model 2 (fully adjusted with moderating variables) between noise and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Noise	-0.23 (-0.30, -0.15)	**<0.001**
Age		
Young healthcare providers	1.20 (-0.97, 3.37)	0.279
Older healthcare providers	1.24 (-1.36, 3.85)	0.348
Gender		
Female healthcare providers	3.45 (1.05, 5.84)	**0.005**
Male healthcare providers	-2.81 (-5.44, -0.17)	**0.037**
Socio economic status		
Financial status	-1.43 (-3.12, 0.27)	0.098
Quality of life	0.53 (-1.28, 2.33)	0.565
Level of assets	-0.15 (-2.02, 1.73)	0.879
Ability to save	1.80 (0.17, 3.43)	**0.030**

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in table 4.58, Noise [β= - 0.23, (95% CI (-0.30, -0.15)), p<0.001] remained negatively statistically significant even in consideration of the demographic characteristics. The demographic characteristics of the female healthcare providers [β=3.45, (95% CI (1.05, 5.84)), p<0.005]; male healthcare provider [β= -2.81, (95% CI (-5.44, -0.17)), p<0.037] and ability to save [β=1.80, (95% CI (0.17, 3.43)), p<0.030] were statistically significant. A unit increase in noise resulted in a decrease in diabetes mellitus management practices. A unit increase in the female healthcare provider and ability to save was associated with significant improvement in diabetes mellitus management practices and vice versa for the male healthcare provider. However, other than the regress in the beta coefficient of noise, the female healthcare provider gender and ability to save had positively significant

moderating effect on the noise; whereas the male healthcare provider gender had negatively significant moderating effect on noise in regard to diabetes mellitus management practices.

Table 4.59: Multiple regression model 2 (fully adjusted with moderating variables) between environmental context and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Environmental context	0.51 (0.42, 0.59)	**<0.001**
Age		
Young healthcare providers	0.26 (-1.72, 2.25)	0.795
Older healthcare providers	0.75 (-1.62, 3.11)	0.536
Gender		
Female healthcare providers	1.89 (-0.31, 4.09)	0.091
Male healthcare providers	-0.77 (-3.20, 1.65)	0.530
Socio economic status		
Financial status	-0.56 (-2.11, 0.98)	0.474
Quality of life	0.52 (-1.12, 2.15)	0.537
Level of assets	-0.18 (-1.88, 1.52)	0.837
Ability to save	0.65 (-0.84, 2.15)	0.392

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.59, environmental context [β=0.51, (95% CI (0.42, 0.59)), p<0.001] remained statistically significant even in consideration of the demographic characteristics. The demographic characteristics were not statistically significant. A unit increase in environmental context was associated with significant improvement in diabetes mellitus management practices. However, other than the regress in the beta coefficient, the demographic characteristics had no significant moderating effect on the environmental context.

4.4.7.3.2. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) with each independent variable by Hospital

In this section, each of the individual independent variable together with the demographic characteristics were analysed by hospital as follows.

Table 4.60: Multiple regression model 2 (fully adjusted with moderating variables) between verbal language use and DMMPs by Hospital in Kenya

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Verbal language	0.31 (0.17, 0.44)	**<0.001**	0.28 (-0.002, 0.57)	0.051
Age				
Young healthcare providers	0.66 (-1.82, 3.13)	0.603	3.0 (-3.2, 9.1)	0.340
Older healthcare providers	1.51 (-1.52, 4.55)	0.327	-0.08 (-6.26, 6.11)	0.980
Gender				
Female healthcare providers	4.47 (1.71, 7.22)	**0.002**	1.1 (-5.11, 7.41)	0.716
Male healthcare providers	-3.01 (-6.13, 0.12)	0.059	-1.55 (-7.95, 4.86)	0.632
Socio economic status				
Financial status	-1.84 (-3.79, 0.12)	0.065	0.07 (-3.65, 3.78)	0.971
Quality of life	0.29 (-1.81, 2.39)	0.787	0.60 (-3.55, 4.75)	0.775
Level of assets	-0.61 (-2.75, 1.54)	0.578	1.37 (-3.06, 5.80)	0.539
Ability to save	2.73 (0.88, 4.58)	**0.004**	-2.96 (-7.30, 1.39)	0.179

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

The findings in table 4.60 showed that verbal language use [β=0.31, (95% CI (0.17, 0.44)), p<0.001] at KNH remained statistically significant even in consideration of the demographic characteristics. The demographic characteristics of the female healthcare providers [β=4.47, (95% CI (1.71, 7.22)), p<0.00] and ability to save [β=2.73, (95% CI (0.88, 4.58)), p<0.004] were statistically significant. A higher score in verbal language use, female healthcare providers and ability to save was associated with significant improvement in diabetes mellitus management practices.

While at MP Shah Hospital, none of the variables (IVs/DCs) were statistically significant. However, other than the regress in the beta coefficient, only the demographic characteristics of female healthcare providers and ability to save had significant moderating effect on the verbal language use at KNH. At MP Shah Hospital the demographic characteristics had no significant moderating effect on verbal language use.

Table 4.61: Multiple regression model 2 (fully adjusted with moderating variables) between nonverbal communicative behaviour and DMMPs by Hospital in Kenya

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Nonverbal communicative behavior	0.44 (0.32, 0.57)	**<0.001**	0.35 (0.07, 0.62)	**0.016**
Age				
Young healthcare providers	0.07 (-2.31, 2.44)	0.957	2.24 (-3.92, 8.40)	0.471
Older healthcare providers	0.18 (-5.93, 3.85)	0.529	0.18 (-5.93, 6.29)	0.954
Gender				
Female healthcare providers	4.30 (1.66, 6.94)	**0.002**	1.16 (-5.00, 7.32)	0.709
Male healthcare providers	-2.44 (-5.43, 0.56)	0.111	-1.79 (-8.09, 4.51)	0.573
Socio economic status				
Financial status	-1.58 (-3.45, 0.30)	0.099	-0.53 (-4.23, 3.17)	0.775
Quality of life	0.55 (-1.46, 2.56)	0.590	0.87 (-3.17, 4.91)	0.668
Level of assets	-0.53 (-2.58, 1.53)	0.614	2.26 (-2.05, 6.57)	0.300
Ability to save	2.60 (0.83, 4.37)	**0.004**	-3.52 (-7.71, 0.67)	0.098

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From table 4.61 above, nonverbal communicative behaviour [β=0.44, (95% CI (0.32, 0.57)), p<0.001] at KNH and [β=0.35, (95% CI (0.07, 0.62)), p<0.016] at MP Shah Hospital remained statistically significant even in consideration of the demographic

characteristics. The demographic characteristics of the female healthcare providers [β=4.30, (95% CI (1.66, 6.94)), p<0.002] and ability to save [β=2.60, (95% CI (0.83, 4.37)), p<0.004] at KNH were statistically significant. A higher score in nonverbal communicative behaviour was associated with significant improvement in diabetes mellitus management practices.

The female healthcare providers' gender and ability to save had significant moderating effect on nonverbal communicative behaviour at KNH while at MP Shah Hospital; there was no significant moderating effect on NVCB other than the change of increase in the beta coefficient. However, other than the changes in the beta coefficient, the rest of the demographic characteristics had no significant moderating effect on the nonverbal communicative behaviour.

Table 4.62: Multiple regression model 2 (fully adjusted with moderating variables) between noise and DMMPs by Hospital in Kenya

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Noise	-0.30 (-0.39, -0.20)	**<0.001**	-0.12 (-0.24, -0.002)	**0.047**
Age				
Young healthcare providers	0.44 (-1.97, 2.85)	0.721	3.51 (-2.56, 9.59)	0.253
Older healthcare providers	0.94 (-2.03, 3.92)	0.533	-0.55 (-6.71, 5.60)	0.858
Gender				
Female healthcare providers	4.32 (1.64, 7.01)	**0.002**	1.11 (-5.15, 7.37)	0.725
Male healthcare providers	-2.46 (-5.51, 0.60)	0.114	-1.55 (-7.94, 4.85)	0.631
Socio economic status				
Financial status	-1.70 (-3.61, 0.20)	0.080	-0.18 (-3.90, 3.54)	0.923
Quality of life	0.12 (-2.17, 1.93)	0.907	1.94 (-2.16, 6.05)	0.349
Level of assets	-0.41 (-2.51, 1.68)	0.697	2.15 (-2.22, 6.51)	0.330
Ability to save	2.61 (0.80, 4.41)	**0.005**	-3.73 (-7.96, 0.51)	0.083

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.62 above, Noise [β= -0.30, (95% CI (-0.39, -0.20)), p<0.001] at KNH and [β= -0.12, (95% CI (-0.24, -0.002)), p<0.047 at MP Shah Hospital remained negatively statistically significant even in consideration of the demographic characteristics. The demographic characteristics of the female healthcare providers [β=4.32, (95% CI (1.64, 7.01)), p<0.002] and ability to save [β=2.61, (95% CI (0.80, 4.41)), p<0.005] were statistically significant. A unit increase in noise resulted in a decrease in diabetes mellitus management practices, more at KNH than at MP Shah Hospital.

The demographic characteristics of the female healthcare provider and ability to save at KNH had significant moderating effect on the noise and not at MP Shah Hospital. Therefore, a unit increase in female healthcare provider and ability to save at KNH was associated with significant improvement in diabetes mellitus management practices even in the presence of noise. However, other than the changes in the beta coefficient, the rest of the demographic characteristics had no significant moderating effect, whether positive or negative on the noise.

Table 4.63: Multiple regression model 2 (fully adjusted with moderating variables) between environmental context and DMMPs by Hospital in Kenya

Variable	**KNH**		**MP Shah**	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Environmental context	0.53 (0.43, 0.63)	**<0.001**	0.39 (0.19, 0.60)	**<0.001**
Age				
Young healthcare providers	-0.10 (-2.30, 2.10)	0.929	3.02 (-2.69, 8.72)	0.295
Older healthcare providers	0.67 (-2.03, 3.37)	0.624	-0.33 (-6.10, 5.45)	0.911
Gender				
Female healthcare providers	2.59 (0.11, 5.06)	**0.041**	0.38 (-5.51, 6.26)	0.899
Male healthcare providers	-0.59 (-3.40, 2.22)	0.680	-1.52 (-7.52, 4.47)	0.614
Socio economic status				
Financial status	-0.33 (-2.10, 1.43)	0.710	-0.78 (-4.29, 2.74)	0.662
Quality of life	0.27 (-1.59, 2.13)	0.776	0.87 (-2.96, 4.70)	0.652
Level of assets	-0.65 (-2.56, 1.25)	0.500	2.35 (-1.75, 6.45)	0.256
Ability to save	1.26 (-0.41, 2.93)	0.138	-2.99 (-6.99, 1.01)	0.141

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in the table 4.63, environmental context [β=0.53, (95% CI (0.43, 0.63)), p<0.001] at KNH and [β=0.39, (95% CI (0.19, 0.60)), p<0.001] at MP Shah Hospital remained statistically significant even in consideration of the demographic characteristics. The demographic characteristic of female healthcare provider gender was statistically significant [β=2.59, (95% CI (0.11, 5.06)), p<0.041] at KNH. A unit increase in environmental context was associated with improvement in diabetes mellitus management practices. In regard to female healthcare providers' gender, a unit increase was responsible for improvement in diabetes mellitus management practices. In addition, the female healthcare providers had significant moderating effect on environmental context. However, other than the changes in the beta coefficient, the rest of the demographic characteristics had no significant moderating effect on the environmental context.

4.4.7.3.3. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) with all independent variables overall

The model was further adjusted for demographic characteristics as moderating variables to determine the independent predictors of DMMPs among patients (model 2) overall. This involved all the independent variables together with the demographic characteristics. Forward stepwise regression method was used to generate the model. Thus, the moderating effect of the demographic characteristics was brought out in the analysis as follows.

Table 4.64: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.593[a]	0.352	0.331	12.27821

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context, age(younger/older), gender (male/female), SES(level of assets, ability to save, quality of life and financial status)

Source: Field Data (2019)

From table 4.64, the value of R is 0.593 an indication that verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status as predictors had an influence on diabetes mellitus management practices. Therefore, a 35.2 % variation of diabetes mellitus management practices was as a result of all the predictor and moderating variables considered together in the model.

An analysis of variance (ANOVA) was done to ascertain whether verbal languages use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status were significant predictors of diabetes mellitus management practices. The results are summarized as in table 4.65.

Table 4.65: ANOVA[a]

Model 1		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig**
	Regression	31229.291	12	2602.441	17.26	**0.000[b]**
	Residual	57588.177	382	150.754	3	
	Total	88817.468	394			

a. Dependent Variable: diabetes mellitus management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context, age (younger/older), gender (male/female), SES (level of assets, ability to save, quality of life and financial status)

Source: Field Data (2019)

From table 4.65, the ANOVA finding [F (12, 382) =17.263, P<.05)] with the significance value of p=0.000. This depicted that there was significant influence of the predictor variables of verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status on the response variable of diabetes mellitus management practices.

All the independent variables of verbal language use, nonverbal communicative behaviour, noise and environmental context together with the demographic characteristics of age, gender and socio economic status as moderating variables were then tested in regression analysis to the dependent variable of diabetes mellitus management practices. This was to determine the moderating effect of the demographic characteristics in healthcare provider patient communication on relation to diabetes mellitus management practices overtime. This is summarised in table 4.66 that follow with the discussions in regard.

Table 4.66: Multiple regression model 2 (fully adjusted with moderating variables) between HCPPV and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.01 (-0.12, 0.15)	0.834
Nonverbal communicative behaviour	0.14 (0.02, 0.26)	**0.023**
Noise	-0.05 (-0.12, 0.02)	0.181
Environmental context	0.46 (0.35, 0.56)	**<0.001**
Age		
Young healthcare providers	-0.05 (-2.03, 1.94)	0.964
Older healthcare providers	0.54 (-1.75, 2.83)	0.642
Gender		
Female healthcare providers	1.95 (0.65-3.25)	**0.003**
Male healthcare providers	-0.60 (-2.41, 1.21)	0.512
Socio economic status		
Financial status	-0.52 (-1.86, 0.82)	0.443
Quality of life	0.49 (-1.07, 2.05)	0.540
Level of assets	-0.17 (-1.86, 1.52)	0.841
Ability to save	0.45 (-0.52, 1.42)	0.361

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in the table 4.66, the only statistically significant predictors of diabetes management practices scores included nonverbal communicative behaviours [β=0.14, (95% CI (0.02, 0.26)), p=0.023], environmental context [β=0.56, (95% CI (0.35, 0.56)), p<0.001] even in consideration of the demographic characteristics. A higher score in the two variables was associated with significant improvement in diabetes mellitus management practices even with inclusion of the demographic characteristics.

Additionally, the female healthcare providers [β=1.95, (95% CI (0.65-3.25)), p=0.003] as a moderating variable was a significant predictor of diabetes mellitus management practices scores. It can therefore be said that the demographic characteristic of the female healthcare provider gender had statistically significant moderating effect during healthcare provider patient communication (IVs) interactions on diabetes mellitus management practices in overral. This is seen in the changes on the beta coefficients in regard to multiple regression model 1. A unit increase in in the female HCP gender score led to an increase in the DMMPs score. Therefore, the three variables had significantly positive effect on DMMPs.

The above results in regard to the female HCP gender concur with Roter, Hall & Aoki, 2002 that female physcians facilitate more open and equal exchange and a different therapeutic milieu from that of male physcians that could lead to better management practices. From the above findings it comes out that in regard to simple linear regression and multiple linear regression model 1 the regression coefficients of the independent variables tended to regress. Therefore, the demographic characteristics had moderating effect on the predictor variables in relation to the response variable, though with no effect on the significance levels.

Whilst all the demographic characteristics (DC) had significant effect on DMMPs on simple linear regression except the SES indicator of financial status, only the female HCPs gender remained statistically significant on multiple linear regression model 2. In addition, though not statistically significant, there was insignificant moderating effect of the demographic characteristics on all the independent variables analysed

together in model 2 as the regression coefficients values regressed. Therefore overall the female HCPs gender had positively significant moderating effect in healthcare provider patient communication on diabetes mellitus management practices.

4.4.7.3.4. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) with all independent variables by Hospital

The model was further adjusted for demographic characteristics of age, gender and socio economic status as moderating variables to determine the moderating effect in relation to the independent variables of verbal language use, nonverbal communicative behaviour, noise and environmental context on diabetes mellitus management practices among patients (model 2) by hospital. Forward stepwise regression method was used to generate the model with findings as analysed and discussed as follows.

Table 4.67: Model Summary

	R	R Square	Adjusted R Square	Std. Error of the Estimate
M.P.Shah Hospital	0.530[a]	0.281	0.156	11.60006
KNH	0.623[b]	0.388	0.364	12.44311

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context, age(younger/older), gender (male/female), SES(level of assets, ability to save, quality of life and financial status)

Source: Field Data (2019)

As in table 4.67, the value of R was 0.530 for MP Shah hospital and 0.623 for KNH, a revelation that verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status as predictors had influence on diabetes mellitus management practices. Therefore, a variation of 28.1% at MP Shah Hospital and 38.8% at KNH in diabetes mellitus management practices was as a

consequence of the predictor and moderating variables considered together in the model.

Analysis of variance (ANOVA) was done to ascertain whether verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status were a significant predictor of diabetes mellitus management practices and the results summarized in table 4.68 that follow.

Table 4.68: ANOVA[a]

Clinic	Model		Sum of squares	df	Mean square	F	Sig.
M.P.Shah Hospital	1	Regression	3626.552	12	302.213	2.246	**0.018[b]**
		Residual	9284.728	69	134.561		
		Total	12911.280	81			
KNH	1	Regression	29453.605	12	2454.467	15.853	**0.000[c]**
		Residual	46449.270	300	154.831		
		Total	75902.875	312			

a. Dependent Variable: diabetes management

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context, age(younger/older), gender (male/female), SES(level of assets, ability to save, quality of life and financial status)

Source: Field Data (2019)

As appears in table 4.68, the ANOVA finding were of [F (12, 69) =2.246, P<.05)] with a significance value of p=0.018 at MP Shah Hospital and of [F (12,300) =15.853, P<.05)] with a significance value of p=0.000 at KNH. This revealed the existence of significant influence of the predictor variables of verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status on the response variable of diabetes mellitus management practices.

At Kenyatta National Hospital and MP Shah Hospital as separate entities, all the independent variables of verbal language use, nonverbal communicative behaviour, noise and environmental context together with the demographic characteristics of age, gender and socio economic status as moderating variables were then associated to the dependent variable of diabetes mellitus management practices. This was to determine the moderating effect of the demographic characteristics in healthcare provider patient communication on relation to diabetes mellitus management practices overtime by hospital. This is summarised in table 4.61 that follow with the discussions in regard.

Table 4.69: Multiple regression model 2 (fully adjusted with moderating variables) between HCPPC and DMMPs by Hospital

Variable	KNH		MP Shah	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Verbal language use	0.02 (-0.12, 0.17)	0.747	-0.07 (-0.41, 0.27)	0.688
Nonverbal communicative behavior	0.18 (0.05, 0.31)	**0.006**	-0.05 (-0.48, 0.38)	0.805
Noise	-0.05 (-0.15, 0.02)	0.181	-0.01 (-0.14, 0.13)	0.904
Environmental context	0.47 (0.36, 0.58)	**<0.001**	0.44 (0.26, 0.63)	**<0.001**
Age				
Young healthcare providers	-0.70 (-2.64, 1.24)	0.479	2.04 (-0.93, 5.00)	0.176
Older healthcare providers	0.27 (-2.41, 2.95)	0.843	0.33 (-5.60, 4.95)	0.902
Gender				
Female healthcare providers	2.31 (0.84-3.78)	**0.002**	0.43 (-5.54, 6.40)	0.886
Male healthcare providers	-0.49 (-2.59, 1.63)	0.652	-1.39 (-6.18, 3.40)	0.565
Socio economic status				
Financial status	-0.39 (-2.05, 1.26)	0.643	-0.78 (-4.25, 2.68)	0.653
Quality of life	0.24 (-1.60, 2.09)	0.797	0.55 (-2.88, 3.97)	0.752
Level of assets	-0.79 (-2.45, 0.88)	0.354	2.20 (-1.38, 5.78)	0.225
Ability to save	0.86 (-0.22, 1.94)	0.118	-1.37 (-3.74, 1.01)	0.256

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As shown in table 4.69, the only statistically significant predictors of diabetes mellitus management practices scores included nonverbal communicative behaviours [β=0.18, (95% CI (0.05, 0.31)), p=0.006], environmental context [β=0.47, (95% CI (0.36, 0.58)), p<0.001] at KNH and environmental context [β=0.44, (95% CI (0.26, 0.63)), p<0.001] at MP Shah Hospital. A higher score in these variables was associated with a significant improvement in diabetes mellitus management practices among the patients.

In addition, the female healthcare providers [β=2.31, (95% CI (0.84-3.78)), p=0.002] at KNH unlike at MP Shah Hospital as a moderating variable was a statistically significant predictor of diabetes management practices scores. It can therefore be said that the demographic characteristic of the female healthcare provider gender had statistically significant moderating effect during healthcare provider patient communication (on IVs) interactions on diabetes mellitus management practices. A unit increase in in the female HCPs' gender score led to an increased improvement in the DMMPs at both KNH and not MP Shah Hospital. It therefore means that the three variables had positively significant effect on DMMPs at KNH. This was similarly noted at MP Shah Hospital in regard to environmental context only.

Why the variance in outcome at the two hospitals? While on the female healthcare providers' gender as a moderating demographic characteristic, the researcher would ascribe the findings at KNH unlike MP Shah Hospital to the nature of the facilities, one a public setting and the other a private setting. Likely the female HCPs at the KNH tended to attend to the needs of the patients more favourably than the male HCPs. At MP Shah Hospital, the stature of the facility as a private setting with certain set standards most certainly implore on the HCPs, whether male or female to engage and attend to the patients in some required manner. Since as a private hospital it likely has an inherent self-regulatory system in place for the HCPs that alert the hospital management for swift action to be taken in case of lapses and complaints arising.

These findings as brought out in multiple regression model 2 on the moderating effect of demographic characteristics do dovetail to some extend with Baltaci et al,

2013 findings. The researcher noted that patient satisfaction level was significantly influenced by their sociodemographic features, among them income level, marital and occupational status and gender. The researcher thence stressed that it was essential to take into consideration such potential factors that could influence patient satisfaction level. Indeed, Mast, 2007 argued that how different physician nonverbal behaviors are related to patient satisfaction also depended on the personal attributes of the physician such as gender what is well demonstrated in the current study findings as analysed and discussed above.

Given the preceding findings in relation to the outcome on simple linear regression and multiple linear regression model 2 analysis by hospital, it ought to be noted that the demographic characteristics had moderating effect in relation to the independent variables with changes in the regression coefficients though not significant. The regression coefficient values tended to regress in all independent variables of verbal language use, nonverbal communicative behaviour, noise, environmental context at KNH as well as MP Shah Hospital with no effect on the significance levels.

4.4.8. Hypothesis Testing.

Following the preceding analysis of the healthcare provider patient communication variables and diabetes mellitus management practices, testing of the hypothesis was carried out and is discussed in this section as below. The hypothesis testing was done at a significant level of 0.05 and at 95% confidence level.

Hypothesis 1

The first objective; Ho_1: There is no significant effect of verbal language use by the healthcare providers and the patients on diabetes management practices in selected hospitals in Kenya. Simple linear regression did show that verbal language use had significantly positive effect on diabetes mellitus management practices, $p < 0.001$. This was also noted at Kenyatta National Hospital and the MP Shah hospital where the significance level was, $p < 0.001$ for each. The significance levels were less than the set significance level of $\alpha=0.05$. Therefore, verbal language use had positive significant effect on diabetes mellitus management practices.

However, multiple regression model 1(adjusted –communication variables) showed that there was positive with no significant effect of verbal language use on diabetes mellitus management practices, p=0.552, overall, at KNH, p=0.513 and MP Shah Hospital, p=0.552 respectively. As such, there was failure to reject the null hypothesis. Therefore, there was no significant effect of verbal language use by the healthcare provider and the patient on diabetes mellitus management practices in selected hospitals Kenya.

Hypothesis 2

From the second objective; Ho_2: There is no significant effect of non-verbal communicative behaviour during healthcare provider patient interaction on diabetes management practices in Kenya. On simple linear regression, nonverbal communicative behaviour had significantly positive effect on diabetes mellitus management practices, $p < 0.001$, a p-value that is less than the set significance level of $\alpha=0.05$. This scenario also goes for Kenyatta National Hospital and the MP Shah hospital where the significance level was, $p < 0.001$. Therefore, nonverbal communicative behaviour had positive significant effect on diabetes mellitus management practices.

However, multiple regression model 1(adjusted- communication variables) showed that there was significantly positive effect of nonverbal communicative behaviour on diabetes mellitus management practices, p=0.016 overall, a finding also noted at KNH, p=0.002 but not at MP Shah Hospital where there was a positive insignificant effect, p=0.899. Therefore, the null hypothesis was rejected overall and at KNH whereas there was failure to reject the null hypothesis at MP Shah Hospital. Therefore, there was significant effect of nonverbal communicative behaviour during healthcare provider patient interaction on diabetes mellitus management practices overall in Kenya; at KNH and not at MP Shah Hospital.

Hypothesis 3

The third objective; Ho_3: There are no significant effects of noise during healthcare provider patient communication on diabetes mellitus management practices in

Kenya. On simple linear regression, noise had negatively significant effect on diabetes mellitus management practices during communication between the healthcare providers and the patient, $p < 0.001$, that was less than the set significance level of $\alpha=0.05$. This scenario was also seen at Kenyatta National Hospital, $p<0.001$ and at the MP Shah Hospital, $p<0.005$. Therefore, noise had a negative significant effect on diabetes mellitus management practices.

However, multiple regression model 1(adjusted- communication variables) showed that there was a negative insignificant effect of noise on diabetes mellitus management practices, $p=0.080$ overall, a finding also noted at KNH, $p=0.128$ and MP Shah Hospital, $p=0.680$. Therefore, there was failure to reject the null hypothesis overall; at KNH and MP Shah Hospital. Therefore, there was no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in in selected hospitals in Kenya.

Hypothesis 4

The fourth objective; Ho_4: There is no significant effect of environmental context during healthcare provider patient interaction on diabetes mellitus management practices in Kenya. On simple linear regression, environmental context had positively significant effect with diabetes mellitus management practices, $p < 0.001$ which was less than the set significance level of $\alpha=0.05$. This scenario also obtained at Kenyatta National Hospital and the MP Shah hospital where the significance level was, $p < 0.001$. It therefore means environmental context had positive significant effect on diabetes mellitus management practices.

Multiple regression model 1(adjusted- communication variables) showed that there was significant effect of environmental context on diabetes mellitus management practices, $p<0.001$ overall, at KNH, $p<0.001$ and MP Shah Hospital, $p<0.001$. Therefore, the null hypothesis was rejected overall; at KNH and MP Shah Hospital. Therefore, there was significant effect of environmental context during healthcare provider patient interaction on diabetes mellitus management practices in in selected hospitals in Kenya.

Hypothesis 5

The fifth objective; Ho_5: There is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in Kenya. Simple linear regression revealed that overall, the demographic characteristics of age and gender individually/independently had positive significant effect on diabetes mellitus management practices, $p<0.001$. This was less than the set significance level of $\alpha=0.05$. By hospital, the scenario was similarly seen at Kenyatta National Hospital and MP Shah Hospital on age and gender.

On socio economic status indicators, there was positive significant association on quality of life, p=0.001, level of assets p=0.019 and the ability to save, p=0.016, hence had independently positive significant moderating effect on the diabetes mellitus management practices overall. Financial status had a negative insignificant association, p=0.196, hence had an independently negative insignificant moderating effect on DMMPs overall. By hospital, similar findings as in the overall were noted at KNH where there was positive significant association on quality of life, p=0.002; level of assets, p=0.014 and ability to save, p=0.003, hence had an independently positive significant moderating effect on diabetes mellitus management practices. Financial status had positive with no significant association, p=0.212, hence had no independently significant moderating effect on DMMPs at KNH. At MP Shah Hospital, except for ability to save which had a negative with no significant association, all the other socio-economic status indicators had positive with no independently significant effect on diabetes mellitus management practices. Therefore, SES at MP Shah Hospital had no significant moderating effect on diabetes mellitus management practices.

Multiple linear regression model 2 (fully adjusted with moderating variables) in regard to each of the independent variables showed that, the female providers' gender and ability to save had positive significant moderating effect on verbal language use while the male healthcare had a negative significant moderating effect on verbal language use overall; by hospital the demographic characteristics of female

healthcare providers and ability to save had significant moderating effect on the verbal language use at KNH and not at MP Shah Hospital; Therefore the null hypothesis was rejected on the account of the female healthcare provider, male healthcare provider and the ability to save overall; at KNH on the account of the female healthcare provider and the ability to save and not at MP Shah Hospital. The female healthcare providers' gender and the ability to save had significant moderating effect on the nonverbal communicative behaviour overall and by hospital, the female healthcare providers' gender and ability to save had significant moderating effect on nonverbal communicative behaviour at KNH and not at MP Shah Hospital; Therefore the null hypothesis was rejected on the account of the female healthcare provider and the ability to save overall, at KNH and not at MP Shah Hospital. Overall, the female healthcare provider gender and ability to save had positively significant moderating effect on the noise; whereas the male healthcare provider gender had negatively significant moderating effect on noise; by hospital, the female healthcare provider and ability to save at KNH had significant moderating effect on the noise and not at MP Shah Hospital; Therefore the null hypothesis was rejected on the account of the female healthcare provider, male healthcare provider and the ability to save overall and on the account of the female healthcare provider, and the ability to save at KNH and not at MP Shah Hospital. Overall, all the demographic characteristics had no significant moderating effect on the environmental context while by hospital, the female healthcare providers had significant moderating effect on environmental context at KNH and not at MP Shah Hospital. Therefore, the null hypothesis was rejected on the account of the female healthcare provider overall, at KNH and not at MP Shah Hospital.

Multiple linear regression model 2 (fully adjusted with moderating variables) with all of the independent variables showed that the female healthcare providers gender, p=0.003 had significant association with diabetes mellitus management practices overall in Kenya. By hospital, similar outcome was observed at KNH, p=0.002 but not MP Shah Hospital, p=0.886. As such, there was positive significant moderating effect of the female healthcare providers' gender on DMMPS overall; at KNH and not MP Shah Hospital where there was positive insignificant moderating effect. Therefore, the null hypothesis was rejected overall; at KNH on the account of female

healthcare provider gender while at MP Shah Hospital, there was failure to reject the null hypothesis. Therefore, only the female healthcare providers' gender of demographic characteristics had significant moderating effect during healthcare provider patient interaction on diabetes mellitus management practices overall in Kenya, at KNH and not at MP Shah Hospital.

4.5. Healthcare Providers Outcome on Communication with Patients

This section shall present and endeavor to discuss how the healthcare providers rated the patients on the different healthcare provider patient communications variables. These are verbal language use, nonverbal communicative behaviour, noise, environmental context and the moderating effect of demographic characteristics effect during the communication interactions on diabetes mellitus management practices at Kenyatta National Hospital and MP Shah Hospital, first individually, then make comparisons between the two hospitals.

4.5.1. To establish the effect of healthcare provider patient verbal language use on diabetes management practices in selected hospitals in Kenya

Tarasova et al, 2014 found that awareness about patients' comprehension of the language that clinicians use when discussing diabetes mellitus treatment and prevention was essential for effective communication. This is quite critical for the patients to follow and understand what is discussed. The verbal language use effects on diabetes mellitus management practices as presented in this section brought out results as follows.

Table 4.70: Healthcare provider patient verbal language use at Kenyatta National Hospital

Variable	KNH (N=11) Mean (SD)	Male (n=3) Mean(SD)	Female (n=8) Mean (SD)	P value
The patients understood and followed the language used in the discussion of the health issues during our interactions.	4.7 (0.5)	4.3 (0.6)	4.9 (0.4)	0.085
The patients understood and were able to follow the vocabulary/words in which I discussed the health issues during our interaction.	4.2 (0.8)	4.3 (0.6)	4.1 (0.8)	0.704
The patients were comfortable and able to follow the pace/speed at which I spoke as we discussed about the medical condition.	4.5 (0.5)	4.0 (0)	4.6 (0.5)	0.074
The patients spoke in a way which I felt communicated that I was caring and concerned about their health problems/needs.	4.6 (0.5)	4.3 (0.6)	4.8 (0.5)	0.241
The patients equally participated in the discussion/conversation to the extent they wished during our interaction.	4.4 (0.7)	4.0 (0)	4.5 (0.8)	0.297
The patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem.	4.3 (0.6)	3.7 (0.6)	4.5 (0.5)	**0.050**
I was comfortable with the kind of loudness in language voice pitch as the patients spoke during our interactions.	4.4 (0.5)	4.0 (0)	4.5 (0.5)	0.152
The changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attending to them well.	4.1 (0.5)	4.0 (0)	4.1 (0.6)	0.751
Verbal Language Score	**84.7 (8.2)**	**77.1 (3.6)**	**87.5 (7.7)**	**0.054**

Source: Field Data (2019)

As shown in table 4.70, the rating of verbal language use of patients by healthcare providers at Kenyatta National Hospital was slightly higher as rated by female HCPs (mean 87.5(SD 7.7)) compared to the male HCPs (mean 77.1(SD 3.6)), p=0.054 overall with no significance difference. The score ratings were above a mean of 4.0 in all the areas of verbal language overall and also among both gender except on the component; the patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem as regards the speech sounds as rated by male HCPs (mean, 3.7 (SD 0.6)).

It was also noted that the female HCPs rated the patients higher in almost all the areas of verbal language use except on the area of; the patients understood and were able to follow the vocabulary/words in which I discussed the health issues during our interaction as for terms (vocabulary) where the male HCPs rating of the patients was higher with a mean score of 4.3(SD 0.6) as compared to that by the female HCPs, mean score of 4.1(SD 0.8). What does this difference on terms (vocabulary) then point to: was it that in the perception of the female HCPs unlike the male HCPs, patients were low in understanding the terms used? Conversely, could it be that the female HCPs used terms that were more of medical leaning for the patients to understand and follow or could the education levels of the patients be pointer to reasons as to why. However, there were no significant differences on the specific areas of verbal language use by gender.

Table 4.71: Healthcare provider patient verbal language use at MP Shah Hospital

Variable	MP Shah (N=10) Mean (SD)	Male (n=3) Mean (SD)	Female n=7) Mean (SD)	P value
The patients understood and followed the language used in the discussion of the health issues during our interactions.	4.8 (0.4)	4.7 (0.6)	4.9 (0.4)	0.545
The patients understood and were able to follow the vocabulary/words.in which I discussed the health issues during our interaction.	4.3 (0.7)	4.0 (1.0)	4.4 (0.6)	0.389
The patients were comfortable and able to follow the pace/speed at which I spoke as we discussed about the medical condition.	4.4 (0.7)	4.3 (0.6)	4.4 (0.8)	0.857
The patients spoke in a way which I felt communicated that I was caring and concerned about their health problems/needs.	4.9 (0.3)	5.0 (0)	4.9 (0.4)	0.545
The patients equally participated in the discussion/conversation to the extent they wished during our interaction.	4.6 (0.5)	4.7 (0.6)	4.6 (0.5)	0.807
The patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem.	4.3 (0.5)	3.3 (0.6)	4.3 (0.5)	0.896
I was comfortable with the kind of loudness in language voice pitch as the patients spoke during our interactions.	4.6 (0.7)	4.3 (1.2)	4.7 (0.5)	0.463
The changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attending to them well.	4.3 (0.8)	4.3 (1.2)	4.3 (0.8)	0.939
Verbal Language Score	**88.1 (9.4)**	**86.5 (11.8)**	**88.8 (9.2)**	**0.737**

Source: Field Data (2019)

In table 4.71, verbal language use by healthcare providers at MP shah Hospital was rated higher by the female HCPs, mean score, 88.8(SD 11.8) than by the male HCPs, mean score of 86.5(SD 9.2) with no significant difference by gender, p=0.737. The score ratings were above a mean of 4.0 in all the areas of verbal language overall and also among both gender except on the component; the patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem as regards the speech sounds as rated by male HCPs (mean, 3.3 (SD 0.6)).

The female HCPs rated the patients higher than the male HCPs in most of the areas of verbal language use except in the areas of; the changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attending to them well in relation to voice inflection in which the rating was similar by gender; the patients spoke in a way which I felt communicated that I was caring and concerned about their health problems/needs in regard to voice tone and the component of; the patients equally participated in the discussion/conversation to the extent they wished during our interaction in regard to participation in discussion (balanced conversion) in which the male HCPs ratings were higher.

This finding would likely show that the female HCPs unlike the male HCPs felt that the patients were not as much involved in the discussions as desired. Additionally, that the patients were not as much in agreement on voice tone of the female HCPs which could go hand in hand with participation in discussion (balanced conversion). This is because the nature and manner of the voice tone could easily discourage one from participating fully in discussions. The rating of patients on component of; the changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attending to them well.as regards voice inflection by both the female and male HCPs was similar. No significance difference on the specific areas of the verbal language use was noted by gender.

Table 4.72: Comparison of healthcare provider patient verbal language use between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (N=11) Mean (SD)	MP Shah (N=10) Mean (SD)	P value
The patients understood and followed the language used in the discussion of the health issues during our interactions.	4.7 (0.5)	4.8 (0.4)	0.713
The patients understood and were able to follow the vocabulary/words.in which I discussed the health issues during our interaction.	4.2 (0.8)	4.3 (0.7)	0.710
The patients were comfortable and able to follow the pace/speed at which I spoke as we discussed about the medical condition.	4.5 (0.5)	4.4 (0.7)	0.841
The patients spoke in a way which I felt communicated that I was caring and concerned about their health problems/needs.	4.6 (0.5)	4.9 (0.3)	0.173
The patients equally participated in the discussion/conversation to the extent they wished during our interaction.	4.4 (0.7)	4.6 (0.5)	0.382
The patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem.	4.3 (0.6)	4.3 (0.5)	0.915
I was comfortable with the kind of loudness in language voice pitch as the patients spoke during our interactions.	4.4 (0.5)	4.6 (0.7)	0.382
The changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attending to them well.	4.1 (0.5)	4.3 (0.8)	0.495
Overall Verbal Language Score	**84.7 (8.2)**	**88.1 (9.4)**	**0.378**

Source: Field Data (2019)

Comparisons between KNH and MP Shah Hospital as in table 4.72 revealed that the rating of verbal language use by healthcare providers in regard to patients was high at both hospitals. Though the HCPs at KNH rated the patients slightly lower (mean

84.7(SD 8.2)) than the HCPs at MP Shah Hospital (mean 88.1(SD 9.4)) there was no significant difference, p=0.378.

The ratings on verbal language use does show that HCPs at MP Shah hospital rated the patients higher in most of the individual areas except for the component; the patients were comfortable and able to follow the pace/speed at which I spoke as we discussed about the medical condition in regard to speech rate where HCPs at KNH rated patients higher, mean 4.5(SD 0.5) as compared to HCPs of MP Shah hospital, mean 4.4(SD 0.7). This means that the patients at KNH spoke at a speech rate that was easier to follow while communicating with the HCPs unlike at MP Shah Hospital.

The reasons for this occurrence should be explored further as to the circumstances behind it. Is there a possibility that the patients at KNH spoke in such a manner because the HCPs also spoke similarly as they attended to them in spite of the educational level of patients at KNH diabetic clinic compared to those at MP Shah diabetic clinic? The rating of patients by HCPs on the component; the patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem as for the speech sounds was similar at both hospitals with a mean score of 4.3.

The findings at the two hospitals brought out the critical place of verbal language in HCPPC and thus had traction with Dickinson et al, 2017 observation that language use was important for healthcare professionals to consider as they work to build and strengthen therapeutic relationships with their patients'. The researchers went on to state that medical language had an influence over patients and played a central role in defining experience and understanding of the health issues discussed. Therefore, the healthcare professionals had an opportunity to reflect on the language used in course of diabetes management and adapt strengths-based, collaborative, and person-centered messages that encourage patients to learn about and take action to manage this complex disease condition.

4.5.2. To determine the effect of healthcare provider patient nonverbal communicative behaviour (NVCB) on Diabetes Mellitus Management Practices in selected Hospitals Kenya

Travaline, Ruchinskas and D'Alonzo, 2005 documented that in communication interactions, much of what is conveyed between physicians and patients in clinical encounters occurs through nonverbal communication. The images of body language and facial expressions will likely be remembered longer after the encounter than any memory of spoken words. The nonverbal communicative behaviour effects on diabetes mellitus management practices as presented in this section brought out varying results as shall be seen in the following analysis and discussions.

Table 4.73: Healthcare provider patient nonverbal communicative behaviour at Kenyatta National Hospital

Variable	KNH (N=11) Mean (SD)	Male (n=3) Mean (SD)	Female (n=8) Mean (SD)	P value
I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient.	4.3 (0.9)	3.3 (1.2)	4.6 (0.5)	**0.025**
The body language of the patients during our interaction communicated that I was caring and concerned.	4.4 (0.5)	4.0 (0)	4.5 (0.5)	0.152
The patients sat in an appropriate manner and physical distance in relation to me.	4.2 (0.9)	3.3 (1.2)	4.5 (0.5)	**0.040**
I was encouraged and comfortable by the way the patients were sitting / standing / lying in body posture while attending to or examining them.	4.4 (0.5)	4.0 (0)	4.5 (0.5)	0.152
The patient looked at me, did not seem distracted, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.5 (0.5)	4.3 (0.6)	4.5 (0.5)	0.662
The patient kept quiet for reasonable amount time to listen to what I said during our interactions.	4.1 (0.9)	3.7 (0.6)	4.3 (1.0)	0.389
The patient maintained appropriate gaze from the way they looked at me during our interaction.	4.5 (0.5)	4.0 (0)	4.6 (0.5)	0.074
The patients found my touch appropriate whenever I examined them and I did seek their permission first.	4.2 (0.9)	3.7 (1.5)	4.4 (0.5)	0.251
The patients' facial expressions encouraged me to keep talking about their disease condition.	4.4 (0.5)	4.3 (0.6)	4.4 (0.5)	0.910
The patients spoke in a voice tone that showed patience and calmness while I was attending to them.	4.2 (0.6)	4.3 (0.6)	4.1 (0.6)	0.635
The general body, hand and head movements of the patients while I was attending to them were appropriate during our interactions.	4.5 (0.5)	4.3 (0.6)	4.5 (0.5)	0.662
The patients did not have to wait for too long for me to attend to them.	3.8 (1.3)	4.0	3.7 (1.6)	0.797
Nonverbal Communicative Behavior Score	**81.6 (9.0)**	**73.6 (8.4)**	**84.6 (7.5)**	**0.065**

Source: Field Data (2019)

As shown in table 4.73, the rating of non-verbal communicative behavior at KNH by female HCPs (mean 84.6 (SD 7.5)) was higher than by the male HCPs (mean 73.6 (SD 8.4)) with no significance difference (p=0.065). The overall score ratings were above a mean of 4.0 in all the areas of NVCB except on component; the patients did not have to wait for too long for me to attend to them in relation to waiting time before patients were attended to (mean, 3.8 (SD 1.3)). Male HCPs mean score ratings were above 4.0 except on the components; I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient as regards consultation time; the patients sat in an appropriate manner and physical distance in relation to me as for proximity (physical distance); the patient kept quiet for reasonable amount time to listen to what I said during our interactions in regard to silence and the component of; the patients found my touch appropriate whenever I examined them and I did seek their permission first in relation to touch by the healthcare provider.

The female HCPs rating of the patients was high with mean scores of above 4.0 in almost all except on the area: the patients did not have to wait for too long for me to attend to them as for waiting time before the patients were attended to with mean scores of 3.7(SD 1.6).

There were significantly higher mean score ratings on the component; I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient as regards consultation time by the female HCPs, 4.6(SD 0.5) as compared to the male HCPs, 3.3(SD 1.2), p=0.025 and on the component; the patients sat in an appropriate manner and physical distance in relation to me as for proximity (physical distance) as rated by female HCPs, 4.5(SD 0.6) as compared to that by the male HCPs, 3.3(SD 1.2), p=0.040. In these two areas, the female HCPs and patients seemed quite comfortable with the consultation time accorded and also the proximity (physical distance) observed unlike the male HCPs. As such, Uncertainty reduction theory applicability in meetings, such as consultation between patient and doctor attest to the findings at KNH and its suggestion of how the inevitable uncertainty between such dyadic encounter might be overcome.

Table 4.74: Healthcare provider patient nonverbal communicative behaviour at MP Shah Hospital

Variable	MP Shah (N=10) Mean (SD)	Male (n=3) Mean (SD)	Female (n=7) Mean (SD)	P value
I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient.	4.4 (1.0)	4.7 (0.6)	4.3 (1.1)	0.598
The body language of the patients during our interaction communicated that I was caring and concerned.	4.6 (0.5)	4.6 (0.6)	4.6 (0.5)	0.807
The patients sat in an appropriate manner and physical distance in relation to me.	3.9 (0.9)	4.3 (0.6)	3.7 (1.0)	0.334
I was encouraged and comfortable by the way the patients were sitting / standing / lying in body posture while attending to or examining them.	4.2 (0.6)	4.3 (0.6)	4.1 (0.7)	0.688
The patient looked at me, did not seem distracted, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.6 (0.7)	5.0 (0)	4.4 (0.8)	0.259
The patient kept quiet for reasonable amount time to listen to what I said during our interactions.	3.8 (0.9)	4.3 (0.6)	3.6 (1.0)	0.251
The patient maintained appropriate gaze from the way they looked at me during our interaction.	4.3 (0.7)	4.3 (0.6)	4.3 (0.8)	0.926
The patients found my touch appropriate whenever I examined them and I did seek their permission first.	3.6 (1.7)	3.7 (2.3)	3.6 (1.6)	0.941
The patients' facial expressions encouraged me to keep talking about their disease condition.	4.4 (0.7)	4.3 (1.2)	4.4 (0.5)	0.857
The patients spoke in a voice tone that showed patience and calmness while I was attending to them.	4.5 (0.5)	4.7 (0.6)	4.4 (0.5)	0.545
The general body, hand and head movements of the patients while I was attending to them were appropriate during our interactions.	4.5 (0.5)	4.3 (0.6)	4.6 (0.5)	0.545
The patients did not have to wait for too long for me to attend to them.	4.3 (0.7)	4.0 (1.0)	4.4 (1.0)	0.389
Non-Verbal Communicative Behavior Score	**81.5 (11.0)**	**84.7 (13.2)**	**80.1 (10.7)**	**0.569**

Source: Field Data (2019)

Findings at MP Shah Hospital, as in table 4.74 show that though in overall the male HCPs (mean 84.7(SD 13.2)) rated the patients higher than the female HCPs (mean 80.1(SD 10.7)) on nonverbal communicative behavior, it was not significantly different, p=0.569. Similarly, no significance differences were noted on all the aspects of nonverbal communicative behaviour. The score ratings were above a mean of 4.0 in all the areas of nonverbal communicative behaviour overall except on the components; I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient as regards consultation time; the patients sat in an appropriate manner and physical distance in relation to me as for proximity (physical distance); the patient kept quiet for reasonable amount time to listen to what I said during our interactions in regard to silence and the component of; the patients found my touch appropriate whenever I examined them and I did seek their permission first in relation to touch by the healthcare provider.

Similar outcomes as above were observed among the female HCPs while for the male HCPs, the rating of below a mean score of 4.0 was only in the area of touch by the healthcare provider. The male HCPs at MP Shah Hospital did rate the patients higher in most areas of nonverbal communicative behaviour than female HCPs except in the following areas: the body language of the patients during our interaction communicated that I was caring and concerned and the component of; the patient maintained appropriate gaze from the way they looked at me during our interaction in regard to eye contact whose rating were the same by both male and female HCPs and also the components of: the patients' facial expressions encouraged me to keep talking about their disease condition; the general body, hand and head movements of the patients while I was attending to them were appropriate during our interactions on gestures and on the component of; the patients did not have to wait for too long for me to attend to them as for waiting time before the patients were attended to that were rated higher by the female HCPs.

Accordingly, it appears the female HCPs in regard to patients were happier and encouraged than the male HCPs by the facial expressions, gestures and waiting time before attending to patients as aspects of NVCB during their interactions in fostering

healthcare provider patient communication in the management of diabetes mellitus and vice versa in the areas the male HCPs had higher score ratings in comparison to the female HCPs.

There is little information from previous studies on HCPs rating of patients on NVCB. Though the case the above findings at KNH and MP Shah Hospital relate to Wanko Keutchafo, Kerr & Jarvis, 2020 who opined that nurses should be self-aware of their nonverbal communication behaviors with patients as well as the way in which the meanings of the messages might be misinterpreted. Additionally, the nurses should identify their own style of nonverbal communication and understand its modification as necessary in accordance with patient's needs. This hence informs the probable outcome in this study of the high ratings of patients NVCB by HCPs as a reciprocal congruence on the part of the communicants in such dyadic encounters.

Table 4.752: Comparison of healthcare provider patient nonverbal communicative behaviour between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=11) Mean (SD)	MP Shah (n=10) Mean (SD)	P value
I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient.	4.3 (0.9)	4.4 (1.0)	0.759
The body language of the patients during our interaction communicated that I was caring and concerned.	4.4 (0.5)	4.6 (0.5)	0.302
The patients sat in an appropriate manner and physical distance in relation to me.	4.2 (0.9)	3.9 (0.9)	0.470
I was encouraged and comfortable by the way the patients were sitting / standing / lying in body posture while attending to or examining them.	4.4 (0.5)	4.2 (0.6)	0.518
The patient looked at me, did not seem distracted, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.	4.5 (0.5)	4.6 (0.7)	0.593
The patient kept quiet for reasonable amount time to listen to what I said during our interactions.	4.1 (0.9)	3.8 (0.9)	0.484
The patient maintained appropriate gaze from the way they looked at me during our interaction.	4.5 (0.5)	4.3 (0.7)	0.562
The patients found my touch appropriate whenever I examined them and I did seek their permission first.	4.2 (0.9)	3.6 (1.7)	0.332
The patients' facial expressions encouraged me to keep talking about their disease condition.	4.4 (0.5)	4.4 (0.7)	0.892
The patients spoke in a voice tone that showed patience and calmness while I was attending to them.	4.2 (0.6)	4.5 (0.5)	0.215
The general body, hand and head movements of the patients while I was attending to them were appropriate during our interactions.	4.5 (0.5)	4.5 (0.5)	0.845
The patients did not have to wait for too long for me to attend to them.	3.8 (1.3)	4.3 (0.7)	0.315
Non-Verbal Communicative Behavior Score	**81.6 (9.0)**	**81.5 (11.0)**	**0.969**

Source: Field Data (2019)

Indications in table 4.75 on comparisons noted that nonverbal communicative behavior was rated slightly higher at KNH (mean 81.6(SD 9.0)) than at MP Shah Hospital (mean 81.5(SD 11.0)), p=0.969 with no significance differences overall and in all the areas of NVCB. HCPs at MP Shah Hospital rated the patient higher in five (5) areas of: I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient as regards consultation time; the body language of the patients during our interaction communicated that I was caring and concerned; the patient looked at me, did not seem distracted, had genuine interest in me as a person, and listened patiently and carefully to what I had to say in regard to attention (looked at me, listen carefully); the patients spoke in a voice tone that showed patience and calmness while I was attending to them in relation to tone of voice and; the patients did not have to wait for too long for me to attend to them regarding waiting time before patients were attended to than KNH healthcare providers, an indication of the HCPs at the hospital being more satisfied on these areas of NVCB.

At KNH, HCPs also did rate patients higher in five (5) areas of: the patients sat in an appropriate manner and physical distance in relation to me on proximity (physical distance); I was encouraged and comfortable by the way the patients were sitting / standing / lying in body posture while attending to or examining them in regard to body posture; the patient kept quiet for reasonable amount time to listen to what I said during our interactions as for silence; the patient maintained appropriate gaze from the way they looked at me during our interaction as regards eye contact and the component of; the patients found my touch appropriate whenever I examined them and I did seek their permission first regarding touch by the healthcare provider than the HCPs at MP Shah Hospital.

This shows how contrasting the difference in satisfaction by HCPs was in these areas of communication with the patients at the two hospitals. A rating by both the male and female HCPs in two (2) areas of: the patients' facial expressions encouraged me to keep talking about their disease condition (facial expressions) (mean, 4.4) and; the patients did not have to wait for too long for me to attend to them (gestures) (mean 4.5) was the same at both hospitals, a demonstration of equal levels of satisfaction by

HCPs with the patients in this areas of communication during the interactions. The foregoing thus show how the ratings balanced out between the two hospitals on the nonverbal communicative behaviour and though the case, reasons as to the differences in the specific areas need to be explored further.

4.5.3. To examine the effects of healthcare provider patient communication as a result of noise during interaction on diabetes mellitus management practices in selected Hospitals in Kenya

According to Salonen, Heidi and Morawska, Lidia, 2013 there are numerous noise sources in healthcare facilities (HCFs), and noise levels in most hospitals far exceed recommended guidelines. This is what this section shall try and highlight in the analysis and discussions on the effects of noise during healthcare provider patient communication on diabetes mellitus management practices as follows.

Table 4.76: Noise in healthcare provider patient communication at Kenyatta National Hospital

Variables	KNH (n=11) Mean (SD)	Male (n=3) Mean (SD)	Female (n=8) Mean (SD)	P value
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the patients and me.	3.1 (1.3)	2.3 (0.6)	3.4 (1.4)	0.257
The patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions.	2.9 (1.3)	2.3 (0.6)	3.1 (1.5)	0.397
The patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition.	3.1 (1.2)	2.7 (1.2)	3.3 (1.3)	0.510
The patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions.	3.1 (1.0)	2.7 (0.6)	3.3 (1.2)	0.438
Noise Score	**51.1 (28.8)**	**37.5 (10.8)**	**56.3 (32.2)**	**0.362**

Source: Field Data (2019)

As shown in table 4.76, noise at Kenyatta National Hospital (KNH) was rated not as high by both the male and female healthcare providers. Though not significantly different, the overall mean scores on noise were higher as rated by the female HCPs (mean 56.3(32.2)) than by the male HCPs (mean 37.5(10.8)), p=0.362. Further analysis at KNH showed that all the specific types of noises were rated lower by the male HCPs as compared to the ratings by the female HCPs.

Even though the mean scores were not as high, it is worth noting that healthcare providers at KNH rated noise mostly above average. The female HCPs rated all types of noise with mean scores of above average while the male HCPs had above average mean scores on components of: the patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition in regard to psychological noise and; the patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions as for semantic noise.

There was below average mean scores on the components of: there was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the patients and me regarding physical noise and; the patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions in regard to physiological noise. These findings then indicate that the female healthcare providers experienced more noise when compared to the male HCPs at KNH as they attended to the patients in the management of diabetes mellitus.

Table 4.773: Noise in healthcare provider patient communication at MP Shah Hospital

Variable	MP Shah (n=10) Mean (SD)	Male (n=3) Mean (SD)	Female (n=7) Mean (SD)	P value
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the patients and me.	2.2 (1.5)	1.3 (0.577)	2.57 (1.7)	0.271
The patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions.	2.6 (1.5)	2.3 (1.5)	2.7 (1.6)	0.737
The patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition.	2.6 (1.4)	2.0 (1.0)	2.9 (1.6)	0.417
The patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions.	2.6 (1.6)	2.0 (1.0)	2.9 (1.8)	0.464
Noise Score	**37.5 (35.1)**	**22.9 (25.3)**	**43.8 (38.5)**	**0.422**

Source: Field Data (2019)

The analysis results at MP Shah Hospital as in table 4.77 indicate that the male healthcare providers (HCPs) turned out below average mean score ratings on all types of noise while the female HCPs had above average mean score ratings. Overall, noise at MP Shah Hospital, though not significantly different, was rated higher by the female HCPs (mean 43.8(38.5)) than by the male HCPs (mean 22.9(25.3)), p=0.422. In addition, the female HCPs rated all types of noise higher in comparison to the male HCPs with there being no significant difference in all the types of noise by gender. This showed that the female HCPs experienced more noise than the male HCPs at this facility.

Table 4.78: Comparison of noise in healthcare provider patient communication between Kenyatta National Hospital and MP Shah Hospital

Variable	**KNH (n=11) Mean (SD)**	**MP Shah (n=10) Mean (SD)**	**P value**
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the patients and me.	3.1 (1.3)	2.2 (1.5)	0.168
The patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions.	2.9 (1.3)	2.6 (1.5)	0.619
The patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition.	3.1 (1.2)	2.6 (1.4)	0.407
The patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions.	3.1 (1.0)	2.6 (1.6)	0.407
Overall Noise Score	**51.1 (28.8)**	**37.5 (35.1)**	**0.341**

Source: Field Data (2019)

Comparisons between Kenyatta National Hospital (KNH) and MP Shah Hospital as in table 4.78, noted that the score ratings on noise was not as high at both hospitals. Though not significantly different, healthcare providers rated noise higher at KNH (mean 51.1(SD 28.8)) than at MP Shah Hospital (mean 37.5(SD 35.1)), p=0341. The mean score rating of noise at KNH was above average on all types of noise.

At MP Shah Hospitals, the mean score ratings were above average on component of: the patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions on physiological noise; the patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition on psychological noise and; on the patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions as for the semantic noise. Low mean score rating of below average were on the component; there was noise within the diabetic clinic / hospital surrounding that interfered with the communication between the patients and me regarding physical noise. Too, the rating of noise was higher on all types of noises as rated by HCPs at KNH when compared with HCPs at MP Shah Hospital.

Noise as a variable not being rated as high as in this study augur well with findings by Salonen and Morawska, 2013 that among staff, reduced noise levels in HCFs is associated with reduced stress, reduced emotional exhaustion and burnout, reduced fatigue, increased satisfaction, increased effectiveness, increased productivity and improved communication and decreased medical errors. The current study findings on noise is of the view that the HCPs at MP Shah Hospital experienced much less noise and did not find it to be an issue during their communication interactions with the patients when compared to the healthcare providers at Kenyatta National Hospital even though there was no any significant difference.

4.5.4. To investigate the effect of healthcare provider patient communication environmental context during interaction on diabetes management practices in selected hospitals in Kenya.

According to Salonen, Heidi & Morawska, Lidia, 2013, it has long been known that the physical environment of a healthcare facility (HCF) can affect patients and staff with impact on the health and wellbeing. Presented in this part is analysis and discussion of the environmental context effect on diabetes management practices.

Table 4.79: Environmental context in healthcare provider patient communication at Kenyatta National Hospital

Variable	KNH (N=11) Mean (SD)	Male (n=3) Mean (SD)	Female (n=8) Mean (SD)	P value
The hospital/healthcare providers' offices- physical environment / consultation room had everything needed to provide complete care.	4.2 (1.0)	3.3 (1.2)	4.5 (0.8)	0.076
The patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable.	4.1 (0.8)	3.3 (1.2)	4.4 (0.6)	0.058
The patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable.	4.1 (1.2)	3.7 (0.6)	4.3 (1.4)	0.510
The patients acted in an impersonal and in a carefree manner with no seriousness that made me uncomfortable.	3.4 (0.9)	3.0 (1.0)	3.5 (0.9)	0.454
The patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.6 (0.5)	4.0 (0)	4.9 (0.4)	**0.003**
The patients did not ignore what I told them, did seek reassurance and guidance if necessary.	4.6 (0.5)	4.3 (0.6)	4.8 (0.5)	0.241
The patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.9 (0.8)	3.0 (1.0)	4.3 (0.5)	**0.016**
The patients acknowledged advice about the illness, the way to stay healthy and asked me all the information they were expected to receive about their health.	4.5 (0.5)	4.0 (0)	4.6 (0.5)	0.074
The patients had respect for culture and their values/beliefs did not affect the communication with me.	3.4 (1.2)	3.3 (0.6)	3.4 (1.4)	0.962
Environmental Context Score	**77.0 (10.9)**	**63.9 (0)**	**81.9 (8.3)**	**0.005**

Source: Field Data (2019)

As in table 4.79, the overall environmental context rating by female HCPs (mean, 81.9(8.3)) was significantly higher than that by the male healthcare providers (mean, 63.9(0)), p=0.005. Also the female HCPs mean score rating of patients at KNH was higher across all the nine (9) areas of environmental context as compared to the male HCPs mean score ratings. In addition, the female HCPs scored the patients significantly higher on the component of; the patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me as regards friendliness (mean of 4.9(0.4)) than the male HCPs (mean 4.0(0)), p=0.003. Similarly, on the component of; the patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions in relation to competitiveness was rated significantly higher as scored by the female HCPs with a mean score of (4.3 (0.5)) in comparison to the male HCPs with a mean score of (3.0 (1.0)), p=0.016.

It therefore means that the female healthcare providers at KNH were more agreeable and satisfied to greater degree with the environmental context in overall and on the individual specific areas especially of friendliness and competeveness in comparison to the male HCPs while interacting with the patients.

Table 4.80: Environmental context in healthcare provider patient communication at MP Shah Hospital

Variable	MP Shah (n=10) Mean (SD)	Male (n=3) Mean (SD)	Female (n=7) Mean (SD)	P value
The hospital/healthcare providers' offices- physical environment / consultation room had everything needed to provide complete care.	4.7 (0.5)	4.3 (0.6)	4.9 (0.4)	0.120
The patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable.	4.0 (1.1)	4.3 (0.6)	3.9 (1.2)	0.545
The patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable.	3.7 (1.3)	4.3 (0.6)	3.4 (1.4)	0.323
The patients acted in an impersonal and in a carefree manner with no seriousness that made me uncomfortable.	3.9 (0.9)	3.3 (1.2)	4.1 (0.7)	0.329
The patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.6 (0.5)	4.7 (0.6)	4.6 (0.5)	0.807
The patients did not ignore what I told them, did seek reassurance and guidance if necessary.	4.9 (0.3)	5.0 (0)	4.9 (0.4)	0.545
The patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.1 (0.9)	3.0 (0)	3.1 (1.1)	0.829
The patients acknowledged advice about the illness, the way to stay healthy and asked me all the information they were expected to receive about their health.	4.9 (0.3)	4.7 (0.6)	5.0 (0)	0.133
The patients had respect for culture and their values/beliefs did not affect the communication with me.	4.3 (0.7)	4.0 (1.0)	4.4 (0.5)	0.389
Environmental Context Score	**80.8 (8.5)**	**79.6 (7.0)**	**81.3 (9.6)**	**0.675**

Source: Field Data (2019)

At MP Shah Hospital as appears in table 4.80, the overall rating of environmental context was not significantly different by gender with the score rating by female HCPs (mean, 81.3(81.3)) being slightly higher than that of the male HCPs (mean, 79.6(7.0)), p=0.675. On the individual specific areas of environmental context, the female HCPs at MP Shah Hospital rated the patients higher in most areas of environmental context with the exception on the components of: the patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable as regards status relationships; the patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable in regard to formality; the patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me (friendliness) and; the patients did not ignore what I told them, did seek reassurance and guidance if necessary in regard to cooperativeness that were rated higher by the male HCPs with there being no significant difference on specific areas by gender.

According to DeVito, 2013, it is worth noting that communication always takes place within a context which is an environment that influences the form and the content of communication and this is what this study intended to show at the KNH and MP Shah hospital in relation to the management of diabetes mellitus in regard to the healthcare providers. Why the contrasting findings in the areas of environmental context, the researcher would suggest for further research to find out reasons behind the differences between the genders at KNH especially on friendliness and competitiveness and also at MP Shah Hospital.

Table 4.814: Comparison of environmental context in healthcare provider patient communication between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=11) Mean (SD)	MP Shah (n=10) Mean (SD)	P value
The hospital/healthcare providers' offices- physical environment / consultation room had everything needed to provide complete care.	4.2 (1.0)	4.7 (0.5)	0.148
The patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable.	4.1 (0.8)	4.0 (1.1)	0.828
The patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable.	4.1 (1.2)	3.7 (1.3)	0.478
The patients acted in an impersonal and in a carefree manner with no seriousness that made me uncomfortable.	3.4 (0.9)	3.9 (0.9)	0.189
The patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.	4.6 (0.5)	4.6 (0.5)	0.872
The patients did not ignore what I told them, did seek reassurance and guidance if necessary.	4.6 (0.5)	4.9 (0.3)	0.173
The patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.	3.9 (0.8)	3.1 (0.9)	**0.043**
The patients acknowledged advice about the illness, the way to stay healthy and asked me all the information they were expected to receive about their health.	4.5 (0.5)	4.9 (0.3)	**0.031**
The patients had respect for culture and their values/beliefs did not affect the communication with me.	3.4 (1.2)	4.3 (0.7)	**0.043**
Environmental context score	**77.0 (10.9)**	**80.8 (8.5)**	**0.387**

Source: Field Data (2019)

On comparisons as shown in table 4.81, the overall score rating on environmental context by healthcare providers (HCPs) though higher for patients at MP Shah Hospital (mean, 80.8(SD 8.5)) than at Kenyatta National Hospital (mean, 77.0(SD 10.9)) was not significantly different, p=0.387. Healthcare providers at MP Shah hospital rated patients higher in most of the areas of environmental context except on components of: the patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me as for friendliness whose score rating was similar at both health facilities (mean, 4.6 (SD 0.5)); the patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable in regard to status relationships; the patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable as concerns formality and; the patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions regarding competitiveness that were all rated higher by healthcare providers at Kenyatta National Hospital.

The component of; the patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions regarding competitiveness was rated significantly higher at KNH (mean 3.9(SD 0.8)) as compared to MP Shah Hospital (mean 3.1(SD 0.9)), p=0.043. On the other hand, the components of: the patients acknowledged advice about the illness, the way to stay healthy and asked me all the information they were expected to receive about their health in regard to health information (p=0.031) and; the patients had respect for culture and their values/beliefs did not affect the communication with me in regard to cultural dimension (p=0.043) were rated significantly higher by the HCPs at MP Shah Hospital in comparison to HCPs at KNH. What this means is that according to HCPs at the health facilities studied, patients at MP Shah Hospital were more versed with health information on DM than those at KNH. This could hence indicate that HCPs at MP Shah Hospital did engage more in provision of health information to the patients in comparison to the HCPs at KNH.

The contrasting outcome on health information between KNH and MP Shah Hospital takes residence in a position taken by Ngo-Metzger, 2006, that communication problems may be exacerbated by the healthcare environment in which physicians have little time for providing information or explanations what could be the probable case at KNH. This is because of the large number of patients that are attended to on clinic days at KNH that makes the HCPs to give less time to each of the patients for adequate engagement. As such patients end up getting little health information and are therefore not able to divulge much of it during the communication interactions with the HCPs.

In addition patients at MP Shah Hospital showed more cultural competence as a cultural dimension aspect when it came to communication on diabetes mellitus management practices as compared to the patients at KNH. In this respect and in augmenting the differing results, past studies provide valuable literature. Caballero, 2007 noted that increased cultural competence may also improve patient provider trust and communication, as well as help patients adhere to prevention and treatment plans. On their part, Forbes, Sidhu & Singh, 2011 averred that patient-practitioner interactions was falling short due to a cultural disconnect leading to misunderstandings between clinicians and their patients in the management of the Type 2 Diabetes Mellitus (T2DM).

4.5.5. To find out the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya

In this section, the moderating effect of the demographic characteristic are presented and discussed in relation to the sociodemographic characteristic of patients at both Kenyatta National Hospital (KNH) and MP Shah Hospital as analysed earlier in the chapter. This will enable in understanding how the healthcare providers rated the patients when it came to age and gender in addition to other socio demographic characteristics distributions. It will also show how they rated themselves in regard to the socio economic status.

Table 4.82: The moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices at Kenyatta National Hospital

Variable	KNH (n=11) Mean (SD)	Male (n=3) Mean (SD)	Female (n=8) Mean (SD)	P value
Age				
In the course of attending to patients during our interactions I was more satisfied with the young patients.	4.0 (0.9)	4.0 (1.0)	3.9 (1.2)	0.881
While attending to patients during our interactions I was more satisfied with the older patients.	4.0 (0.6)	3.7 (0.6)	4.1 (0.6)	0.309
Gender				
In interacting with patients I was more satisfied with the female patients.	4.4 (0.7)	4.0 (1.0)	4.5 (0.5)	0.297
During the interactions with the patients I was more satisfied with the male patients.	3.7 (0.9)	3.3 (0.6)	3.9 (1.0)	0.405
Socio economic status				
In course of my practice attending to the patients to date, I am satisfied with my financial status.	3.6 (1.2)	2.7 (1.5)	4.0 (1.0)	0.104
In course of my practice attending to the patients to date, I am satisfied with my quality of life.	4.0 (1.0)	3.3 (1.5)	4.3 (1.0)	0.189
In course of my practice attending to the patients to date, I am satisfied with my level of assets.	3.5 (1.2)	3.0 (2.0)	3.8 (0.9)	0.389
In course of my practice attending to the patients to date, I am satisfied with my ability to save.	3.4 (1.5)	3.0 (2.0)	3.5 (1.4)	0.720

Source: Field Data (2019)

As shown in table 4.82, even though the overall the rating of both the young and older patients was similar (mean, 4.0), the male HCPs at KNH rated young patients

higher (mean, 4.0(1.0)) in comparison to the female HCPs (mean, 3.9 (1.2)). The older patients were rated higher by the female HCPs (mean, 4.1(0.6)) in comparison to the male HCPs (mean, 3.7(0.6)).This shows that the male HCPs were more satisfied with the younger patients while on the other hand the female HCPs were more satisfied with the older patients during their communication interactions'. Why this is the case needs further probing.

On gender, overall the male and female HCPs rated the female patients higher (mean, 4.4(0.7)) than the male patients (mean, 3.7(0.9). The rating of female patients was higher by female HCPs (mean, 4.5 (0.5)) than by male HCPs (mean, 4.0 (1.0)). Similarly, male patients were rated higher by the female HCPs (mean, 3.9 (1.0)) as compared to that by the male HCPs (mean, 3.3 (0.6)). There was no significant difference in the score rating by gender. It is of importance to realise that both the male and female HCPs were more satisfied in their interactions with the female gender patients, an outcome that needs further probing to uncover the reasons behind it.

On socio economic status, overall, healthcare providers rated themselves higher on quality of life (mean, 4.0 (1.0)) and lowest on ability to save (mean, 3.4 (1.5)). On gender, female HCPs rated themselves higher than male HCPs in all areas of SES. Further analysis of SES at KNH showed that the female and male HCPs rated themselves higher on the quality of life with the lowest ratings being on ability to save by the female HCPs and on financial status by the male HCPs. What comes out clearly is that generally the female HCPs were more satisfied with their SES in comparison to male and why so calls for some additional research in this area to find out. There were no significant differences overall and on all the specific areas of SES.

Table 4.83: The moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices at MP Shah Hospital

Variable	MP Shah (n=10) Mean (SD)	Male (n=3) Mean (SD)	Female (n=7) Mean (SD)	P value
Age				
In the course of attending to patients during our interactions I was more satisfied with the young patients.	4.1 (0.6)	4.3 (0.6)	4.0 (0.6)	0.427
While attending to patients during our interactions I was more satisfied with the older patients.	4.2 (0.6)	4.0 (0)	4.3 (0.8)	0.545
Gender				
In interacting with patients I was more satisfied with the female patients.	4.3 (0.5)	4.3 (0.6)	4.3 (0.5)	0.896
During the interactions with the patients I was more satisfied with the male patients.	4.1 (0.6)	3.7 (0.6)	4.3 (0.5)	0.118
Socio Economic Status				
In course of my practice attending to the patients to date, I am satisfied with my financial status.	3.2 (0.8)	2.7 (0.6)	3.4 (0.8)	0.174
In course of my practice attending to the patients to date, I am satisfied with my quality of life.	3.8 (0.4)	4.0 (0)	3.7 (0.5)	0.356
In course of my practice attending to the patients to date, I am satisfied with my level of assets.	3.3 (0.8)	3.0 (1.0)	3.4 (0.8)	0.483
In course of my practice attending to the patients to date, I am satisfied with my ability to save.	3.6 (1.1)	2.7 (1.2)	4.0 (0.8)	0.067

Source: Field Data (2019)

At MP Shah Hospital as shown in table 4.83, overall on age, older patients were rated higher than the younger patients by the HCPs. The male HCPs rated younger patient higher (mean, 4.3 (0.6)) than the older patients (mean, 4.0 (0)). Whereas the ratings by the female HCPs were higher for older patients (mean, 4.3 (0.8)) as

compared to the younger patients (mean, 4.0 (0.6)). Just as for KNH, the male and female HCPs were more satisfied in their communication interaction with the younger and older patients respectively what need to be researched on further do realise the probable explanations for this outcome.

The mean score rating on gender was higher in overall for the female patient gender (mean, 4.3 (0.5)) than the male patient gender (mean, 4.1 (0.6)). There was higher rating for male patients by the female HCPs (mean, 4.3(0.5)) in comparison with the rating by the male HCPs (mean, 3.7(0.6)). Thus, these shows the female HCPs were more satisfied with the male patient gender than the female HCPs; the reasons as to this outcome need additional research. The rating for female patients was the similar by the male as well as the female HCPs (mean, 4.3) a depiction of similar satisfaction levels for the female patient gender by both the male and female HCPs.

On socioeconomic status, the highest rating by HCPs was on quality of life (mean, 3.8 (0.4)) and the lowest on financial status (mean, 3.2 (0.8)). The female HCPs rated themselves higher in most of the areas of SES, nay, on financial status (mean, 3.4 (SD 0.8)), level of assets (mean, 3.4 (SD 0.8)) and ability to save (mean, 4.0 (SD 0.8)) as compared to the male HCPs who rated themselves higher on quality of life (mean, 4.0 (SD 0)). The female HCPs rated themselves highly on ability to save while the male HCPs rated themselves highly on quality of life. The lowest ratings were in financial status and level of assets (mean, 3.4 (SD 0.8)) for each by the female HCPs and in financial status and ability to save (mean, 2.7) for each by the male HCPs. There were no significant differences in all the areas of demographic characteristics as rated by the HCPs at MP Shah Hospital.

Table 4.84: Comparison of the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=11) Mean (SD)	MP Shah (n=10) Mean (SD)	P value
Age			
In the course of attending to patients during our interactions I was more satisfied with the young patients.	4.0 (0.9)	4.1 (0.6)	0.766
While attending to patients during our interactions I was more satisfied with the older patients.	4.0 (0.6)	4.2 (0.6)	0.478
Gender			
In interacting with patients, I was more satisfied with the female patients.	4.4 (0.7)	4.3 (0.5)	0.808
During the interactions with the patients, I was more satisfied with the male patients.	3.7 (0.9)	4.1 (0.6)	0.278
Socio economic status			
In course of my practice attending to the patients to date, I am satisfied with my financial status.	3.6 (1.2)	3.2 (0.8)	0.344
In course of my practice attending to the patients to date, I am satisfied with my quality of life.	4.0 (1.0)	3.8 (0.4)	0.565
In course of my practice attending to the patients to date, I am satisfied with my level of assets.	3.5 (1.2)	3.3 (0.8)	0.598
In course of my practice attending to the patients to date, I am satisfied with my ability to save.	3.4 (1.5)	3.6 (1.1)	0.686

Source: Field Data (2019)

As indicated in table 4.84, comparisons on demographic characteristics were not significantly different between the healthcare providers at Kenyatta National Hospital and MP Shah Hospitals in regard age, gender and socio economic status. Though the case, the healthcare providers at MP Shah Hospital rated the young and older patients higher as compared with the healthcare providers at Kenyatta National Hospital. Additional analysis at Kenyatta National Hospital show that the mean score

ratings were the same for both younger and older patient while at MP Shah hospital the ratings were higher for the older patients than for the younger patients.

As in a past study, the findings on the moderating effect of the demographic characteristics as above are in line with Peck, 2011 in intimating that doctor interacted with patients differently depending on age; that age moderated the relationship between interaction style and patient satisfaction. The researcher in his study additionally stated that older patients were more likely than younger patients to interact with their physicians in ways consistent with patient-centered interaction what was the most likely case at MP Shah Hospital.

On gender, healthcare providers at Kenyatta National Hospital rated female patients' higher (mean, 4.4 (0.7)) in comparison with the HCPs at MP Shah Hospital (mean, 4.3 (0.5)). The rating of the male patients was higher by healthcare providers at MP Shah Hospital (mean, 4.1 (0.6)) than by HCPs at KNH (mean, 3.7 (0.9)). Though, the results still show that healthcare providers at both Kenyatta National Hospital and MP Shah Hospital rated the female patient gender higher than the male patient gender, thus showing that they were more satisfied with the female patient gender.

On socio economic status indicators of financial status, quality of life and level of assets, the healthcare providers at Kenyatta National Hospital rated themselves higher than the healthcare providers at MP Shah Hospital who rated themselves higher on the ability to save (mean, 3.6 (SD 1.1)) in comparison to the HCPs at Kenyatta National Hospital (mean, 3.4 (SD 1.5)). The healthcare providers at both Kenyatta National Hospital and MP Shah Hospital rated themselves higher on quality of live in comparison to other socio economic indicators meaning that the healthcare providers at both hospitals were much more satisfied with their quality of life as they went about with their work of attending to the patients. What accounts for this difference in SES needs to be studied on further to bring out the factors that would offer an explanation.

4.5.6. Healthcare providers rating of diabetes mellitus management practices (DMMPs) in selected hospitals in Kenya

American Diabetes Association, 2003 documents that the management plan of diabetes mellitus should be formulated as an individualized therapeutic alliance and treatment goals set together with the patient, family, and health care team in view of the various aspects of diabetes management. This observation by the researcher goes a long way in accounting for what shall be presented in this section in which there are analysed results on how the healthcare providers rated the diabetes mellitus management practices in view of the nature of communication they had had with patients over the period they had been in interaction.

Table 4.85: Diabetes mellitus management practices at Kenyatta National Hospital

Variable	KNH (n=11) Mean (SD)	Male (n=3) Mean (SD)	Female (n=8) Mean (SD)	P value
The patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers.	4.6 (0.5)	4.7 (0.6)	4.6 (0.5)	0.910
The patients take the medicines according to the instruction and as prescribed by the healthcare providers.	4.8 (0.4)	4.7 (0.6)	4.9 (0.4)	0.476
The patients do engage in regular physical activities/ exercises as instructed and discussed with the healthcare providers.	4.4 (0.5)	4.0 (0)	4.5 (0.5)	0.152
The patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions.	4.4 (0.5)	4.0 (0)	4.5 (0.5)	0.152
The patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers.	4.6 (0.5)	4.7 (0.6)	4.6 (0.5)	0.910
Diabetes Mellitus Management Practices Score	**89.1 (9.4)**	**85.0 (5.0)**	**90.6 (10.5)**	**0.407**

Source: Field Data (2019)

As in table 4.85, the HCPs at KNH rated the patients highly on diabetes mellitus management practices (mean, 89.1(9.4)) and in all its areas of management practices. Though the Female HCPs (mean, (90.6(10.5)) rated the patients higher than the male HCPs (mean, 85.0(5.0)), there was no significant difference (p=0.407). The female HCPs rated the patients highly on the components of: the patients take the medicines according to the instruction and as prescribed by the healthcare providers as regards medication therapy; the patients do engage in regular physical activities/ exercises as

instructed and discussed with the healthcare providers in regard to physical activities/exercises and; the patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions as for clinic attendance follow ups. On the other hand, the male HCPs rated patients highly on the component of; the patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers in relation to dietary therapy and; the patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers as regards monitoring of glycaemic control.

Table 4.86: Diabetes mellitus management practices at MP Shah Hospital

Variable	MP Shah (n=10) Mean (SD)	Male (n=3) Mean (SD)	Female (n=7) Mean (SD)	P value
The patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers.	4.8 (0.4)	5.0 (0)	4.7 (0.5)	0.356
The patients take the medicines according to the instruction and as prescribed by the healthcare providers.	4.7 (0.5)	4.7 (0.6)	4.7 (0.5)	0.896
The patients do engage in regular physical activities/ exercises as instructed and discussed with the healthcare providers.	4.3 (0.9)	4.7 (0.6)	4.1 (1.1)	0.456
The patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions.	4.2 (0.8)	4.3 (1.2)	4.1 (0.7)	0.748
The patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers.	4.5 (0.5)	4.3 (0.6)	4.6 (0.5)	0.545
Diabetes Mellitus Management Practices Score	**87.5 (11.4)**	**90.0 (10.0)**	**86.4 (12.5)**	**0.675**

Source: Field Data (2019)

Table 4.86 above indicate that just as at KNH, HCPs at MP Shah Hospital rated the patients highly on diabetes management practices (mean, 87.5(11.4)). Even though the male HCPs (mean, 90.0(10.0)) scored the male patients higher than the female HCPs (mean, 86.4(12.5)) there was no significant difference (p=0.675). Of note is that there was no significance differences observed in all the areas of diabetes mellitus management practices at MP Shah Hospital.

The male HCPs at MP Shah Hospital rated the patients higher on components of: the patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers in relation to dietary therapy; the patients do engage in regular physical activities / exercises as instructed and discussed with the healthcare providers in regard to physical activities/exercises and; the patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions as for clinic attendance follow ups. On the other hand, the female HCPs rated the patients higher on component of; the patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers as regards monitoring of glycaemic control. The rating on the component of; the patients take the medicines according to the instruction and as prescribed by the healthcare providers as regards medication therapy was the same as scored by both the male and female HCPs.

Table 4.875: Comparison of diabetes mellitus management practices between Kenyatta National Hospital and MP Shah Hospital

Variable	KNH (n=11) Mean (SD)	MP Shah (n=10) Mean (SD)	P value
The patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers.	4.6 (0.5)	4.8 (0.4)	0.433
The patients take the medicines according to the instruction and as prescribed by the healthcare providers.	4.8 (0.4)	4.7 (0.5)	0.549
The patients do engage in regular physical activities/ exercises as instructed and discussed with the healthcare providers.	4.4 (0.5)	4.3 (0.9)	0.848
The patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions.	4.4 (0.5)	4.2 (0.8)	0.574
The patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers.	4.6 (0.5)	4.5 (0.5)	0.552
Diabetes Mellitus Management Practices Score	**89.1 (9.4)**	**87.5 (11.4)**	**0.730**

Source: Field Data (2019)

Comparisons as in table 4.87 show that even though the healthcare providers rating was high, the HCPs overall score rating at KNH was higher (mean, 89.1 (SD 9.4)) than for HCPs at MP Shah Hospital (mean, 87.5 (SD 11.4)) with no significant differences (p=0.730). HCPs at KNH rated all the areas of diabetes mellitus management practices higher except on the component of: the patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers in

relation to dietary therapy that was rated higher by the HCPs at MP Shah Hospital. The researcher would suppose the plausible reason for the higher mean score rating on dietary therapy at MP Shah hospital than at KNH is most likely due to the availability of two nutritionists who are present daily and have been there for more than one year unlike at the KNH diabetic clinic where there is one nutritionist who again has been there for less than one year. This means patients at MP Shah Hospital are in constant and continuous interaction with the nutritionist unlike the patients at KNH.

It could be argued that findings of the current study as presented herein on how the healthcare providers rated patients on DMMPs tend to reinforce findings by (Abdulhadi, Al-Shafaee, Wahlström & Hjelm, 2013). The researchers suggested of healthcare providers in avoiding giving instructions to the patients, but instead have good communication and respect the patients concerns. This would be a more useful way to correct the patients' understanding of diabetes and therefore gain their cooperation what would ultimately enhance on the diabetes mellitus management practices in the long run.

4.5.7. Regression Analysis

Presented in this section are analysed results on the nature of relationship between healthcare provider patient communication and diabetes mellitus management practices of how the healthcare providers rated patients overall and then at each of the hospital. This was to determine and thereby ascertain the relationship between the independent and dependent variables. The analysis was first done in regard to all the HCPs participants to get the entire outcome of the study sample and then separately at KNH and MP Shah Hospital.

Diabetes management practices score was first analysed individually with each of the communication variables (CV) of verbal language use, nonverbal communicative behaviour, environmental context and noise by simple linear regression and afterwards by multiple linear regressions. Also, the moderating variable of demographic characteristics effect in relation to healthcare provider patient

communication on DMMPs was analysed first by simple linear regression and then by multiple linear regression.

4.5.7.1. Simple Linear Regression

Simple linear regression was performed to establish the relationship between each of the independent variables individually and diabetes mellitus management practices overall and then by hospital as follows. This was to establish the relationship and thereby the effect of the individual predictor variables of verbal language use, nonverbal communicative behaviour, environmental context and noise on the response variable of diabetes mellitus management practices.

4.5.7.1.1. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) overall in Kenya

Simple linear regression involved each of the healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise and environmental context individually as a predictor to determine the relationship with diabetes mellitus management practices overall with the results summarized and discussed as follows.

Table 4.88: Healthcare provider patient communication and diabetes mellitus management practices overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.64 (0.17, 1.10)	**0.010**
Nonverbal communicative behavior	0.50 (0.06, 0.94)	**0.028**
Noise	0.03 (-0.12, 0.19)	0.662
Environmental context	0.44 (-0.01, 0.89)	0.056

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.88 above, overall, verbal language use (VLU) and nonverbal communicative behaviour (NVCB) had positive significant relationship with diabetes mellitus management practices. Increased score in verbal language use positively influenced diabetes mellitus management practices, [β 0.64 (95% CI (0.17, 1.10)), p=0.010] and similarly, so for nonverbal communicative behavior, [β 0.50 (95% CI (0.06, 0.94)), p=0.028]. Therefore, verbal language use and non-verbal communicative behaviour had positive significant effect on diabetes mellitus management practices.

There was no significant relationship of noise, [β 0.03 (95% CI **(**-0.12, 0.19)), p=0.662] and environmental context, [β 0.44 (95% CI (-0.01, 0.89)), p=0.056] with diabetes mellitus management practices. However, there was positive relationship of noise and environmental context with diabetes mellitus management practices. Therefore, noise and environmental context had a positive with no significant effect on diabetes mellitus management practices in overall.

4.5.7.1.2. Healthcare provider patient communication and diabetes mellitus management hospitals by hospital

Simple linear regression involved each of the healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise and environmental context individually as a predictor to determine the relationship with diabetes mellitus management practices at KNH and MP Shah Hospital with the results summarized and discussed as follows.

Table 4.89: Healthcare provider patient communication and diabetes mellitus management practices by Hospital

Variable	Kenyatta National Hospital		MP Shah Hospital	
	β (95% CI)	**P value**	**β (95% CI)**	**P value**
Verbal language use	0.96 (0.47, 1.44)	**0.002**	0.45 (-0.46, 1.36)	0.288
Nonverbal communicative behavior	0.24 (-0.54, 1.01)	0.237	0.70 (0.07, 1.32)	**0.033**
Noise	-0.018 (-0.27, 0.23)	0.876	0.06 (-0.20, 0.32)	0.596
Environmental context	0.37 (-0.22, 0.96)	0.193	0.67 (-0.27, 1.61)	0.140

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

By hospital as in table 4.89, positive significant relationship was seen at Kenyatta National Hospital in regard to verbal language use, [β 0.96 (95% CI (0.47, 1.44)), p=0.002]. At MP Shah Hospital, [β 0.45 (95% CI (-0.46, 1.36)), p=0.288] there was a positive with no significant relationship with diabetes mellitus management practices. On nonverbal communicative behavior and diabetes mellitus management practices, there was positive significant relationship at MP Shah Hospital, [β 0.70 (95% CI (0.07, 1.32)), p=0.033]. At KNH, [β 0.24 (95% CI (-0.54, 1.01)), p=0.237] there was a positive with no significant association on DMMPs.

The findings show that verbal language use had positively significant effect and therefore a unit increase in verbal language use led to improvement in diabetes mellitus management practices at Kenyatta National Hospital and not at MP Shah Hospital. On the other hand, at MP Shah Hospital nonverbal communicative behaviour had positively significant effect and a unit increase in nonverbal communicative behaviour led to improvement in diabetes mellitus management practices.

There was negative relationship with no significant effect of noise at Kenyatta National Hospital, [β -0.018 (95% CI (-0.27, 0.23)), p=0.876] while there was a positive relationship with no significant effect at MP Shah Hospital, [β 0.06 (95% CI **(**-0.20, 0.32)), p=0.596] with diabetes mellitus management practices. On the other hand, there was positive relationship with no significant effect and therefore relationship between environmental context and diabetes mellitus management practices at Kenyatta National Hospital, [β 0.37 (95% CI (-0.22, 0.96)), p= 0.193] and MP Shah Hospital [β 0.67 (95% CI (-0.27, 1.61)), p=0.140].

As such, noise had a negative relationship with no significant effect on diabetes mellitus management practices at Kenyatta National Hospital and a positive relationship with no significant effect at MP Shah Hospital. Environmental context had a positive relationship with no significant effect at both Kenyatta National Hospital and MP Shah Hospital. Therefore, increased score in noise negatively affected diabetes mellitus management practices at Kenyatta National Hospital and not at MP Shah Hospital.

4.5.7.1.3. Demographic characteristics and diabetes mellitus management practices overall in Kenya

In this section results of the relationship between the moderating effects of the demographic characteristics (age, gender and socio economic status) and diabetes mellitus management practices in view of healthcare provider patient communication (HCPPC) are presented as follows. This was to determine their moderating effect of each of the demographic characteristics overall on their own without the predictor variables on the response variable.

Table 4.90: Demographic characteristics in healthcare provider patient communication and diabetes mellitus management practices overall in Kenya

Variable	β (95% CI)	P value
Age		
Young patients	0.6 (-6.0-7.2)	0.849
Older patients	1.1 (-6.7-8.9)	0.778
Gender		
Female patients	3.3 (-5.1-11.6)	0.423
Male patients	-0.7 (-7.0-5.6)	0.818
Socio economic status		
Financial status	1.9 (-2.8-6.6)	0.406
Quality of life	-0.7 (-7.0-5.6)	0.818
Level of assets	0.5 (-4.3-5.2)	0.837
Ability to save	-0.7 (-4.5-3.1)	0.701

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

In table 4.90, the regression analysis testing of the demographic characteristics and diabetes mellitus management practices in regard to healthcare provider patient communication yielded no significant relationship for age, gender and socioeconomic status. Though the case, there was positive relationship in regard to almost all the demographic characteristics, hence had positive with no significant moderating effect on DMMPs except for the male patient gender [β -0.7 (95% CI (-7.0-5.6)), p= 0.818]; the socio economic status indicators of quality of life [β -0.7 (95% CI (-7.0-5.6)), p=0.818] and ability to save [β -0.7 (95% CI (-4.5-3.1)), p=0.701] that had a negative relationship with no significant effect during communication between the healthcare providers and the patients on diabetes mellitus management practices as rated by healthcare providers.

4.5.7.1.4. Demographic characteristics and diabetes mellitus management practices in healthcare provider patient communication by Hospital

In this section, results of the relationship between the moderating effects of the demographic characteristics and diabetes mellitus management practices. This was to determine their moderating effect of each of the individual demographic characteristic variables on their own by hospital in view of HCPPC are presented as follows. This was to determine their effect on their own in absence of the independent predictor variables on the response variable.

Table 4.91: Demographic characteristics in healthcare provider patient communication and diabetes mellitus management practices by Hospital

Variable	KNH		MP Shah Hospital	
	β (95% CI)	P value	β (95% CI)	P value
Age				
Young patients	0.6 (-7.3-8.6)	0.863	0.9 (-15.4-17.2)	0.906
Older patients	-1.3 (-12.5-10.0)	0.807	4.2 (-10.1-18.4)	0.519
Gender				
Female patients	3.0 (-7.3-13.3)	0.527	3.6 (-15.4-22.5)	0.434
Male patients	-0.9 (-8.8-6.9)	0.791	0.9 (-15.4-17.2)	0.906
Socio economic status				
Financial status	1.8 (-3.9-7.6)	0.493	1.8 (-9.9-13.4)	0.733
Quality of life	0.5 (-6.6-7.6)	0.877	-9.4 (-30.0-11.2)	0.325
Level of assets	1.0 (-4.8-6.9)	0.692	-1.2 (-12.4-10.0)	0.807
Ability to save	0.4 (-4.3-5.1)	0.859	-2.9 (-11.2-5.4)	0.446

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

On analysis by hospital as shown in table 4.91, there was positive relationship with no significant effect between almost all areas of age, gender and socio economic

status and diabetes mellitus management practices except for older patient in regard to age and the male patient gender at KNH; quality of life, level of assets and ability to save at MP Shah Hospital all which had a negative relationship with no significant effect on diabetes mellitus management practices. Therefore, a positive with no significant moderating effect of the demographic characteristics on diabetes mellitus management practices was observed at both KNH and MP Shah Hospital in most areas except on the older patient and the male patient at KNH; quality of life, level of assets and ability to save at MP Shah Hospital.

4.5.7.2. Multiple linear Regression model 1 (Adjusted – communication variables)

Multiple regression model 1 involved all the healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise and environmental context together in the model as predictors. This was done so as to determine their relationship with diabetes mellitus management practices at KNH and MP Shah Hospital with the results summarized and discussed as follows.

4.5.7.2.1. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) overall in Kenya

Table 4.92: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.659[a]	0.435	0.293	8.54640

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise and environmental context.

Source: Field Data (2019)

From table 4.92, the value of R is 0.659, an indication that verbal language use, nonverbal communicative behaviour, noise and environmental context as predictors had an influence on diabetes mellitus management practices. From these results a

43.5 % variation of diabetes mellitus management practices was as a result of these independent variables. An analysis of variance (ANOVA) was done to ascertain whether verbal language use, nonverbal communicative behaviour, noise and environmental context were significant predictors of diabetes mellitus management practices with the results tabulated as in table 4.85 that follow.

Table 4.93: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	898.010	4	224.503	3.074	**0.047[b]**
	Residual	1168.656	16	73.041		
	Total	2066.667	20			

a. Dependent Variable: diabetes management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise and environmental context.

Source: Field Data (2019)

From table 4.93, the ANOVA findings [F (4, 16) =3.074, P<0.05)] where the significance value of 0.047 depicted the existence of the significant influence of the predictor variables of verbal language use, nonverbal communicative behaviour, noise and environmental context on the response variable of diabetes mellitus management practices.

Table 4.94: Multiple regression model 1 (adjusted - communication variables) of healthcare provider patient communication and diabetes mellitus management practices overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.56 (0.10, 1.01)	**0.019**
Nonverbal communicative behaviour	0.20 (-0.29, 0.69)	0.396
Noise	0.03 (-0.10, 0.16)	0.642
Environmental context	0.34 (-0.07, 0.74)	0.098

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

On multiple linear regression model 1 as in table 4.94, verbal language use at Kenyatta National Hospital remained significant, [β 0.56 (95% CI (0.10, 1.01)), p= 0.019] with positive association on adjustment using stepwise method (model 1), hence had positive significant effect on DMMPs. This meant that only the verbal language use variable resulted to more improved outcome in the response variable of DMMPs.

This finding is consistent with Tarasova, Caballero, Turner & Inzucchi, 2014 observation that awareness about patients' comprehension of the language that clinicians use was essential for effective communication, a necessary component in the management of diabetes. The other variables of nonverbal communicative behaviour, noise and environmental context had positive with no significant relationship with diabetes mellitus management practice. A unit increase in these three variables did not lead to improvement in the response variable.

4.5.7.2.2. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) rating by Hospital

Table 4. 956: Model Summary

Clinic	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
M.P.Shah Hospital	1	0.755[a]	0.570	0.226	9.99979
KNH	1	0.903[b]	0.816	0.693	5.22583

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise and environmental context.

Source: Field Data (2019)

From the table 4.95, the value of R was 0.755 for MP Shah Hospital and 0.903 for KNH hospital, a revelation that verbal language use, nonverbal communicative behaviour, noise and environmental context as predictors had an influence on diabetes mellitus management practices. From the results 57.0% (MP Shah Hospital) and 81.6% (KNH) variation in DMMPs was as a result of the four independent variables.

An analysis of variance (ANOVA) was done to ascertain whether verbal language use, nonverbal communicative behaviour, noise and environmental context were significant predictors of diabetes mellitus management with results summarized and discussed as in table 4.88 that follow.

Table 4.967: ANOVA[a]

Clinic	Model		Sum of Squares	df	Mean of square	F	Sig.
MP Shah Hospital	1	Regression	662.521	4	165.630	1.656	0.294[b]
		Residual	499.979	5	99.996		
		Total	1162.500	9			
KNH	1	Regression	727.053	4	181.763	6.656	**0.021[c]**
		Residual	163.856	6	27.309		
		Total	890.909	10			

a. Variable: Diabetes management practices

b. Predictor: (Constant), verbal language use, nonverbal communicative behaviour, noise, environmental context

Source: Field Data (2019)

In table 4.96, the ANOVA findings [F (4, 5) =1.656, P<0.05)] with no significant value of 0.294 at MP Shah Hospital depicted that there existed no significant influence of the predictor variables of verbal language use, nonverbal communicative behaviour, noise and environmental context on the response variable of diabetes mellitus management practices at the MP Shah hospital. At Kenyatta National Hospital, the ANOVA finding [F (4, 6) =6.656, P<0.05)] with the significance value of p= 0.021 showed there was significant influence of the predictor variables on the response variable.

Table 4.97: Multiple regression model 1 (adjusted - communication variables) between healthcare provider patient communication and diabetes mellitus management practices by Hospital

Variable	KNH		MP Shah	
	β (95% CI)	P value	β (95% CI)	P value
Verbal language use	1.17 (0.54, 1.81)	**0.004**	0.24 (-1.38, 1.86)	0.718
Nonverbal communicative behavior	-0.12 (-0.63, 0.39)	0.595	0.70 (0.07, 1.32)	**0.033**
Noise	-0.13 (-0.28, 0.03)	0.091	0.09 (-0.11, 0.29)	0.310
Environmental context	-0.06 (-0.52, 0.41)	0.779	0.24 (-0.79, 1.26)	0.594

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As in table 4.97, verbal language use [β 1.17 (95% CI (0.54, 1.81)), p= 0.004] at Kenyatta National Hospital was statistically significant. In concurrence, Tripp-Reimer et al, 2001 observed that communication in the language of the client was crucial to effective care. Although the research was clear that matching staff and patient for language was crucial it was not very easy in reality especially in a cosmopolitan locality like the study sites that receive patient from all walks of life. Also nonverbal communicative behaviour [β 0.70 (95% CI (0.07, 1.32)), p= 0.033] was statistically significant at MP Shah Hospital. The finding resonates with Beck, Daughtridge & Sloane, 2002 study that physician behavior could enhance favorable patient outcomes, such as understanding and adherence to medical regimens and overall satisfaction. Therefore, VLU and NVCB variables had positive significant effect on diabetes mellitus management practices.

Noise and environmental context had negative relationship with no significant effect on DMMPs at KNH but with positive relationship with no significant effect at MP

Shah Hospital. Though noise had no significant relationship with DMMPs, it is worth noting that noise level can be distracting in patient-provider encounter even when at low levels given the negative relationship with the response variable. In regard, Joseph & Ulrich, 2007 study reported that Hospitals are extremely noisy, and noise levels in most hospitals far exceed recommended guidelines. The researchers observed that high ambient noise levels, as well as peak noise levels in hospitals, have serious impacts on patient and staff outcomes and impeded effective communication. Too, Ngo-Metzger, 2006 findings does accord support on the environmental as well as noise variable with the view that communication problems may be exacerbated by the healthcare environment, in which physicians have little time for providing information or explanations.

Though the foregoing variations in study outcome on verbal language use and nonverbal communicative behaviour between KNH and MP Shah Hospital, Soysal & Yağar, 2017 on the contrary, observed that doctors in private institutions had higher level of satisfaction in the level of communication with the patients in comparison to the public institutions. However, the study did not distinguish between aspects of communication as the current study does. This would then necessitate further exploration on the communication aspects and their components to dig out more data information in regard to hospital types.

4.5.7.3. Multiple Linear Regression Model 2 (Fully Adjusted with Moderating Variables)

Multiple linear regressions Model 2 involved all the variables put together in the model as predictors of diabetes mellitus management practices. This was first done in regard to each individual independent variable with the moderating variables and afterward all the independent variables with the moderating variables. This was with consideration of the demographic characteristics to determine the relationship with diabetes mellitus management practices overall, at KNH and MP Shah Hospital. It was to establish the moderating effect of the demographic characteristics in healthcare provider patient communication on DMMPs and found out the following.

4.5.7.3.1. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) overall in Kenya

In this section, analysis is done between each of the independent variable together with the moderating variables on the dependent variable.

Table 4.98: Multiple regression model 2 (fully adjusted with moderating variables) between verbal language use and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.78 (0.05, 1.50)	**0.038**
Age		
Young healthcare providers	1.78 (-8.44, 12.01)	0.708
Older healthcare providers	-2.70 (-13.66, 8.26)	0.598
Gender		
Female healthcare providers	0.51 (-10.78, 11.80)	0.923
Male healthcare providers	-0.10 (-9.39, 11.39)	0.837
Socio economic status		
Financial status	3.10 (-6.86, 13.06)	0.508
Quality of life	0.99 (-8.32, 10.29)	0.820
Level of assets	0.48 (-9.00, 9.95)	0.914
Ability to save	-3.76 (-9.51, 2.00)	0.179

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in the table 4.98, verbal language use [β=0.78, (95% CI (0.05, 1.50)), p<0.038] remained statistically significant even when considered together with the demographic characteristics. The demographic characteristics of age, gender and socio-economic status were not statistically significant. A higher score in verbal language use was associated with significant improvement in diabetes mellitus management practices. However, other than the change of the change of increase in

the beta coefficient, the demographic characteristics had no significant moderating effect on the verbal language use.

Table 4.99: Multiple regression model 2 (fully adjusted with moderating variables) between nonverbal communicative behaviour and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Nonverbal communicative behaviour	0.44 (-0.17, 1.05)	0.138
Age		
Young healthcare providers	0.83 (-10.73, 12.39)	0.877
Older healthcare providers	2.27 (-8.66, 13.20)	0.656
Gender		
Female healthcare providers	1.45 (-11.04, 13.95)	0.803
Male healthcare providers	-3.12 (-13.78, 7.53)	0.532
Socio economic status		
Financial status	4.00 (-6.97, 14.97)	0.439
Quality of life	-1.96 (-11.62, 7.71)	0.665
Level of assets	0.57 (-9.94, 11.08)	0.907
Ability to save	-1.22 (-7.32, 4.88)	0.668

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As in the table 4.99 above, nonverbal communicative behaviour [β=0.44, (95% CI –(0.17, 1.05)), p<0.138] was not statistically significant when considered together with the demographic characteristics. The demographic characteristics of age, gender and socio-economic status were not statistically significant. A higher score in the variables was not associated with improvement in diabetes mellitus management practices. However, the demographic characteristics had an insignificant moderating effect on nonverbal communicative behaviour as seen in the change from being significant on simple linear regression as earlier analysed to being insignificant. In

addition, there was a regress in the beta coefficient of the nonverbal communicative behaviour.

Table 4.100: Multiple regression model 2 (fully adjusted with moderating variables) between noise and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Noise	0.01 (-0.22, 0.24)	0.897
Age		
Young healthcare providers	2.80 (-9.68, 15.28)	0.631
Older healthcare providers	2.18 (-10.20, 14.56)	0.706
Gender		
Female healthcare providers	0.90 (-13.13, 14.92)	0.891
Male healthcare providers	-3.00 (-14.96, 8.97)	0.592
Socio economic status		
Financial status	6.45 (-5.14, 18.03)	0.246
Quality of life	-2.26 (-13.38, 8.86)	0.663
Level of assets	-0.66 (-12.47, 11.15)	0.904
Ability to save	-1.73 (-8.76, 5.30)	0.599

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

From the findings as in table 4.100 above, noise [β=0.01, (95% CI (-0.22, 0.24)), p<0.897] was not statistically significant even in consideration of the demographic characteristics. The demographic characteristics of age, gender and socio-economic status were not statistically significant. A higher score in the variables was not associated with improvement in diabetes mellitus management practices. The demographic characteristics had no significant moderating effect on noise other than the regress in the beta coefficient.

Table 4.101: Multiple regression model 2 (fully adjusted with moderating variables) between environmental context and DMMPs overall in Kenya

Variable	β (95% CI)	P value
Environmental context	0.60 (-0.09, 1.29)	0.082
Age		
Young healthcare providers	3.73 (-7.14, 14.60)	0.466
Older healthcare providers	2.49 (-8.02, 13.00)	0.612
Gender		
Female healthcare providers	-0.22 (-12.26, 11.82)	0.969
Male healthcare providers	-6.48 (-17.44, 4.48)	0.220
Socio economic status		
Financial status	4.36 (-5.97, 14.68)	0.373
Quality of life	-3.08 (-12.38, 6.23)	0.482
Level of assets	0.05 (-9.98, 10.08)	0.992
Ability to save	0.54 (-6.55, 5.46)	0.846

N=400

a. Dependent Variable: Diabetes mellitus management practices

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As in the table 4.101 above, environmental context [β=0.60, (95% CI (-0.09, 1.29)), p<0.082] was not statistically significant even in consideration of the demographic characteristics. The demographic characteristics of age, gender and socio-economic status were not statistically significant. A higher score in the variables was not associated with improvement in diabetes mellitus management practices. However, the demographic characteristics had insignificant moderating effect on environmental context as seen in the change from being statistically significant on simple linear regression to being insignificant. In addition, there was a regress in the beta coefficient of the environmental context.

4.4.7.3.2. Healthcare provider patient communication (HCPPC) and diabetes Management practices (DMMPs) by Hospital

In this section, each of the healthcare provider patient communication variables in consideration of the moderating variable of demographic characteristics was analysed. Whereas multiple regressions model 2 involved each of the independent variable with consideration of demographic characteristics put together in the model as predictors of diabetes mellitus management practices, it was however noted that the demographic characteristic variables had no effect on the model by hospital and hence were excluded in the 2nd step of regression model in regard.

4.5.7.3.3. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) overall in Kenya

Multiple regression model 2 was used in order to determine the relationship between DMMPs with all the independent variables considered in overall and thereby determine the moderating effect of the demographic characteristics. The model was further adjusted for demographic factors as moderating variables to determine their moderating effect on diabetes mellitus management practices (model 2). Forward stepwise regression method was used to generate the model as tabulated below.

Table 4.102: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.717[a]	0.514	-0.216	11.20774

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status.

Source: Field Data (2019)

From table 4.102, the value of R was 0.717, an indication that verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life

and financial status as predictors had influence on diabetes mellitus management practices. From the results a 51.4% variation of diabetes mellitus management practices was as a result of these independent variables. An analysis of variance (ANOVA) was also done to ascertain whether verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status were significant predictors of DMMPs and the results summarized as in table 4.91.

Table 4.103: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1061.759	12	88.480	0.704	0.718[b]
	Residual	1004.907	8	125.613		
	Total	2066.667	20			

a. Dependent Variable: Diabetes management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status

Source: Field Data (2019)

From table 4.103, the ANOVA findings [F (12, 8) =0.704, P<0.05)] with the significance value of 0.718 depicted that there existed no significant influence of the predictor variables verbal language use, nonverbal communicative behaviour, noise, environment context, age (young/older), gender (male/female), level of assets, ability to save, quality of life and financial status on the response variable of diabetes management practices.

Table 4.104: Multiple regression model 2 (fully adjusted with moderating variables) of healthcare provider patient communication and diabetes mellitus management practices overall in Kenya

Variable	β (95% CI)	P value
Verbal language use	0.56 (0.08, 1.11)	**0.019**
Nonverbal communicative behavior	0.13 (-0.44, 0.69)	0.635
Noise	-0.001 (-0.23, 0.22)	0.991
Environmental context	0.34 (-0.07, 0.74)	0.098
Age		
Young patients	2.0 (-4.09, 8.1)	0.494
Older patients	-1.19 (-10.90, 8.52)	0.794
Gender		
Female patients	0.33 (-11.23, -11.90)	0.950
Male patients	-2.78 (-10.84, 5.29)	0.472
Socio economic status		
Financial status	2.2 (-3.0, 7.4)	0.383
Quality of life	-0.26 (-10.76, 10.25)	0.957
Level of assets	0.72 (-8.34, 9.79)	0.864
Ability to save	-1.51 (-4.58, 1.56)	0.314

N=21

a. Dependent Variable: Diabetes management

Significant at the 0.05 level (2-tailed)

Source: Field Data (2019)

As appears in table 4.104, the only statistically significant predictor of diabetes mellitus management practices scores was verbal language use β=0.56, (95% CI (0.08, 1.11), p=0.019. Nonverbal communicative behaviour, noise and environmental context were not statistically significant. None of the demographic characteristics had significant relationship with DMMPs, hence had no statistically significant moderating effect in healthcare provider patient communication on DMMPs.

Though the regression coefficients on verbal language use and environmental context in multiple regression model 2 were similar to those in multiple regression model 1; they were different to those in simple linear regression that were higher and hence clearly showing a tendency to regress. The regression coefficients of nonverbal communicative behaviour and noise (N) tended to regress as in model 1 and 2. As such, there was positive with no significant moderating effect of the demographic characteristics in healthcare provider patient communication on diabetes mellitus management practices. This hence indicated that the moderating effect of demographic characteristics had no significant influence in regard to the independent variable of VLU, NVCB, N and EC during communication interactions to have effect on the DMMPs.

4.5.7.3.2. Healthcare provider patient communication and diabetes mellitus management practices (DMMPs) rating by Hospital

Here, the regression analysis testing was done in regard to each of the hospital separately to comparatively determine the moderating effect of the demographic characteristics of age (younger/older), gender (male/female), socio economic status (level of assets, ability to save, quality of life) and financial status on the predictor value of all the independent variables of verbal language use, nonverbal communicative behaviour, noise and environment context on diabetes mellitus management practices.

Table 4. 105: Model Summary

Clinic	Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
MP Shah Hospital	1	1.000[a]	1.000	.	.
KNH	1	1.000[a]	1.000	.	.

a. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status

Source: Field Data (2019)

When all the variables were included in the model as shown in table 4.105, the R values for MP Shah Hospital and KNH was 1.000 while the R squared value was 1. 000. This showed that the variables as predictors had influence on diabetes mellitus management practices and 100% variation in DMMPs was as a result of all the variables together in the model 2.

An analysis of variance (ANOVA) was done to ascertain whether the variables of verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status were significant predictors of diabetes mellitus management practices as summarized in table 4.106.

Table 4.106: ANOVA[a]

Clinic	Model		Sum of Squares	df	Mean of Square	F	Sig.
MP Shah Hospital	1	Regression	1162.500	9	129.167	.	.b
		Residuals	0.000	0	.		
		Total	1162.500	9			
KNH	1	Regression	890.909	10	89.091	.	.c
		Residuals	0.000	0	.		
		Total	890.909	10			

a. Dependent Variable: Diabetes mellitus management practices

b. Predictors: (Constant), verbal language use, nonverbal communicative behaviour, noise, environment context, age (younger/older), gender (male/female), level of assets, ability to save, quality of life and financial status.

Source: Field Data (2019)

From table 4.106, all the healthcare provider patient communication variables in consideration of the moderating variable of demographic characteristics were statistically significant for model building. Whereas multiple regressions model 2 involved all the variables with consideration of demographic characteristics put together in the model as predictors of diabetes mellitus management practices, it was however noted that the demographic characteristic variables had no effect on the

model by hospital and hence were excluded in the 2nd step of regression model in regard. Therefore, the demographic characteristics had no significant moderating effect in healthcare provider patient communication on the diabetes mellitus management practices at KNH and MP Shah Hospital. This finding is thus reflected in the hypothesis testing analysis reporting whereby the model 2 findings in overall applied as will be discussed later. It therefore means that the demographic characteristics had no significant moderating effect on DMMPs overral, at KNH and MP Shah Hospital.

The finding hitherto, whereby no significant moderating effect on DMMPs was demonstrated was an indication of the healthcare providers' communication with the patients invariably not having been affected by the demographic characteristics. As such, the finding solidify Verlinde et al, 2012 observation that variability in physicians' communication and perceptions may be related to the patients' demographic characteristics. The patients' communication style could have a strong effect on physician behaviour and beliefs. To some degree the factors were at play in the current study though insignificantly. Verlinde et al, 2012 found that physicians behaved differently with patients from different SES and patients communicate differently with their doctor depending on their SES, hence with likely important implications for the daily practice of the physician.

The findings on SES of HCPs between the KNH and MP Shah Hospital on simple and multiple linear regression model 1and 2 showed no significant differences. This suggests that the HCPs at either KNH or MP Shah Hospital were unaffected in regard to their SES. Though, there is dearth of data in relation to HCPs attending to diabetic patients at either a public or a private hospital, related studies have contrasting findings. Rojas et al, 2014 study showed that there were major differences between public and private hospitals as the results suggested that in terms of job satisfaction, physicians in private institutions were in general more satisfied than the ones in public hospitals. This difference in findings with the current study could be due to differing nature of the research studies in regard to the focus of the study as the past study was more general and not specific to aspects / domains of healthcare provider patient communication.

4.5.8. Hypothesis testing

This was done following the analysis on the preceding healthcare provider patient communication variables of verbal language use, nonverbal communicative behaviour, noise and environment context as rated by healthcare providers. In addition it was also done in regard to the demographic characteristics of age, gender and socio economic status. This is discussed in this section as follows. The hypothesis testing was done at a significant level of 0.05 of 95% confidence level.

Hypothesis 1

The first objective as stated, Ho_1: There is no significant effect of verbal language use by the healthcare provider and the patient on diabetes mellitus management practices in selected hospitals in Kenya. Simple linear regression showed there was positive significant effect between verbal language use and diabetes mellitus management practices, p=0.010 overall in Kenya. This was noted at Kenyatta National Hospital, p=0.002. At MP Shah Hospital, verbal language use had positive relationship with no significant effect on diabetes mellitus management practices, p=0.288.

However, multiple regression model 1(adjusted–communication variables) did show there was positive significant effect of verbal language use on diabetes mellitus management practices, p=0.019 overall in Kenya; at KNH, p=0.004 and not at MP Shah Hospital, p=0.718. Therefore, verbal language use had statistically significant positive effect overall in Kenya; at KNH while there was positive insignificant effect at MP Shah Hospital. Thus, the hypothesis was rejected overall in Kenya and at KNH while there was failure to reject the hypothesis at MP Shah Hospital. Therefore, there was significant effect of verbal language use by the healthcare provider and the patient on DMMPs overall in Kenya; at KNH and not at MP Shah Hospital.

Hypothesis 2

From the second objective; Ho_2: There is no significant effect of non-verbal communicative behaviour use during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Simple linear regression showed there was positive significant effect between nonverbal communicative behaviour and diabetes mellitus management practices, p = 0.028. This was also observed at MP Shah Hospital, p=0.033 and not at Kenyatta National Hospital, p=0.237 where there was positive relationship with no significant effect. However, multiple regression model 1(adjusted-communication variables) showed that nonverbal communicative behaviour had positive relationship with no significant effect on DMMPs overall in Kenya, p=0.396; a negative relationship with no significant effect on DMMPs at KNH, p=0.595 and a positive significant effect on DMMPs at MP Shah Hospital, p=0.033. Therefore, NVCB had statistically significantly positive effect on DMMPs at MP Shah Hospital and not overall in Kenya and at KNH. The null hypothesis was rejected at MP Shah Hospital while there was failure to reject the null hypothesis overall in Kenya and at KNH. Therefore, there was significant effect of nonverbal communicative behaviour during healthcare provider patient interaction on DMMPs at MP Shah Hospital and not overall in Kenya and at KNH.

Hypothesis 3

From the third objective; Ho_3: There is no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Simple linear regression showed noise had positive relationship with no significant effect overall in Kenya, p=0.662 and MP Shah Hospital, p=0.596 whereas there was negative relationship with no significant effect at KNH, p=0.876. Therefore, there was positive insignificant effect of noise on diabetes mellitus management practices overall in Kenya; at MP Shah Hospital while at Kenyatta National Hospital there negative insignificant effect.

Multiple regression model 1(adjusted - communication variables) did show that there was positive association with no significant effect of noise on diabetes mellitus

management practices overall in Kenya, p=0.642 and at MP Shah Hospital, p=0.310 while there was negative relationship with no significant effect at KNH, p=0.091. Therefore, noise had no statistically significant effect on DMMPs overall in Kenya; at MP Shah Hospital and at KNH. Therefore, there was failure to reject the null hypothesis, Kenya; at KNH and MP Shah Hospital. Therefore, there was no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya.

Hypothesis 4

On the fourth objective; Ho_4: There is no significant effect of environmental context during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Simple linear regression did show there was positive relationship with no significant effect of environmental context on diabetes mellitus management practices, p=0.056. This was similarly noted at Kenyatta National Hospital, p=0.193 and at MP Shah Hospital, p=0.140, p-values that were greater than the set significance level of α=0.05.

Multiple regression model 1(adjusted-communication variables) showed that there was positive relationship with no significant effect of environmental context on diabetes mellitus management practices, p=0.098 overall in Kenya and MP Shah Hospital, p=0.594 while there was negative relationship with no significant effect at KNH, p= 0.779. Therefore, environmental context had no statistically significant effect on DMMPs overall in Kenya; at MP Shah Hospital and at KNH. Therefore, there was failure to reject the null hypothesis overall in Kenya; at KNH and MP Shah Hospital. Therefore, there was no significant effect of environmental context during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya.

Hypothesis 5

From the fifth objective; Ho_5: There is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Simple linear

regression revealed that overall, in Kenya there was positive relationship with no significant effect of the demographic characteristics on diabetes mellitus management practices. Similarly, by hospital there was positive relationship with no significant effect of the demographic characteristics on diabetes mellitus management practices at KNH and at MP Shah Hospital.

Multiple linear regression model 2 (fully adjusted with moderating variables) in regard to each of the independent variables showed that the demographic characteristics had no significant moderating effect on the verbal language use; nonverbal communicative behaviour; noise and on environmental context in regard to DMMPs overall in Kenya, at KNH and MP Shah Hospital.

Multiple regression model 2 (fully adjusted with moderating variables) with all of the independent variables showed no significant moderating effect of the demographic characteristics on DMMPS overall in Kenya; at KNH and MP Shah Hospital. Thus, there was failure to reject the null hypothesis, Kenya; at KNH and MP Shah Hospital. Therefore, there was no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECCOMENDATIONS

5.1. Introduction

The purpose of study was to examine the effect of healthcare provider patient communication on diabetes mellitus management hospitals in selected hospitals in Kenya and was guided by five objectives. The first objective was to establish the effect of healthcare provider patient verbal language use on diabetes mellitus management practices in selected hospitals in Kenya. The second objective was to determine the effect of healthcare provider patient nonverbal communicative behaviour on diabetes management practices in selected hospitals in Kenya. The third objective was to examine the effects of healthcare provider patient communication as a result of noise during interaction on diabetes mellitus management practices in selected hospitals in Kenya. The fourth objective was to investigate the effect of healthcare provider patient communication environmental context during interaction on diabetes mellitus management practices in selected hospitals in Kenya. Finally, the fifth objective was to find out the moderating effect of the demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya.

5.2. Summary of Findings

This section offers a summary of findings as established in the analysis and discussion section which addressed the findings of how the patients found their communication with the healthcare providers on diabetes mellitus management practices first. This is followed by the second phase of how healthcare providers also found their communication with the patients during interactions in the management of diabetes mellitus. In addition, there is also a report of findings on hypothesis testing.

The theoretical foundation in this study rested in uncertainty reduction theory in describing the interrelationships between important factors in the dyadic exchange as regards verbal communication, nonverbal expressiveness, information-seeking

behavior, intimacy, reciprocity, similarity, and liking. Additionally, communication accommodation theory was used to describe the psychologic, social, and linguistic behaviors that exhibited when communicating and in examining the patient-practitioner dyad. This enabled an understanding of how ambulatory medical visit conversation's function and where communication interventions may be useful to improve patient outcomes in regard to diabetes mellitus management practices. Thus, the two theoretical approaches can help improve our understanding of healthcare provider patient communication and patient-centered care by providing a framework for the interplay of interpersonal factors that are very much at play in HCPPC.

5.2.1. Patients Outcome of Communication with their Healthcare Providers

5.2.1.1. Healthcare provider patient verbal language use on diabetes mellitus management practices

The first objective was to establish the effect of healthcare provider patient verbal language use on diabetes management practices in Kenya. Verbal language use as rated by patients was positive with overall high mean score at Kenyatta National Hospital **(**83.0 (SD 12.5)) and MP Shah Hospital **(**88.1 (SD 10.9)). The mean score rating by the female patients (mean, 83.3 (SD 12.7)) was higher than that of the male patients (mean, 82.6 (SD 12.1)) at KNH. Equally at MP Shah Hospital the rating by the female patients (mean, 89.3 (11.4)) was also higher than that by the male patients (mean, 86.9 (10.4)).

The mean score rating of all the specific components of verbal language were equally high, with more than a mean score of 4.3 at KNH and 4.4 at MP Shah Hospital respectively. The highest scores of 4.4 were in language and participation in discussion (balanced conversion) at KNH and 4.6 in language, participation in discussion (balanced conversion), voice inflection and speech volume at MP Shah Hospital. The lowest score of 4.3 was observed in regard to terms (vocabulary), speech rate, voice tone, the speech sounds, speech volume and voice inflections at KNH while at MP Shah Hospital the lowest mean score of 4.4 was in voice inflection. There was no significant difference by gender either for the individual areas or in the overall mean score of verbal language use at the two hospitals. The

findings at both hospitals are in congruence with the research outcome by Abdulhadi, Al-Shafaee, Wahlström & Hjelm (2013) on language concordance on the high level of satisfaction by patients. Abdulhadi et al (2007), found that encouraging the patient to ask questions was a mechanism of patient participation in the medical dialogue which is positively associated with patients' satisfaction and health outcomes

Comparisons between the KNH and MP Shah hospital on verbal language use revealed that patients at MP Shah hospital rated the verbal language use significantly higher than the patients at KNH overall ($p< 0.001$) and in all categories except on voice inflections in which there was no significant difference, $p=0.061$. When it came to language, terms (vocabulary), voice tone and speech volume, there were significantly higher score ratings at MP Shah Hospital than at KNH ($p=0.001$). The speech rate ($p=0.015$), participation in discussion (balanced conversion) ($p=0.029$) and speech sounds ($p=0.021$) were also rated significantly higher at MP Shah Hospital than at KNH.

On regression analysis testing, simple linear regression revealed verbal language use had positive significant effect on diabetes mellitus management practices among patients during communication with the healthcare providers overall. This relationship between verbal language use and diabetes mellitus management practices was also noted at both Kenyatta National Hospital and MP Shah Hospital where verbal language use had positive significant effect on diabetes mellitus management practices. This findings bolsters Partida, 2012, Kourkouta & Papathanasiou, 2014 and Hacker et al, 2012 that language concordance fosters diabetes mellitus management with Hacker et al, 2012 reckoning that patients who received 100% of their primary care visits with language concordant providers were least likely to have diabetes-related emergency department visits compared to other groups ($p<0.001$). Further analysis by multiple linear regression showed that verbal language use was not statistically significant on adjustment using stepwise method (model 1) overall, with similar outcome at KNH and MP Shah Hospital. Therefore, verbal language use had positive relationship with no significant effect with DMMPs.

There is theoretical grounding in the findings in lieu of uncertainty reduction theory; Bylund, Peterson & Cameron, 2012, avers of information exchange to being a basic human function in which individuals' request, provide, and exchange information with the goal of reducing uncertainty. This is from the time of consultation processes at first especially initially with increased communication dynamics in the follow-up consultations and interactions. This is as found in its interactive strategies, which are dialogic and conversational in nature, together with the passive and active strategies do tend to reinforce dialogue and especially so with increased frequency of dialogue, builds coalitions.

There was failure to reject the null hypothesis as stated: There is no significant effect of verbal language use in healthcare provider patent communication on diabetes mellitus management practices in selected hospitals in Kenya. Therefore, there was no significant effect of verbal language use in healthcare provider patient communication on diabetes mellitus management practices in in selected hospitals in Kenya. In regard to this finding, then it means verbal language use does not bring about improved diabetes mellitus management practices among patients overtime regardless of the hospital setting, public or private. Hence, for patients not doing well in diabetes mellitus in terms of health outcome will maintain the status quo and viceversa. Verbal language use in its current form in inconsequential and as such measure need to be put in place to make it a significant factor in enhancing diabetes mellitus management practices. This does imply that patient in general were not satisfied with the nature of verbal language use by the healthcare providers in general and at both hospital settings.

5.2.1.2. Healthcare provider patient nonverbal communicative behaviour (NVCB) on diabetes management practices

The second objective sought to determine the effect of healthcare provider patient nonverbal communicative behaviour on diabetes mellitus management practices in Kenya. It was established that the patients overall mean score ratings of the healthcare providers were high with patients having rated healthcare providers positively with an overall rating of 81.6 (SD 12.8) at KNH and 85.5 (SD 11.1)) at

MP Shah Hospital. Ratings were of more than a mean score 4.3 across all the twelve (12) facets except on the aspect of waiting time before you were attended to, in which the mean score was (3.4(SD 1.2)) at KNH and (mean, 3.6(SD 1.1)) at MP Shah hospital. According to Abdulhadi et al, 2007, long waiting time of up to four or five hours' despite being given appointments was an issue that was raised spontaneously by almost all the patients and was expressed as stressful and unacceptable.

The highest mean score rating at KNH was on the aspect of touch by the healthcare provider, mean score, 4.5 (SD 0.7) while at MP Shah Hospital it was on attention (looked at me, listen carefully), mean score, 4.7 (SD 0.6). The male gender overall mean score rating, 82.0 (13.0) was higher than that of the female gender with a mean score of 81.3 (12.7) at KNH and vice versa at MP Shah hospital where the male had a lower mean score rating, 84.0 (11.6) as compared to the rating by the female gender, mean score, 87.0 (10.6). On waiting time before you were attended to, the male patients had a significantly higher mean score, 3.6 (1.2) as compared to the female patients (mean, 3.2 (1.3)), p=0.014 at KNH, an occurrence not observed at MP Shah Hospital on the same where no significant difference was observed between the gender (p=0.273). There were no significant differences between the female and male patients' scores across most of the facets in NVCB at MP Shah hospital except on the body posture in which there was a significant difference with a lower mean score by male patients (mean 4.4(SD 0.6)) than by the female patients (mean 4.6(SD 0.5)), p=0.047. According to Travaline, Ruchinskas, D'Alonzo, Jr. (2005), body position can greatly affect the quality of one-to-one communication between the patient and physician.

On silence, the mean score was significantly lower for the male patients (mean4.3 (SD 0.7) as compared to the female patients (mean 4.6(SD 0.5)), p =0.034. Kourkouta & Papathanasiou (2014) noted that what of course in any case should be avoided by the caregivers was silence and indifference to the questions of the patient as in the best cases, the patient will leave disappointed and in the worst really indignant with healthcare providers. Mickel, McGuire & Gross-Gray (2013) in their research stated that nonverbal behaviors that include interruptions and silence that

are thought to imply power or dominance have been reported as negatively impacting patient outcomes

Comparisons did show that significantly higher scores were computed at MP Shah Hospital in regard to body language (p=0.001), proximity (p=0.004), body posture (0.018), attention (p=0.001) and tone of voice (p=0.008) as compared to those at KNH. These findings agree with Mickel, McGuire & Gross-Gray, 2013 in positing that physician proximity and lean, tone of voice, expressiveness and body position were significantly linked to patient satisfaction and compliance and that physician speed and volume of talking correlated with patient satisfaction levels.

The overall mean score for healthcare provider patient non-verbal communicative behavior was significantly higher at MP Shah Hospital (mean, 85.5 (11.1)) than at KNH (mean, 81.6 (12.8)) (p=0.010). As regards the waiting time before you were attended to as one of the aspects in non-verbal communicative behaviour, the mean scores computed showed no significance difference between KNH and MP Shah Hospital although the rating by patients was higher at MP Shah hospital (mean 3.6(SD1.1)) than at KNH (mean 3.4(SD1.2)). In addition, the ratings by patients at MP Shah hospital were higher in almost all areas of NVCB except on touch by the healthcare provider that was rated higher by KHN patients (mean, 4.5 (0.7)) than as by the MP Shah hospital patients (mean, 4.3 (0.8)).

These results dovetail in communication accommodation theory (CAT) in aiding in the understanding of how healthcare providers can provide satisfactory care to patients. This is through the ability to be not only providers but also active listeners and finds residence in the findings hereto as already reported. This revolves around the principle that interaction is fundamentally transactional in nature with behavioral adjustments to manage their levels of social distance when interacting.

Mickel, McGuire & Gross-Gray, 2013 opined that CAT provides a theoretical basis to forecast and account for such adjustments depicting convergence on almost all aspects of NVCB as one of its polarities in accommodation processes during communication interactions as aptly demonstrated by the current study findings. According to D'Agostino & Bylund the healthcare provider and patient matching or

reciprocation in communication closely related to CAT is largely observed nonverbally.

On regression analysis testing, simple linear regression revealed nonverbal communicative behavior had positive significant effect on diabetes mellitus management practices. Correspondingly, similar relationships were found at Kenyatta National Hospital and MP Shah Hospital where nonverbal communicative behaviour had positive significant effect on diabetes mellitus management practices.

This is in tandem with Khan et al, 2014 that positive, effective, and sensitive nonverbal behavior helps to strengthen the doctor-patient bond. Multiple regression model 1 showed that nonverbal communicative behaviour remained significant on adjustment using stepwise method (model 1) overall in Kenya, with similar outcome at Kenyatta National Hospital and not at MP Shah Hospital. Beck, Daughtridge & Sloane, 2002 findings align to the current study findings that physician behavior can enhance favorable patient outcomes, such as understanding and adherence to medical regimens and overall satisfaction.

The null hypothesis as stated: There is no significant effect of nonverbal communicative behaviour during healthcare provider patient interaction on diabetes management practices in selected hospitals in Kenya. This was rejected overall in Kenya; at KNH while at MP Shah Hospital, there was failure to reject the null hypothesis. Therefore, there was significant effect of nonverbal communicative behaviour in healthcare provider patient communication on diabetes management practices in Kenya; at KNH and not at MP Shah Hospital.

This then shows that patients at KNH had improved diabetes management practices; hence health outcome unlike those at MP Shah hospital who maintained the status quo as nonverbal communicative behaviour was of no consequence in the diabetes mellitus management practices. This implies that patients at KNH were more satisfied with the nature of NVCB by the healthcare providers than those ta MP Shah Hospital

5.2.1.3. Healthcare provider patient communication in regard to noise during interaction on diabetes mellitus management practices

The third objective was to examine the effects of healthcare provider patient communication as a result of noise during interaction on diabetes mellitus management practices in selected hospitals in Kenya. The mean score rating of noise by the patients was generally low at both hospitals with an overall mean score of 16.0 (SD17.2) at KNH and 26.7(SD 23.7) at MP Shah Hospital. The ratings on various types of noises were of mean score not greater than 1.7 at KNH and 2.3 at MP Shah Hospital with the male patients having had lower mean scores as compared to the female patients in all types of noises at each of the hospital. The lowest score ratings were in physical and physiological noise of mean 1.6 in each with a higher score rating that was in psychological and semantic noises of mean 1.7 in each at KNH. At MP Shah Hospital, the lowest mean score rating was on physical noise (mean, 1.9 (SD1.1)) with the highest mean score on semantic noise (mean, 2.3 (1.1)). There was no significant difference in the mean score ratings by gender at the two hospitals.

Comparison between Kenyatta National Hospital and MP Shah Hospital indicates that noise was rated significantly higher at MP Shah Hospital than at KNH ($p < 0.001$) overall. Patients at MP Shah Hospital experienced significantly more physical noise ($p < 0.001$), physiological noise ($p < 0.001$), psychological noise ($p=0.002$) and semantic noise ($p < 0.001$) than patients at KNH. The findings, more in regard to MP Shah Hospital reinforce Chew, Shariff-Ghazali & Fernandez, 2014, in noting that patients with diabetes mellitus (DM) were at high risk of decreased psychological well-being. The proportion of the people with DM who were likely to have depression and diabetes-related distress (DRD) was 13.8% and 44.6%, respectively, with overall poor quality of life at 12.2%. Reiling, Hughes & Murphy (2008) averred that noise can reduce overall perceived patient satisfaction.

On regression analysis testing, simple linear regression revealed that noise had negative significant effect on diabetes mellitus management practices. This was also noted at Kenyatta National Hospital and MP Shah Hospital. Miller, 2006 observed

that noise had been proven to have a negative influence on patient recovery times and that noise often resulted in medication errors, one of today's most challenging issues in delivering care. Pfeiffer, 1973 noted that the greater the noise, the more difficult it becomes to communicate clearly. According to Joseph & Ulrich, 2007, high noise levels negatively impacted patient health and well-being and may slow the process of healing among patients. Multiple linear regressions showed that noise was not statistically significant on adjustment using stepwise method (model 1) overall in Kenya; with similar outcome at Kenyatta National Hospital and MP Shah Hospital though with negative insignificant effect at KNH, hence an inverse relationship on DMMPs at KNH. In regard this concurs with Ryherd & Waye, 2012 view that hospital noise was a serious issue that can negatively affect patient as the outcome at KNH showed.

There was failure to reject the null hypothesis as stated: There are no significant effects of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Therefore, noise had no significant effect during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya. These findings indicated that noise was of no value in the communication process in the course of diabetes management. Though it should be noted that whilst, overall and MP Shah Hospital noise did not foster better good management practices among patients, neither was it detrimental as is the case at KNH where it had a negative impact albeit insignificant. This implies that noise at KNH was likely to bring about poor management practice with attendant poor health outcomes among patients than would happen to patients at MP Shah Hospital.

5.2.1.4. Healthcare provider patient communication environmental context during interaction on diabetes management practices.

The fourth objective was to investigate the effect of healthcare provider patient communication environmental context during interaction on diabetes management practices in selected hospitals in Kenya. The overall mean scores in relation to environmental context were generally high, 82.7(SD15.3) at KNH and 85.5(SD13.5)

at MP Shah Hospital. The rating by the female patient (mean, 83.2 (16.0)) was slightly higher than that by the male patients (mean, 82.1 (14.2) at KNH) but with no significant difference in the mean score rating by gender, p=0.534. At MP Shah Hospital as well the rating by the female patient (mean, 86.6 (SD 14.2)) was slightly higher than that by the male patients (mean, 84.4(SD 12.7))) but with no significant difference in the mean score rating by gender, p=0.452.

The environmental context among patients at KNH was rated highly with scores of more than four (mean, 4.0) across all the nine (9) areas except for competitiveness that had a mean score of 3.9(SD1.2) at KNH and 3.8 (SD1.3) at MP Shah hospital hence rated lower than the others and consequently reflected on both the male and female patients score ratings. At KNH, ratings by patients were highest on friendliness, cooperativeness and health information, all with a mean score of 4.5 while at MP Shah Hospital the highest ratings were on friendliness, cooperativeness and physical (consultation room) environment, all with a mean score of 4.7. No significant difference was observed in the overall environmental context score by gender at KNH and MP Shah Hospital.

However, on individual areas of environmental context no significant difference was recorded at KNH. The score rating at MP Shah Hospital showed that even though no significant difference was noted in almost all the areas of environmental context, the female patients had a significantly higher mean score, 4.4(SD 0.9) rating than the male patients (mean 3.9(SD 1.1)), p=0.015 in regard to cultural dimension. The significance of cultural dimension was underscored by Caballero, 2007 that increased cultural competence improved patient provider trust and communication, as well as helped patients adhere to prevention and treatment plans; that cultural competence could lead to a much more pleasant and productive health care provider patient interaction. Patel, Datye & Jaser, 2018 established that a better understanding of patients' cultural beliefs, values, and traditions also improved communication and could increase disclosure of personal health information. However, the researchers highlighted the lack of culturally competent communication among healthcare providers and their patients required to provide optimal care among culturally diverse populations.

Comparisons between the two hospitals did show that patients at MP Shah Hospital rated HCPs on environmental context significantly higher in relation to physical (consultation room) environment, $p<0.001$; formality, $p=0.010$; friendliness, $p=0.011$ and cooperativeness, $p=0.006$ than the rating given by the patients on HCPs at KNH. In regard, Joseph & Ulrich, 2007 observed that poorly designed environments can result in private conversations between patients and healthcare providers being overheard by unintended listeners, resulting in unacceptable breaches of confidentiality and therefore affect communication dynamics between the patients and the HCPs. Kieft, de Brouwer, Francke and Delnoij (2014) study revealed that among the quality aspects was attention to physical and environmental needs. However, there was no significant difference in the overall environmental context mean score between the two hospitals, $p=0.123$.

On regression analysis testing, simple linear regression showed that environmental context had significantly positive effect on diabetes mellitus management practices. Similar finding was found in regard to Kenyatta National Hospital and MP Shah Hospital. Multiple linear regressions showed that environmental context remained statistically significant on adjustment using stepwise method (model 1) overall and with similar outcome at Kenyatta National Hospital and MP Shah Hospital. Though significant in this study unlike Abdulhadi et al, 2006 study on environmental context that otherwise rightly argued that improving the work situation and further improvement in the organizational efficiency of diabetes services positively impacted diabetes management. The researchers found in overall that 52% of the doctors' consultations were not optimal; that some important aspects for a positive consultation environment were fulfilled in only about half of the doctors' consultations: the quality of the nurses' consultations was sub-optimal in about 75% of 85% consultations regarding aspects of consultation environment, care and information.

The null hypothesis as stated: There is no significant effect of environmental context during healthcare provider patient interaction on diabetes management practices in in selected hospitals in Kenya was rejected. Therefore, there was significant effect of environmental context of healthcare provider patient communication on diabetes

mellitus management practices in selected hospitals in Kenya. This outcome indicates that environmental context generally and at both hospital settings was favourable and had positive consequential impact and greatly responsible for improvement in diabetes mellitus management practices. Therefore, patients at both hospitals were likely to experience better health outcomes, hence had high levels of satisfaction with this domain of healthcare provider patient communication.

5.2.1.5. Moderating effect demographic characteristics (DC) on diabetes management practices

The fifth objective was to find out the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya. Patients at KNH rated highly their satisfaction for older healthcare providers, mean 4.1(SD 0.9) and this was reflected in the scores by patients of both the female (mean, 4.1(SD 1.1)) as well as male (mean, 4.0 (SD 1.0)) gender respectively. Patients had a preference for the older HCPs in comparison to the young healthcare providers.

At Kenyatta National Hospital, overall high satisfaction was also given by the patients for HCPs of the male gender (mean, 4.1(SD 0.9)), and indeed the mean scores for the male gender HCPs were much higher as given by the male (mean, 4.0 (SD 0.9)) as well as the female patients, mean 4.1 (SD 0.9) than for the female HCPs. Therefore, there was a higher preference for the male gender HCPs. In respect, the female patients mean score ratings were higher than that by male patients in all the categories of age and gender for the healthcare providers. Socio economic status had low scores generally with the lowest satisfaction scores observed in the financial status and the ability save with a mean, 2.7 (SD 1.3) in each. The male patients score ratings were higher in financial status and the ability to save than as by the female patients. Both genders had similar score ratings in the quality of life (mean, 3.3 (SD 1.2)) and the level of asserts (mean, 3.2 (SD 1.2)). There was no significant difference by gender as rated by the patients on the demographic characteristics at the hospital.

Patients at MP Shah Hospital showed high satisfaction with healthcare providers of all age groups and either gender. Though it was observed that the overall ratings were a little higher for the older HCPs (mean score 4.2(0.8)) and the female HCPs (mean score, 4.1(1.0)). Respectively the score ratings were higher for the older HCPs and the female HCPs as scored by either the male or female patients, hence showing preference for the older and female gender HCPs. Socio economic status delivered low scores with lower satisfaction seen in relation to financial status, mean 3.2 (SD1.1) and the ability to save, mean 3.3 (SD1.0). The male patients rated themselves higher on financial status and ability to save than the female patients. Similar score rating were noted on quality of life (mean, 3.5) and level assets (mean, 3.5) by both genders. There was no significant difference observed in all areas of demographic characteristics in regard to the satisfaction scores as rated by patients at the hospital.

Comparisons between KNH and MP Shah Hospital revealed that when it came to gender of the HCPs, patients at the two hospitals showed a difference. Patients at KNH gave male HCPs a higher score (mean, 4.1(SD 0.9)), hence had a likely preference for male HCPs while those at MP Shah hospital gave the female HCPs a higher score, mean 4.1 (SD1.0), hence with a likely preference for the female HCPs. When it came to age, patients at both hospitals rated older HCPs with higher mean scores than the younger HCPs. However, on socio economic status, patients at MP Shah Hospital had significantly higher satisfaction in regard to their financial status ($p=0.002$), quality of life ($p=0.044$), level of assets ($p=0.023$) and ability to save ($p=0.001$) than their counterparts at KNH. Singh et al, 2017 highlighted that the demographic characteristics inclusive of age and gender as significant factors influence patient-centered provider communication. Arpey, Gaglioti and Rosenbaum, 2017, found evidence that socioeconomic status (SES) affected health outcomes and the health care received by patients.

On regression analysis testing, simple linear regression showed positive significant effect in regard to age, for the young HCPs and the older HCPs with diabetes management practices in overall. Similarly, there was positive significant effect between diabetes mellitus management practices and gender, for the female HCPs

and for the male HCPs respectively. Socio economic status was found to have positive significant effect on diabetes mellitus management practices of the patients on the quality of life, level of assets, and the ability to save. There was a negative relationship with no significant effect in regard to financial status. In context therefore, it showed that while other aspects of SESs had significant relationship with positive influence on diabetes mellitus management practices, financial status had a negative influence with no significant relationship.

By hospital showed that age was found to have positive significant effect on diabetes mellitus management practices at both facilities. Similarly, there was positive significant effect between diabetes mellitus management practices and gender. On socio economic status, while there was positive significant effect with diabetes mellitus management practices on quality of life, level of assets and ability to save at KNH; there was a negative relationship with no significant effect in regard to financial status. At MP Shah Hospital, positive relationship with no significant effect was found between all the SESs and diabetes mellitus management practices of the patients except on the ability to save in which there was negative relationship with no significant effect.

Multiple regression analysis by model 2 for each individual independent variables found that; only the female / male healthcare providers' gender and ability to save had significant moderating effect on verbal language use; all the demographic characteristics had no significant moderating effect on the nonverbal communicative behaviour, except the female healthcare providers' gender and the ability to save; the female healthcare provider gender and ability to save had positively significant moderating effect on the noise; whereas the male healthcare provider gender had negatively significant effect on noise and the demographic characteristics had no significant moderating effect on the environmental context. By hospital, the demographic characteristics of the female healthcare providers' gender and ability to save had significant moderating effect on the verbal language use at KNH and not at MP Shah Hospital; Female healthcare providers and ability to save had significant moderating effect on nonverbal communicative behaviour at KNH and not at MP Shah Hospital; the demographic characteristics of the female healthcare provider and

ability to save at KNH had significant moderating effect on the noise and not at MP Shah Hospital and in addition, the female healthcare providers' gender had significant moderating effect on environmental context.

Multiple linear regression model 2 (fully adjusted with moderating variables) with all the independent variables in overall did show that female healthcare providers had positive significant effect on diabetes mellitus management practices. By hospital, similar outcome was observed at KNH but not at MP Shah Hospital. It therefore means female healthcare providers remained statistically significant with DMMPs when all the independent variables were tested together with the demographic characteristics. Therefore, there was significant moderating effect of female healthcare providers gender of the demographic characteristic on DMMPS overall in Kenya, p=0.003, at KNH, p=0.002 and not at MP Shah Hospital, p=0.886.

The null hypothesis as stated: There is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya was rejected in regard to female healthcare provider gender. On the other hand, there was failure to reject the null hypothesis in regard to age, male healthcare provider gender and socio-economic status. Therefore, the demographic characteristic of the female healthcare provider gender had significant moderating effect on diabetes mellitus management practices overall in Kenya; at KNH and not at MP Shah Hospital. Whereas the demographic characteristics of age, male healthcare provider gender and the socio-economic status had no significant moderating effect on diabetes mellitus management practices in selected hospitals in selected hospitals in Kenya. What this implied was that the female healthcare provider gender was consequential in improving diabetes mellitus management practices unlike the other demographic characteristics in general and at KNH in comparison to MP Shah Hospital. Patients were more satisfied with the female healthcare provider, hence, likely to enjoy better health outcomes.

The preference for female HCPs overall in Kenya and at KNH gets support from Roter, Hall & Aoki (2002) who documented that female physcians facilitated more open and equal exchange and a different therapeutic milieu from that of male physcians; that female primary physcians engaged in more communication that could be considered patient centered than their male colleagues. Scheiber et al, 2014 documented that a better agreement was observed for female concordant dyads and that female doctors appeared to facilitate agreement with their patients on advice given during communication interactions on the management practices. Cooper & Roter, 2013 stated that although male and female physicians did not differ in how much biomedical information they conveyed, the male engaged in less verbal and nonverbal communicative behaviour than female physicians to the extent that male physicians' behavior and attitudes were less patient centered than those of female physicians, hence with implications for overall quality of care and health outcomes.

5.2.1.6. Patients rating of diabetes mellitus management practices (DMMPs)

The rating of diabetes mellitus management practices by patients was high with an overall mean score of 87.4(SD15.6) at KNH and 87.3(SD15.6) at MP Shah Hospital. At KNH, mean score rating of the female patients (87.6 (15.8)) was slightly higher than that of the male patients (87.0 (15.3)). This was similarly observed at MP Shah Hospital with female patients rating (mean, 87.5 (13.1)) slightly higher than that of the male patients (mean, 87.1 (12.5)).

The ratings of the individual diabetes management practices were equally high with mean scores of greater than of 4.2 at KNH and 4.4 at MP Shah Hospital. The highest rating at KNH was in clinic attendance follow up (mean score, 4.7 (0.6)) and the lowest in physical activities/exercises (mean score 4.2 (1.0)). While at MP Shah Hospital the highest rating was on Medication therapy (mean score 4.7 (0.5)) with the lowest being on dietary therapy and physical activities/exercises both of which had a similar mean score rating of 4.4. There was no statistically significant difference in the score rating by gender in either of the two health facilities overall as well as in the individual areas of diabetes mellitus management practices. Heisler et al, 2002 noted that ratings of providers' communication effectiveness were more

important in predicting diabetes self-management and that higher rating in PCOM was associated with higher self-management among patients just as above outcome indicate.

Comparisons between the two hospitals showed no significant difference in the overall mean score rating on diabetes mellitus management practices between KNH and MP Shah Hospital, p=0.957. The ratings by the patients at MP Shah Hospital were higher on medication therapy and physical activities/exercises as compared to patient at KNH. Ratings with the same mean score by patient was observed on dietary therapy (mean, 4.4) and monitoring of glycaemic control (mean, 4.5). No statistically significant differences were observed on the preceding four areas of DMMPs. However, patients rated clinic attendance follow ups significantly higher at KNH (4.7(SD 0.6)) than at MP Shah Hospital (4.5(SD 0.6)), p=0.025. The findings showed that clinic attendance follow ups at KNH was an indication of better healthcare provider patient communication, thus high satisfaction levels among this patient for the healthcare provider unlike at MP Shah Hospital.

5.2.2. Healthcare Providers Outcome of Communication with Patients

5.2.2.1. To establish the effect of healthcare provider patient verbal language use on diabetes mellitus management practices

Regarding the first objective, overall, the rating of verbal language use of patients by healthcare providers at KNH was high. The mean score was slightly higher by female HCPs (mean 87.5(SD 7.7)) compared to the male HCPs (mean 77.1(SD 3.6)) with no significant difference by gender. The female HCPs rated the patients higher in almost all the areas of verbal language use except on the area of terms (vocabulary) where the male HCPs score rating was higher. Verbal language use at MP Shah Hospital was rated higher by the female HCPs (mean, 88.8(SD 11.8)) than by male HCPs (mean, 86.5(SD 9.2)) with no significant difference by gender. The female HCPs also rated the patients higher than the male HCPs in most of the areas of verbal language except on voice tone and participation in discussion (balanced conversion) in which the male HCPs ratings were higher. The rating of patients on voice inflection by both the female and male HCPs was similar at this hospital.

On comparisons, the rating of verbal language use by healthcare providers was high at both hospitals. However, the HCPs at KNH (mean, 84.7 (SD 8.2)) rated the patients slightly lower than the HCPs at MP Shah Hospital (mean, 88.1 (9.4)) with no significant differences. The ratings on verbal language did show that HCPs at MP Shah Hospital rated the patient higher in most of the individual areas on communication except on speech rate where HCPs at KNH rated patients higher as compared to HCPs of MP Shah hospital. The rating of patients by HCPs on speech sounds was similar at both hospitals. At KNH the HCPs rated language highest and voice inflection the lowest. At MP Shah Hospital, the HCPs rated voice tone the highest and terms (vocabulary), the speech sounds and voice inflections were all rated lowest with similar mean scores.

On regression analysis testing, simple linear regression showed there was positive relationship with significant effect of verbal language use on diabetes mellitus management practices overall in Kenya. Similar outcome was noted at KNH and not at MP Shah Hospital where there was positive relationship with no significant effect of verbal language use on diabetes mellitus management practices. Therefore, there was positive significant effect of verbal language use on diabetes mellitus management practices overall in Kenya; at KNH and not at MP Shah Hospital where there was a positive relationship with no significant effect. Multiple regression model 1(adjusted –communication variables), did show there was positive significant effect of verbal language use on diabetes mellitus management practices overall and similarly at KNH, but not at MP Shah Hospital. These findings though with a better outcome overall in Kenya and at KNH as compared to MP Shah Hospital are strengthened by Dickinson et al, 2017 observation that language is important for health care professionals to consider as they work to build and strengthen therapeutic relationships with the patients'.

The null hypothesis as stated: There is no significant effect of verbal language use by the healthcare provider and the patient on diabetes mellitus management practices in selected hospitals in Kenya was rejected overall in Kenya and at KNH. There was failure to reject the null hypothesis at MP Shah Hospital. Therefore, there was significant effect of verbal language use on diabetes mellitus management practices

overall in Kenya, at KNH but not MP Shah Hospital. The finding implied that verbal language use overall and at KNH brought about improvement in diabetes mellitus management practices with better health outcomes in patient which was not the case at MP Shah Hospital. At MP Shah Hospital, the patient maintained the status quo, neither did they show improvement nor deterioration in their diabetes management practices.

5.2.2.2. To determine the effect of healthcare provider patient nonverbal communicative behaviour on diabetes management practices

Findings on the second objective showed that nonverbal communicative behavior at KNH was not significantly different (p=0.065) though was rated slightly higher by female HCPs (mean 84.6 (7.5)) when compared to the male HCPs (mean 73.6 (8.4)). Though the case, there were significant differences in the rating of consultation time with the mean score being higher by the female HCPs, 4.6(0.5) as compared to the male HCPs, 3.3(1.2), p=0.025. Proximity (physical distance) was rated significantly higher by female HCPs with mean score, 4.5(0.6) as compared to the male HCPs mean score, 3.3(1.2), p=0.040. In addition, the female HCPs did rate the patents higher in almost all the areas of nonverbal communicative behaviour except on tone of voice and on waiting time before the patients were attended to in which the male HCPs rated the male patients higher with a mean score of 4.3 (0.6) and 4.1 (0.6) as compared to the rating by female HCPs mean scores of 4.0(0) and 3.7 (1.6) respectively.

Though in overall the male HCPs (mean 84.7(13.2)) rated the male patients higher than the female HCPs (mean 80.1(10.7)) on non-verbal communicative behavior at MP Shah Hospital, it was not significantly different, p=0.569. The male HCPs at MP Shah Hospital did rate the patients higher in most areas of nonverbal communicative behaviour than female HCPs except in the following areas: body language and eye contact whose rating were the same by both male and female HCPs; facial expression, gestures and waiting time before the patients were attended to were rated higher by the female HCPs. The rating by both the male and female HCPs in areas of facial expressions (mean, 4.4) and gestures (mean 4.5) was the similar.

Comparisons between the two hospitals noted that non-verbal communicative behavior was highly rated at both KNH (mean 81.6(SD 9.0)) and MP Shah Hospital (mean 81.5(SD 11.0)), with no significance differences, p=0.969. The high ratings of NVCB at KNH and MP Shah Hospital are in tandem with findings by Wanko Keutchafo, Kerr & Jarvis, 2020 that nurses should be self-aware of their nonverbal communication behaviors with patients as well as the way in which the meanings of the messages might be misinterpreted and thereby understand its modification as necessary in accordance with patient's needs. HCPs at MP Shah Hospital rated the patient higher in areas of consultation time, body language, attention (looked at me, listen carefully), tone of voice and waiting time before patients were attended to. HCPs at KNH did rate patients higher in areas of proximity (physical distance), body posture, silence, eye contact and touch by the healthcare provider.

On regression analysis testing, simple linear regression showed that overall nonverbal communicative behaviour had positive relationship with significant effect on diabetes mellitus management practices. There was positive relationship with significant effect on diabetes mellitus management practices at MP Shah Hospital but not at KNH, where there was a positive relationship with no significant effect. Multiple regression model 1 (adjusted - communication variables) did show that there was positive relationship with no significant effect of nonverbal communicative behaviour on diabetes mellitus management practices overall in Kenya. At KNH there was negative relationship with no significant effect while at MP Shah Hospital there was positive relationship with significant effect of NVCB with DMMPs.

Beck, Daughtridge & Sloane, 2002 study that physician behavior could enhance favorable patient outcomes, such as understanding and adherence to medical regimens and overall satisfaction gains currency with the findings at MP Shah Hospital. It therefore means nonverbal communicative behaviour had positive with no significant effect on DMMPs overall and a negative insignificant effect at KNH while there was a positive significant effect at MP Shah Hospital.

The null hypothesis as stated: There is no significant effect of nonverbal communicative behaviour use during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in selected hospitals in Kenya. This was rejected at MP Shah Hospital while there was failure to reject the null hypothesis overall in Kenya and at Kenyatta National Hospital. Therefore, there was significant effect of nonverbal communicative behaviour use during healthcare provider patient interaction on diabetes mellitus management practices at MP Shah Hospital. On the other hand there was no significant effect of nonverbal communicative behaviour use during healthcare provider patient interaction on diabetes mellitus management practices overall in Kenya and at KNH. The meaning of these findings is that nonverbal communicative behaviour at MP Shah Hospital brought about improvement in diabetes mellitus management practices with better health outcomes in patient which was not the case overall and at KNH. At KNH, the patient experienced no change, neither did they show improvement nor deterioration in their diabetes management practices.

5.2.2.3. To examine the effects of healthcare provider patient communication as a result of noise during interaction on diabetes mellitus management practices

Noise at Kenyatta National Hospital was not rated as high by both male (mean 37.5(SD 10.8)), and female HCPs (mean 56.3(SD 32.2)) and though not significantly different, the mean score on noise was higher as rated by the female HCPs than the male HCPs. All the specific types of noises were rated lower by the male HCPs as compared to the ratings by the female HCPs. While at MP Shah Hospital noise was rated low and below average by both the male (mean 22.9(SD 25.3)) and female HCPs (mean 43.8(SD 38.5)) and though not significantly different, it was rated higher by the female HCPs than the male HCPs. Female HCPs rated all types of noise higher in comparison to the male HCPs at both Kenyatta National Hospital and MP Shah Hospital.

Comparisons between the two hospitals noted that noise was low at both hospitals and though not significantly different, HCPs rated noise higher at KNH (mean 51.1(SD 28.8)) than at MP Shah Hospital (mean 37.5(SD 35.1)). Too, rating was

higher on all types of noises as rated by HCPs at KNH when compared with HCPs at MP Shah Hospital with there being no significant difference. The findings are testimony to Salonen & Morawska, 2013 that among staff, reduced noise levels in HCFs was associated increased satisfaction, increased effectiveness, increased productivity and improved communication and decreased medical errors.

On regression analysis testing, simple linear regression showed there was positive relationship with no significant effect of noise on diabetes mellitus management practices overall in Kenya. Also, there was positive relationship with no significant effect of noise at MP Shah Hospital while at KNH there was a negative relationship with no significant effect on diabetes mellitus management practices. Multiple regression model 1(adjusted- communication variables) did show that there was positive relationship with no significant effect of noise on diabetes mellitus management practices overall in Kenya, a finding also noted at MP Shah Hospital but not KNH where there was a negative relationship with no significant effect. Therefore, noise had positive relationship with no significant effect overall in Kenya, at MP Shah Hospital and a negative relationship with no significant effect at KNH.

There was failure to reject the null hypothesis as stated: There is no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. Therefore, there is no significant effect of noise during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. This is indication of the fact that noise was of no consequence on diabetes mellitus management practices. Though, there was a likelihood of patients at KNH not only experienced poor but reduced diabetes management practices due to the inverse relationship of noise with diabetes mellitus practices. On the other had KNH patient had no change in their DM management practices.

5.2.2.4. To investigate the effect of healthcare provider patient communication environmental context during interaction on diabetes management practices in Kenya

The female HCPs at KNH rated environmental context significantly higher than the male HCPs, p=0.005. Female HCPs scored the patients significantly higher on friendliness compared to males HCPs, p=0.003. Similarly, competitiveness was significantly higher as scored by the female HCPs in comparison to the male HCPs, p=0.016. The mean score rating of environmental context at MP Shah Hospital was not significantly different by gender. On the specific areas of environmental context the female HCPs at MP Shah Hospital rated the patients higher in most areas with the exception of status relationship, formality, friendliness and cooperativeness that were rated higher by the male HCPs.

Comparisons showed that even though, the overall mean score rating on environmental context by HCPs was higher at MP Shah Hospital (mean, 80.8(SD 8.5)) as compared to Kenyatta National Hospital (mean, 77.0(SD 10.9)) it was not statistically significant, p=0.387. However, competitiveness was rated significantly higher at KNH as compared to MP Shah Hospital, p=0.043. On the other hand, health information (p=0.031) and cultural dimension (p=0.043) were rated significantly higher by the HCPs at MP Shah Hospital in comparison to HCPs at KNH. Ngo-Metzger, 2006 intimated that communication problems may be exacerbated by the health care environment in which physicians have little time for providing information or explanations as seen in the outcome between KNH and MP Shah Hospital. The findings also concur with Forbes, Sidhu & Singh, 2011 who averred that patient-practitioner interactions was falling short due to a cultural disconnect leading to misunderstandings between clinicians and their patients in the management of the Type 2 Diabetes Mellitus (T2DM).

On regression analysis testing, simple linear regression revealed there was positive relationship with no significant effect of environmental context on diabetes mellitus management practices overall in Kenya, at Kenyatta National Hospital and MP Shah Hospital. Multiple regression model 1(adjusted - communication variables) did show

that there was positive relationship with no significant effect of environmental context on diabetes mellitus management practices overall, a finding also noted at MP Shah Hospital. At KNH there was negative relationship with no significant effect on DMMPs.

There was failure to reject the null hypothesis as stated: There is no significant effect of environmental context during healthcare provider patient communication interaction on diabetes management practices in selected hospitals in Kenya. Therefore, environmental context had no significant effect during healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya. Hence the results indicated of environmental context not being a factor in DM management practices. Patients neither showed improved nor deterioration in DM management practices and would neither be said to have experienced better health outcomes.

5.2.2.5. To find out the moderating effect of demographic characteristics during healthcare provider patient communication on diabetes mellitus management practices in Kenya

At KNH while the male HCPs rated young patients higher than the female HCPs on age, the female HCPs did rate older patients higher than the male HCPs. On gender both the male and female HCPs rated the female patients higher than the male patients with the female HCPs rating the female patients higher than the male HCPs. The female HCPs rated themselves higher than the male HCPs in all areas of socioeconomic status. There were no significant differences by gender on the demographic characteristics.

The rating of patient at MP Shah Hospital by male and female healthcare providers in regard to age and gender was not statistically significant. On age, the male HCPs rated younger patient higher than the older patients and vice versa in regard to ratings by female HCPs. The rating on gender was high for male patients by the female HCPs as compared with the rating by male HCPs, while the rating for female patients was the same by the HCPs of both genders. In rating themselves on SES, no significant difference was noted between the male and female HCPs. Nevertheless

the female HCPs rated themselves higher on financial status, level of assets and ability to save than the male HCPs who rated themselves high on quality of life.

A comparison of analysis outcome on demographic characteristics between KNH and MP Shah Hospital was not statistically significant between the HCPs at KNH and MP Shah Hospitals in regard age, gender and socio economic status. On age, the HCPs at MP Shah Hospital rated the young and older patients higher as compared with the HCPs at KNH whose rating was the same for both the male and female patients. At MP Shah Hospital the ratings were higher for the older patients. This finding are in line with Peck, 2011 research outcome that doctors interacted with patients differently depending on age and that age moderated the relationship between interaction style and patient satisfaction. The researcher stated that older patients were more likely than younger patients to interact with their physicians in ways consistent with patient-centered interaction what was the most likely case at MP Shah Hospital On gender, HCPs at KNH rated female patients' higher than HCPs at MP Shah Hospital who rated the male patients higher. The HCPs at KNH rating of themselves on socio economic status indicators of financial status, quality of life and level of assets was higher than that by HCPs at MP Shah Hospital who rated themselves higher on the ability to save.

On regression analysis testing, simple linear regression showed that overall there was positive relationship with no significant effect for age, female gender; socioeconomic status of financial status and level of assets with diabetes mellitus management practices. On the other hand, there was a negative relationship with no significant effect for the male gender; the SES of quality of life and ability to save with DMMPs. While at Kenyatta National Hospital there was positive relationship with no significant effect between the demographic characteristics and diabetes mellitus management practices, there was a negative relationship with no significant effect between the young patients as well as the male patient gender and DMMPs. At MP Shah Hospital, there was positive relationship with no significant effect between age, gender and the SES of financial status and diabetes mellitus management practices with there being negative relationship with no significant effect between the SES indicators of quality of life, level of assets and ability to save with DMMPs.

Multiple regression analysis by model 2 for each individual independent variable overall found that; the demographic characteristics had no significant moderating effect on the verbal language use and noise. However, the demographic characteristics had an insignificant moderating effect on nonverbal communicative behaviour and environmental context as seen in the change from being statistically significant on simple linear regression as earlier analysed to being insignificant with a regress in the beta coefficient.

Multiple regression model 2 (fully adjusted with moderating variables) with all the independent variables did show positive relationship with no significant moderating effect of the younger patients, female patients and SESs of financial status and level of assets on DMMPS overall, at KNH and MP Shah Hospital. On the other hand, there was negative relationship with no significant effect of the older patients, male patients and the SESs of quality of life and ability to save on DMMPs overall, at KNH and MP Shah Hospital.

Verlinde et al, (2012) observed that variability in physicians' communication and perceptions may be related to the patients' demographic characteristics and that the patients' communication style could have a strong effect on physician behaviour and beliefs. To some degree the factors were at play in the current study though insignificantly. Verlinde et al, (2012) study also found that physicians behaved differently with patients from different SES and patients communicated differently with their doctor depending on their SES. Therefore, this led to likely important implications for the daily practice of the physician. As a pointer to the SES, Rojas et al, 2014 study finding is somewhat contrary to the current study findings that showed that there were major differences between public and private hospitals as the researchers' results suggested that in terms of job satisfaction, physicians in private institutions were in general more satisfied than the ones in public hospitals.

There was failure to reject the null hypothesis as stated: There is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. The same finding was also observed at Kenyatta National Hospital and the MP Shah

hospital. Therefore, there is no significant moderating effect of demographic characteristics during healthcare provider patient interaction on diabetes mellitus management practices in selected hospitals in Kenya. The findings imply that demographic characteristics had no consequence on diabetes mellitus management practices; hence patient did not experience improved DM management practices.

5.2.2.6. Healthcare providers rating of diabetes mellitus management practices (DMMPS) in Kenya

The healthcare providers at KNH rated the patients highly on diabetes mellitus management practices and in all its areas of management practices. Even though the female HCPs rated the patients higher than the male HCPs it was not statistically significant, p=0.407. The female HCPs rated the patients high on medication therapy, physical activities/exercises and clinic attendance follow ups while the male HCPs rated patients high on dietary therapy and monitoring of glycaemic control.

At MP Shah Hospital HCPs rated the patients higher on diabetes mellitus management practices and though the male HCPs scored the patient higher than the female HCPs, it was not statistically significant, p=0.675. The male patients rated the patients higher on dietary therapy, physical activities/exercises and clinic attendance follow ups while the female HCPs rated the patients higher on monitoring of glycaemic control. The rating for medication therapy was the same as scored by both the male and female HCPs.

Even though the HCPs rated the patients highly on DMMPs, there was no significant differences between KNH and MP Shah Hospital, p=0.730. HCPs at KNH rated the patients higher in all the areas of diabetes mellitus management practices except on dietary therapy that was rated higher by the HCPs at MP Shah Hospital. In light of the foregoing, Abdulhadi, Al-Shafaee, Wahlström & Hjelm, 2013 suggested of healthcare providers to have good communication and respect for the patients concerns as this would be a more useful way to correct the patients' understanding of diabetes. This would thereby earn their cooperation that would ultimately enhance diabetes mellitus management practices in the long run.

5.3. Conclusion

The study sought to examine the effect of healthcare provider patient communication on diabetes mellitus management practices in selected hospitals in Kenya. It was established that indeed healthcare provider patient communication affects diabetes mellitus management practices in various ways. It is of essential importance to note that there were forms of healthcare provider patient communication which were at the very core of analysis and discussion in the management of diabetes mellitus as follows.

The first objective was to establish the effect of verbal language use on diabetes mellitus management practices in in selected hospitals Kenya. The second objective was to determine the effect of nonverbal communicative behaviour on diabetes mellitus management practices in in selected hospitals Kenya. The third objective was to examine the effect of noise on diabetes mellitus management practices in in selected hospitals Kenya. The fourth objective was to investigate the effect of environmental context on diabetes mellitus management practices in in selected hospitals Kenya. The fifth objective was to find out the moderating effect of the demographic characteristics on diabetes mellitus management practices in selected hospitals Kenya.

In the analysis of this study, the interplay of the theoretical constructs touched on every aspect of communication interaction of the independent variables hence impacting on the DMMPs. Chinna & Karuthan, 2020 did state that the application of URT and CAT strategies in medical interaction helps the interpretation of patterns and flow of healthcare provider patient conversations/interactions. This identifies occasions of uncertainty or certainty as well as accommodation or non-accommodation processes within the healthcare provider patient communication interactions overtime.

It is important to note that there will always be power imbalance between the healthcare providers and patients, as healthcare providers have specialized knowledge and information that is not always accessible to patients. To bridge such imbalances, the theoretical approaches are crucial to the healthcare professionals

need to improve their communication skills for an effective provider patient exchange. In making the conclusions, there will be two parts; the first part will focus on the patients' communication with healthcare providers while the second part will focus on the healthcare providers' communication with the patients during interactions in the course of diabetes mellitus management practices. From the findings, it was concluded that healthcare provider patient communication had effect on diabetes mellitus management practices in various ways as follows.

5.3.1. Patients Outcome of Communication with Healthcare Providers in Kenya

As regards the first objective, verbal language use had positive insignificant effect on diabetes mellitus management practices overall in Kenya, at KNH and MP Shah Hospital and therefore, the failure to reject the null hypothesis. This means verbal language use though important to diabetes mellitus management practices does not necessarily lead to remarkable improvement in these practices overtime whether in public or private hospitals. In essence, patients either at KNH or MP Shah Hospital would neither be said to have achieved better diabetes mellitus glycaemic control or not as a result. Therefore, the patients' ultimate diabetes mellitus control and outcome was not dependent on VLU.

On second objective, it was established that nonverbal communicative behaviour had positive significant effect on diabetes mellitus management practices overall in Kenya, at KNH and not at MP Shah Hospital. The null hypothesis was rejected overall in Kenya; at KNH while at MP Shah Hospital; there was failure to reject the null hypothesis. Therefore, NVCB by healthcare providers led to better and improved diabetes mellitus management practices overall in Kenya and Kenyatta National hospital and not at MP Shah Hospital where NVCB of the healthcare providers was not a factor in the DMMPs. As such patients at KNH were likely to achieve better glycaemic control, hence well managed and controlled diabetes mellitus than those at MP Shah Hospital

The third objective established that noise had negative insignificant effect on diabetes mellitus management practices overall in Kenya, at KNH and MP Shah Hospital. Therefore, there was the failure to reject the null hypothesis overall in

Kenya, at KNH and MP Shah Hospital. Though findings show noise was not a factor in course of managing diabetes it led to decrease in the diabetes mellitus management practices as it had an inverse relationship with DMMPs. It is possible to then conclude that overtime patient were likely to end up with poorly controlled diabetes mellitus.

With regard to the fourth objective, it was established that environmental context had positive significant effect on diabetes mellitus management practices in Kenya, at KNH and MP Shah Hospital. The null hypothesis was rejected overall in Kenya, at KNH and MP Shah Hospital. Thus, environmental context had favourable impact and brought about improved DMMPs among patients whether in public or private hospitals. This means the environmental context was conducive and hospitable to the patients in the course of care they received all along and therefore led to glycaemic control with better DM outcome among patients.

The fifth objective established that apart from the other demographic characteristics of age, male gender and socio economic status; only the female healthcare providers gender had positively significant moderating effect on diabetes mellitus management practices overall in Kenya; at KNH and not at MP Shah Hospital. The null hypothesis was rejected overall and at KNH on the account of female healthcare provider gender while at MP Shah Hospital; there was failure to reject the null hypothesis. Therefore, the female healthcare provider gender was better than the male healthcare provider gender in the course of communication interactions with the patients and ultimately responsible for improved performance in DMMPs among all patients in general and at KNH. This was not the case at MP Shah Hospital as the HCPs gender is inconsequential to DMMPs. In essence, the presence of the other demographic characteristics during HCPPC was not responsible for the performance in diabetes mellitus management practices among patients at KNH.

The present study shows that other than the environmental context; nonverbal communicative behavior and female healthcare provider gender were significant hence responsible for improvement in DMMPs at KNH and not at MP Shah Hospital. This indicates patients were more satisfied with healthcare providers at

KNH, a public hospital as compared to MP Shah Hospital, a private hospital on these aspects in provider patient communication. Though there is little past research data on comparative studies between public and private hospitals on diabetes mellitus on these two aspects, related studies on communication in other areas have contrasting results. Taner & Antony, 2006 study did indicate that patients in private hospitals were more satisfied with healthcare workers than their counterparts in the public hospitals. It is therefore necessary for other comparative research studies in the area of diabetes mellitus and communication to be carried out in other jurisdictions to affirm and solidify the current study findings and viceversa.

5.3.2. Healthcare Providers Outcome of Communication with Patients in Kenya

On the first objective, it was found that verbal language use had positive significant effect on DMMPs overall in Kenya and at KNH, hence the null hypothesis was rejected but not at MP Shah Hospital where there was failure to reject the null hypothesis. Therefore, verbal language use as conversed with patients was imperatively important to the healthcare providers overall in Kenya and at KNH and led to improvement in DMMPs in the long run which was not the case in regard to the HCPs at MP Shah Hospital.

In regard to the second objective, it was found that while nonverbal communicative behaviour had positive significant effect at MP Shah Hospital, there was no significant effect on diabetes mellitus management practices overall in Kenya and at KNH. The null hypothesis was rejected at MP Shah while there was failure to reject the hypothesis overall in Kenya and at KNH. This means healthcare providers at MP Shah Hospital found NVCB with patients at the hospital fostered better and improved DMMPs with expected better outcomes unlike the HCPs at KNH. It also showed that overall, in Kenya; nonverbal communicative behaviour had inconsequential impact on diabetes mellitus management practices.

As for the third objective, there was positive insignificant effect of noise on diabetes mellitus management practices overall in Kenya, at MP Shah Hospital while at KNH there was negative insignificant effect. Therefore, there was failure to reject the null hypothesis overall in Kenya, at KNH and MP Shah Hospital. As such, though noise

was not an influencing factor on diabetes management practices it had no detrimental effect at MP Shah Hospital as it was likely to have at KNH due to the inverse relationship with DMMPs. Noise at MP Shah Hospital was likely not to discomfort or distract and instead brought about a good feel effect among the HCPs while interacting with the patients and vice versa for the HCPs at KNH. But on the whole, it was not responsible for improvement in DMMPs overall in Kenya.

The fourth objective established that environmental context had positive insignificant effect on DMMPs overall in Kenya and at MP Shah Hospital. At KNH, environmental context had negative insignificant effect on DMMPs. Therefore, the null hypothesis was rejected overall in Kenya, at KNH and MP Shah Hospital. As such, environmental context did not lead to improvement in diabetes mellitus management practices. However, the environmental context at MP Shah Hospital was conducive and hospitable to the HCPs unlike the case at KNH as it had an inverse relationship with DMMPs.

Regarding the fifth objective, there was positive insignificant effect of age, gender and socioeconomic status on diabetes mellitus management practices except for the older patients, the male patient gender and the socio economic status indicators of quality of life and ability to save which had negative insignificant effect on DMMPs overall in Kenya. At KNH and MP Shah Hospital there was positive insignificant effect of almost all areas of age, gender and socio economic status on DMMPs except the older patient, the male patient gender at KNH and on the socio economic status indicators of quality of life, level of assets and ability to save at MP Shah Hospital in which there was negative insignificant effect on DMMPs. Therefore, there was no significant moderating effect of the demographic characteristic on DMMPs overall in Kenya, at KNH and MP Shah Hospital, hence the failure to reject the null hypothesis overall in Kenya; at KNH and MP Shah Hospital. This shows that while the demographic characteristics had no consequences on DMMPs performance; almost all of them at KNH were in favour with the HCPs in their communication with the patients except the older patients and the male patient gender which were likely not to enhance communication and hence performance in DMMPs. At MP Shah Hospital, the SES of quality of life, level of assets and ability

to save among HCPs suffered a great deal in the course of attending to patients overtime with the likelihood they were likely not to foster communication in regard to performance in the DMMPs. This could be attributed to the work schedule dynamics at the hospital as a private setting in comparison to KNH, a public hospital.

Therefore, according to the healthcare providers, the present study show that verbal language use and nonverbal communicative behaviour were responsible for improved performances in diabetes mellitus management practices. The HCPs at KNH and MP Shah Hospital were respectively satisfied with VLU and NVCB effect on DMMPs among patients as it was likely to bring about good glycaemic control and therefore DM outcome.

5.3.3. Healthcare provider patient communication on diabetes mellitus management practices and the clinical characteristics / outcomes

In view of the above, it is therefore important to note that the foregoing conclusions on communication interactions between patients and healthcare providers do provide valuable insight into the findings on clinical characteristics / outcomes of patients as earlier analysed and discussed in chapter four (4).

The clinical characteristics are the end outcome measures of the diabetes mellitus management practices as a result of the nature of communication over the period of interaction between the patients and healthcare providers. Therefore, the glycaemic control as reported earlier with the resulting complications and psychological effects experienced by the patients demonstrate the significance and central role of healthcare provider patient communication dynamics in healthcare practice in the management of diabetes mellitus at the public as well as private hospitals.

Therefore, proactively anchoring effective healthcare provider patient communication in medical practice for chronic health conditions like diabetes mellitus is likely to enhance and ameliorate on the clinical characteristics / outcomes. This would hence result in better health outcome with improved quality of life for patients with diabetes mellitus. While on the other hand, the healthcare providers would experience increased satisfaction and productivity.

5.4. Recommendations

In view of the research study outcome, a number of recommendations are thus made concerning the various stakeholders that include but is not limited to healthcare facilities, training institutions and governments. Recommendations are targeted at the patients, healthcare providers/practitioners and the policy makers. Broadly, the study recommends that healthcare provider patient communication should be addressed more adequately and broadly in healthcare practice and by extension in all kinds of healthcare settings in Kenya and elsewhere. This should encompass all segments of the healthcare providers, all cadres and specializations who attend to patients with diabetes mellitus.

Practice implications are that by increasing the healthcare providers' awareness of the communicative differences and by empowering patients to express concerns and preferences, a more effective communication model be established within the healthcare system right from training facilities to practice in treatment centers, private and public. The results of this study could help stakeholders focus on specific dimensions of service provision on diabetes mellitus in view of healthcare provider patient communication. This to a large extend will improve the overall quality of care among patients in the healthcare facilities. In view of the objectives as analysed and discussed, the researcher would aptly recommend the following.

5.4.1. Recommendations to the medical practice, professionals and facilities

First, with regard to verbal language use as captured in the first objective, measures ought to be taken to reinforce and even solidify the already existing strategies on verbal language use to either maintain the current state or make it even much better as it was found to have no impact on DMMPs among patients. VLU should be proactively anchored within medical practice encounters through information on the same to enable fruitful engagements as ratings by patients brought out. Therefore, conscious awareness of verbal language use by the healthcare providers as well as patients at the healthcare settings should be enhanced. As concerns healthcare providers, the study recommends that conscious awareness of verbal language use by the HCPs with emphasis on effective VLU with patients as a domain in

communication. In addition, due attention ought to be embraced on how verbal language use affect DMMPs in regard to HCPs and more so at private healthcare settings where an inverse insignificant relationship with DMMPs was demonstrated. Strategies should be developed to enhance this aspect of communication especially at private Hospitals as it was found not to have significant impact in improving DMMPs as was at public Hospitals.

Second, nonverbal communicative behaviour need to be well conceptualized and incorporated at healthcare facilities including training institutions with programs touching on each of its components to equip healthcare providers with the required communication skills. On particular components of nonverbal communicative behaviour emphasis on the waiting time before the patients are attended to, silence and body posture need to be addressed in regard to the male gender with particular attention placed on body language, proximity, body posture, attention and tone of voice at public health settings. Though on the other hand in regard to private settings, focus on NVCB effectiveness as a whole on the part of HCPs in view of the patients would be of paramount importance as it was of no consequence to DMMPs. As regards healthcare providers' rating of communication of patients, a review on nonverbal communicative behaviour at public healthcare settings as a whole is of critical importance to make improvement as it did not bring about improvement in DMMPs as was the case at private Hospital settings. In addition, emphasis is placed on components of consultation time and proximity due to significant gender differences at public healthcare settings so as to make improvement in regard to the male patient gender.

Third, noise effect on DM management practices should be addressed to ensure ideal interactions at the healthcare settings as it had a significant inverse relationship with DMMPs as per the patients; whereas this inverse relationship was observed at public hospitals as per the HCPs. This should be targeted at both the healthcare providers and the facility administrations so that measures are put in place to alleviate on the noise effects emanating from the physical environment itself and as regards the patients themselves as indisposed individuals visiting the hospitals. Communication strategies on how to ameliorate on the physiological, psychological and sematic

noises could be put in place as this would greatly impact on the management of diabetes mellitus with favourable outcomes. Also, more focus on how to deal with noise effects at private healthcare settings is emphasized as the study brought out in regard to patients and at public health settings in regard to healthcare providers. Hospital caregivers and administrators can begin acting on current knowledge as this study brings out to improve the hospital environment in regard to noise. A combination of administrative strategies such as behavioral modifications, quiet zones, changing alarm settings and design strategies such as sound absorbing materials, architectural layout would be imperative. In addition, publicity materials or warning signs for noise control should be posted in prominent locations. Hospitals should also provide their respective healthcare workers periodical educational courses on noise control in order to reduce the noise from staff activities.

Fourth, as study findings show on environmental context (EC), the effect of EC as a whole on DMMPs be reinforced and enhanced at both the public and privates' hospitals with emphasis at private hospitals for improvement as the public hospitals performed marginally better. Additionally, there is need to evaluate its various components to realize improvement and enhancement on them for better communication on the management of diabetes mellitus. This would be in such areas as consultation (physical environment) rooms to align to the needs of both the HCPs and in particular the patients especially at public healthcare settings; in addition to formality, friendliness and cooperativeness. Sensitivity to cultural competence and provision of health information at these settings ought to be put into serious consideration too and more so at public health institutions with an alertness to dealing with competitiveness that tend to come into play as brought out by the HCPs on patients. Gender variations on the environmental domain should also be addressed adequately by being sensitive to sartle gender differences that go unnoticed during communication.

Fifth, demographic characteristics ought to be put into high consideration at healthcare settings as they do affect diabetes mellitus management practices. Therefore, while attending to patients, healthcare provider should be well aware and consciously so of the sartle nature and way the demographic factors are likely to

affect and either negate or synergize the management practices. They should hence deliberately embrace this aspect to ensure a buildup within the communication interactions at all times. In regard to gender, the male gender HCPs need to be addressed in regard to patients since unlike the female gender HCPs they did not lead to improvement in DMMPs. In addition, the male gender by either patients or HCPs had an inverse relationship with DMMPs. Also, the female HCP gender at private hospitals need reevaluation to make improvement as it had no impact on DMMPs. The socio-economic status indicators especially at public health setting should be addressed. The insignificant inverse relationship or effect of financial status and level of assets at KNH; financial status and ability to save at MP Shah Hospital in regard to patients; on quality of life and ability to save by HCPs require due attention. This is because diabetes mellitus as a disease condition has an astronomical cost in time and economics on the patients with HCPs having to expend a lot more time and energy to addressing the medical needs of the patients while on the other hand the patient have to put in so much in dealing with DM.

5.4.2. Recommendations to the policy makers

The study results could influence health ministry bureaucrats in Kenya to develop new policy strategies and prioritized programs for improving health care systems in regard to healthcare provider patient communication. This would aid healthcare providers to objectively measure patient satisfaction and evaluate feedback. The research findings should allow investing in programmes to facilitate communication, as it is the link to bring together all the healthcare provider patient relationship values; all the more so as the patient-centered communication approach is a strategy to improve the management practices of diabetic patients.

First, in regard to verbal language use, strategies ought to be developed to enhance this aspect of communication especially at public health facilities as the rating was observed to have been significantly higher in all the components of VLU at MP Shah Hospital than at KNH according to patients. This should also apply at private Hospitals on VLU domain as it was found not to have a significant impact on DMMPs by HCPs at MP Shah Hospital.

Second, on nonverbal communicative behaviour, though KNH came out significantly better, MP Shah Hospital was rated better on specific component of NVCB than KNH. This should hence call on policymakers to come up with programmes to strengthen these areas at both the public and private hospital settings. Since there is hardly any law /policy on HCPPC; this should hence be a call on policymakers in government and ministry of health to come up with programmes guided by laws and policies to strengthen on the components at private hospitals with particular attention to enhancement of NVCB at the public hospital settings as a way to bolster on DMMPs among patients at both private and public hospitals. A standard healthcare provider patient nonverbal communicative behaviour model based on theory as demonstrated in this study need to be developed and applied in healthcare for DM management.

Third, as for noise in HCPPC, strategies on ways to ameliorate on noise effects at private health setting is necessary as finding showed that MP Shah patients comparatively experienced far more noise than those at KNH when it came to types of noises. As there was an inverse relationship of noise with DMMPs, policy development with programmes to reverse this is imperative to guide DM management and foster the wellbeing of the patients as well as the HCPs as none is in existence.

Fourth, on environmental context, policy programmes be developed to embed and reinforce the already existing environmental contextual structures that brought about improved DMMPs is essential. This should also inform the gender and by type of hospital variations in ratings and performance on the components of NVCB, hence come up with programmes on how to stimulate improvement on these aspects is critical in regard to DMMPs among patients.

Finally, on the demographic characteristics, policy programmes need to be worked out on how to bring the male healthcare provider gender to enhancing their communication so as to improve diabetes mellitus management practices as the female healthcare provider gender was shown to do overall in Kenya and at KNH. This should also be the case for both the female and male healthcare provider at MP

Shah Hospital. Further, in regard to the age and SES, ways to plough them into HCPPC to improve on DM management practices ought to be explored to reverse some of the associated negative effect.

5.4.3. Recommendations to the training institutions

There is need for introduction of healthcare provider patient communication in the medical education curriculum to enable it to be part and parcel in training institutions at various levels as a necessary requirement in medical practice. A standard healthcare provider patient communication model on the HCPPC domains of verbal language use, nonverbal communicative behaviour, noise, environmental context and demographic characteristics need to be developed. This should be through training and strict guidelines given on the general conduct for the healthcare providers and equally in regard to the patients as consumers of health services to ensure concordance and especially as concerns the specific types of communication domain components.

Recognition of theoretical establishment as a basis in healthcare practice and training is essential. Although theoretical approaches as applied in this study are helpful, theoretical basis of communication in healthcare practice still remain overlooked and have been applied only sparingly. Grounding of healthcare provider patient communication in healthcare providers training is of imperative importance in healthcare provision as poor communication exchange with patients is associated with lower patient satisfaction, misdiagnosis, mistreatment and negative medical outcome. Therefore, healthcare providers need effective communication skills guided by theory to break this barrier in order to achieve better provider-patient exchange in the course of their communication interactions overtime.

5.5. Suggestions for further studies

The research study findings bring out in a broad sense the effect of healthcare provider patient communication on diabetes mellitus management practices as depicted by the analysis and discussions of the research objectives. Suggestions are

therefore made for further research on each of the variables and their specific domain areas of communication.

On the first objective, the researcher suggests for in-depth research on the specific components of verbal language use in public and private health settings especially regarding the contrasting outcomes by type of hospital and gender; why the outcomes were better at private than at public hospital settings. In addition, as concerns healthcare providers at MP Shah Hospital, a private setting, further research needs to be done to ascertain on inverse relationship of verbal language use with diabetes mellitus management practices. Further research would be of necessity as to why the VLU was rated better by HCPs at KNH, a public hospital than at MP Shah Hospital which is a private hospital as this indicates it led to a deterioration and poor performance in the DMMPs by patients.

On the second objective, investigations on gender differences in regard to patients on the component of NVCB would be in order. Further research in lieu of the significant differences on NVCB as a HCPPC domain in addition to its components between public and private healthcare settings would shade light on the circumstances that account for such. This would be on the area of waiting time before the patients are attended to, silence and body posture. Further review in regard to the significant differences on body language, proximity, body posture, attention and tone of voice in favour of MP Shah Hospital, a private health setting is necessary. Additionally, research on why NVCB was rated significantly better at KNH by patients unlike at MP Shah Hospital is essential. The areas of consultation time and proximity on the part of HCPs in regard to the patients' gender difference in favour of the female patients needs further probing to uncover the reasons as to such occurrences. The negative insignificant effect of NVCB on DMMPs as by HCPs rating of patients at KNH, a public health setting unlike MP Shah Hospital, a private setting confers a plausible urge for additional research.

The third objective on noise calls for serious reevaluation at healthcare settings of whatever kind because noise had negative significant effect more so as reported by patients and in all its types on simple linear regression even though multiple

regressions turned out an insignificant outcome. Therefore, research is necessary to delineate the circumstances and how this can then be dealt with within the settings so as to foster effective provider patient communication. Then, noise was rated higher by patients at MP Shah Hospital, a private hospital as compared to KNH, a public hospital calls for research on this aspect to dig out the circumstance that are likely to be responsible. As for the HCPs, even though there was no statistically significant effect, an inverse relationship was still revealed, thus research to ascertain the reasons for this quite reasonably imperative. Additionally, a contrast of the circumstances of the noise occurrence and effects of the HCPs with those of patients is made as they both relate and operate within the same healthcare environment.

The fourth objective on environmental context gear towards suggestion to research on the areas of physical (consultation room) environment, formality, friendliness, cooperativeness, competitiveness, cultural dimension and health information. This would be to realize the possible cause of differences in gender and by type of health facility as it would clearly set to plug the gaps where they exist. Regression analysis though statistically significant at both hospitals, the regression coefficient was higher at KNH than at MP Shah Hospital, an indication of better DMMPs. The probable underlying circumstantial explanations for this require further research. In respect to healthcare providers, investigation on the inverse relationship of environmental context at KNH even with no statistically significant effect on DMMPs would be in order to get some understanding of such reported outcome on this aspect of HCPPC. Future research is also needed to determine how to effectively remove environmental barriers especially on the components of EC so as to enhance environmental facilitators to provider patient communication in the diabetic centers to ultimately demonstrate if and how these changes improve patient healthcare.

On the fifth objective of demographic characteristics, the researcher suggests that differences brought out between the public and private healthcare settings and also on age and gender should be evaluated further to tease out what account for the disparities. Investigations on the socio-economic status indicators need to be carried out among patients as well as HCPs on the differences noted and how these differences could be abridged. As regards gender, further researcher as to why the

female gender healthcare provider had statistically significant effect on DMMPs as a moderating factor, an indication of favourable outcome in comparison to the male gender healthcare provider call for necessary review of the gender aspect in the management of diabetes mellitus. This outcome on the gender needs to be further probed in regard to why the female healthcare provider gender positively resulted in enhanced improvement in DMMPs at KNH in comparison to MP Shah Hospital. Further research needs to be carried out in regard to the moderating effects of culture in healthcare provider patient communication on DMMPs.

Other than the above, the researcher would additionally make suggestions for profound research on the para-language / paraverbal as a part of the healthcare provider patient communication aspect in regard to verbal language and nonverbal language; on how it affects communication dynamics between the HCPs and the patients so as to complement the current study findings. It is an aspect that was not exhaustively dealt with in this study. Research on communication interactions among healthcare providers themselves and in which ways such communications impact on the DM management practices is advocated for. In addition, research is recommended on the diabetes mellitus patient population of below eighteen years of age (the pediatrics and adolescents). Finally, this was by and large a quantitative research study and therefore an in-depth qualitative study would be imperative and particularly informative as it would provide more data that would likely synchronize with the current study findings.

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APPENDICES

Appendix I: Informed Consent Explanation Form for Patients

Dear participant,

My names are Geoffrey M. Likata Ungaya, a doctor of philosophy student in health communication, at the Department of Media Technology and Applied Communication, Jomo Kenyatta University of Agriculture and Technology. The consent explanation form to be read and questions answered in a language in which the patient is fluent. Your permission is being requested to participate in a study as noted below to be conducted at the diabetic outpatient clinic at Kenyatta National Hospital and MP Shah Hospital. This protocol is designed with the client's confidentiality in mind. The code of professional conduct and discipline (1949 medical ethics and the 1965 Declaration of Helsinki on Human Experiment and Structure law) will be adhered to in this research. There are guides to procedures in conducting research that involve human beings.

Title: The Effect of Healthcare Provider Patient Communication on Diabetes Mellitus Management Practices in Selected Hospitals in Kenya.

Institution: Department of Media Technology and Applied Communication, School of Communication and Development Studies, Jomo Kenyatta University of Agriculture and Technology.

Investigator: Mr. Geoffrey M. Likata Ungaya.

Supervisors: Prof. Hellen Mberia

Dr. Kyalo wa Ngula

Permission is requested from you to enroll in a healthcare provider patient communication research study. You should understand the following general principles which apply to all in medical research whether normal or patient volunteers:

(i) Your agreement to enroll is entirely voluntary.

(ii) You may withdraw from the study at any time.

(iii) Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled.

(iv). After you have read or been taken through the explanation, please feel free to ask any question (s) that will allow you to understand clearly the nature of the study and only participate when you are ready.

Purpose of the study: In this study, I am examining the effect of healthcare provider patient communication on diabetes mellitus management practices

Procedure: You will be asked to go through the consent explanation document. You will be allowed time to ask the researcher any question that you may have. When you have understood and are willing to participate, you will be asked to sign the consent form attached to this explanation document. Signing the consent form indicates that you have agreed to participate in the study, after which the questionnaire will be administered what will take about 30 minutes to complete. No name will appear on the questionnaires. I will request for information from you concerning your communication with the healthcare provider. This will be in form of questionnaires. You have the right of asking questions where you do not understand.

Benefit: It is hoped that the outcome of the study will lead to awareness of the nature of communication patterns and therefore the impact of this in regard management practices to these medical conditions and hence enable or lead to greater understanding of the communication strategies on how to manage the condition.

Risks: There are no anticipated risks in participating in this study. However, if there are any communication problems that may arise due to your participation, you will be assisted accordingly.

Confidentiality: Records will be kept confidential and your name will not be used in any resulting publications.

Contact: If you have any questions regarding the study or participation in this study, you can call any of the supervisors: Prof. Hellen Mberia on Tel No. 0721779229; Dr. Kyalo wa Ngula on Tel No. 0720697428; Dr.Saira Sokwalla on Tel No. 0726108774 and Dr. William Kiprono Sigilai on Tel No.0726125505. You can also contact the researcher on Tel No. 0713039621 / 0736872248. If you have any questions about your rights as a study participant, you should contact KNH-UON ERC secretariat on Tel No.726300-9.ext.44102. Email: uonknh-erc@uonbi.ac.ke and MP Shah Hospital on Tel no.020 4291000. Email: info@mpshahhosp.org.

Appendix II: Informed Consent Explanation Form for Healthcare Providers

Dear participant,

My names are Geoffrey M. Likata Ungaya, a doctor of philosophy student in health communication, in the Department of Media Technology and Applied Communication, Jomo Kenyatta University of Agriculture and Technology. The consent explanation form to be read and questions answered in a language in which the healthcare provider is fluent. Your permission is being requested to participate in a study as noted below to be conducted at the diabetic outpatient clinic at Kenyatta National Hospital and MP Shah Hospital. This protocol is designed with the client's confidentiality in mind. The code of professional conduct and discipline (1949 medical ethics and the 1965 Declaration of Helsinki on Human Experiment and Structure law) will be adhered to in this research. There are guides to procedures in conducting research that involve human beings.

Title: The Effect of Healthcare Provider Patient Communication on Diabetes Mellitus Management Practices in Selected Hospitals in Kenya.

Institution: Department of Media Technology and Applied Communication, School Of Communication and Development Studies, Jomo Kenyatta University of Agriculture and Technology.

Investigator: Mr. Geoffrey M. Likata Ungaya.

Supervisors: Prof. Hellen Mberia

Dr. Kyalo wa Ngula

Permission is requested from you to enroll in a healthcare provider patient communication research study. You should understand the following general principles which apply to all in medical research whether normal or patient volunteers:

(i) Your agreement to enroll is entirely voluntary.

(ii) You may withdraw from the study at any time.

(iii) Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled.

(iv) After you have read or been taken through the explanation, please feel free to ask any question (s) that will allow you to understand clearly the nature of the study and only participate when you are ready.

Purpose of the study: In this study, I am examining the effect of healthcare provider patient communication on diabetes mellitus management practices

Procedure: You will be asked to go through the consent explanation document. You will be allowed time to ask the researcher any question that you may have. When you have understood and are willing to participate, you will be asked to sign the consent form attached to this explanation document. Signing the consent form indicates that you have agreed to participate in the study, after which the questionnaire will be administered what will take about 30 minutes to complete. No name will appear on the questionnaires. I will request for information from you concerning your communication with the patient. This will be in form of questionnaires. You have the right of asking questions where you do not understand.

Benefit: It is hoped that the outcome of the study will lead to awareness of the nature of communication patterns and therefore the impact of this in regard management practices to this medical conditions and hence enable or lead to greater understanding of the communication strategies on how to manage the condition.

Risks: There are no anticipated risks in participating in this study. However, if there are any communication problems that may arise due to your participation, you will be assisted accordingly.

Confidentiality: Records will be kept confidential and your name will not be used in any resulting publications.

Contact: If you have any questions regarding the study or participation in this study, you can call any of the supervisors: Prof. Hellen Mberia on Tel No. 0721779229; Dr. Kyalo wa Ngula on Tel No. 0720697428; Dr.Saira Sokwalla on Tel No. 0726108774 and Dr. William Kiprono Sigilai on Tel No.0726125505. You can also contact the researcher on Tel No. 0713039621 / 0736872248. If you have any questions about your rights as a study participant, you should contact KNH-UON ERC secretariat on Tel No.726300-9.ext.44102. Email: uonknh-erc@uonbi.ac.ke and MP Shah Hospital on Tel no.020 4291000. Email: info@mpshahhosp.org.

Appendix III: Participant's Informed Consent Form

I, the undersigned do hereby volunteer to participate in the study whose nature and purpose has been explained to me fully. I do understand that all the information gathered will be used for purposes of the study only and will be handled in total confidence. I have been given the opportunity to ask questions regarding the study and I have understood. I understand I can withdraw from the study and that I will not lose any benefits or my rights that I may have.

Participant's Name_____

Signature_____

Date_____

Person obtaining the consent.

Researcher's Name_____

Signature_____

Date_____

Appendix IV: Questionnaire for Patients

I am conducting a research to determine the effect of healthcare provider patient communication on diabetes management practices among patients who attend this diabetic clinic. Please feel free, be assured that none of your responses can be traced back to you.

Study Number_____ Date_____ Clinic_____

Gender_____ Age_____

Communication with healthcare providers' is a very important part of quality medical care. We would like to know how you feel about the way your healthcare providers have communicated with you. Your answers are completely confidential, so please be as open and honest as you can. The researcher will read to you each one of the statements carefully, keeping in mind your experience with the healthcare providers who attended to you. The researcher is interested in the healthcare provider patient communication during your interaction in the course of management of diabetes mellitus.

Circle one number for the appropriate answer for each item below or write the appropriate response in the space provided.

A. SOCIO DEMOGRAPHIC CHARACTERISTICS

1. Marital status.

(i) Single (ii) Married (iii) Separated

(iv) Divorced (v) Widowed (iv) Cohabiting

2. Highest level of education.

(i) None (ii) Primary (iii) Secondary

(iv) College (v) University

3. Occupation.

(i) Professional (ii) Business - Personnel (iii) Technical Personnel

(iv) Skilled personnel (v) Unskilled Personnel (vi) Learner

4. Religion.

(i) Catholic (ii) Protestant (iii) Hindu

(iv) Muslim (v) African Traditional (vi) others

B. DIABETES MELLITUS

5. When were you diagnosed with diabetes mellitus, at what age? Year_____ Age_____

6. a) Are you on any treatment/management?

Yes ☐ No ☐

b) If yes, which of the following treatment/management are you on (tick on the ones that you do)?

(i) Dietary therapy
(ii) Exercises
(iii) Drug treatment
(iv) Monitoring of glycaemic control
(v) Clinic follow-up attendance

7. Have you ever experienced any other medical condition(s) or complication(s) after being diagnosed with diabetes mellitus?

Yes ☐ No ☐

a) If yes, indicate the nature of the medical condition(s) or complication(s) by a tick in the table below.

b) For how long have you had the medical condition or complication; indicate the duration in the table below?

		Tick below in the space below ↓	Duration of condition(s) / complication(s): (Q 7b); Indicate in the spaces below for each ↓
	Medical condition(s)/ complication(s) ↓ (Q7a)	(Q7a) ↓	
(i)	Hypertension		
(ii)	Heart disease		
(iii)	Kidney disease		
(iv)	Cardio vascular Accident (Stroke)		
(v)	Sexual dysfunction		
(vi)	Foot ulcer		
(vii)	Eye disease		
(viii)	Amputation		
(ix)	Others		

Table 2: Other medical condition(s) or complication(s)

Source: Researcher generated

c) Have you had any form of treatment for the medical condition(s) or complication(s)?

Yes ☐ No ☐

8. a) Have you ever experienced any psychological problem or your life been affected in any way because of the diabetes mellitus?

Yes ☐ No ☐

b) If yes, what kind of psychological problems or in which way has your life been affected (Table below)?

c) For how long have you had these psychological problems or your life been affected (Table below)?

			Duration with problem (Q8c)				
			Indicate duration in the spaces below ↓				
Psychological problem / life affected (Q8b) ↓		(Q8b) Tick in the space below ↓	<1 years ↓	1-2 years ↓	2-3 years ↓	3-4 years ↓	>5 years ↓
(i)	Lifestyle changes						
(ii)	Financial effects (increased expenditure)						
(iii)	Marital conflicts						
(iv)	Family conflicts						
(v)	Anxiety						
(vi)	Depression						

Table 3: Psychological problem / life been affected

Source: Researcher generated

9. What was your random blood sugar level (RBS)?

First measure (at diagnosis) _____

Second measure (one year ago) _____

Today's (most recent) measure_____

10. What was your fasting blood sugar level (FBS)?

First measure (one year ago) _____

Today's (most recent) measure_____

11. What was your Glycated hemoglobin (HbA1C)?

First Measure (one year ago) _____

Today's (Most recent) measure_____

12. For how long have you attended this diabetes mellitus clinic? _____

C. HEALTHCARE PROVIDER PATIENT COMMUNICATION

13. a) Were you satisfied with the nature of communication between you and your healthcare providers' during your interactions?

Yes ☐ No ☐

b) If yes, how satisfied were you with the nature of communication?

1. Extremely satisfied

2. Satisfied

3. Neutral

4. Dissatisfied 5. Extremely dissatisfied

D. HEALTHCARE COMMUNICATION QUESTIONNAIRE FOR PATIENTS

Please use the scale below to rate communication between the healthcare providers and you.

1	2	3	4	5	
Strongly Agree	**Agree**	**Uncertain**	**Disagree**	**Strongly**	**Disagree**

How strongly do you AGREE or DISAGREE with each of the following statements? Indicate your answer for each item statements in the types of communication categories below by making a tick in the space provided (next page).

1. VERBAL LANGUAGE USE	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
I understood the language in which the healthcare providers used while speaking with me during our interaction.					
The healthcare providers spoke to me in vocabulary/words that I could understand easily.					
The healthcare providers spoke at a pace/speed that enabled me to follow what was being discussed					
The healthcare providers spoke to me in a way and nature of voice language that communicated caring and concern.					
The healthcare providers encouraged me to equally participate in the discussion/conversation to the extent I wished during our interaction.					
The healthcare providers' pronunciations of words in sound as spoken by the healthcare provider enabled me to follow what was discussed.					
I was comfortable with the loudness in language voice pitch as spoken by the healthcare providers during our interactions.					
The changing in language and word voice as spoken by the healthcare provider was in a way and manner that left me feeling that I was being attended to well					

2. NONVERBAL COMMUNICATIVE BEHAVIOUR	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
The healthcare providers are usually in a hurry when providing medical care or treatment and do not spend enough of time with me.					
The body language of the healthcare providers communicated caring and concern.					
The healthcare providers sat in an appropriate manner and physical distance in relation to me during our interaction.					
I was encouraged and comfortable by the way the healthcare providers were sitting/standing in regard to body posture while attending to me.					
The healthcare providers looked at me, did not seem distracted, attended to my physical comfort, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.					
The healthcare providers kept quiet for reasonable amount of time to listen to what I said during our interactions.					
The healthcare provider maintained appropriate gaze from the way they looked at me during our interaction.					
The touch by the healthcare provider was appropriate whenever I was examined and did seek my permission first.					

The healthcare providers' face expressions encouraged me to keep talking about my disease condition.					
The healthcare providers' spoke in a voice that showed patience and calmness while attending to me.					
The general body, hand and head movements by the healthcare providers while attending to me were appropriate during our interactions.					
I had to wait for too long from the time I got to the clinic to be attended to by the healthcare providers.					

3. NOISE	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the healthcare providers and me.					
I was feeling quite unwell to the extent that I was not able to comfortably participate in the discussions during the interactions with the healthcare providers.					
My mind was filled up with thoughts that affected the communication I had with the healthcare providers.					
I was able to understand and follow the manner of language use/ words as used in the way in which the healthcare providers communicated during our interactions.					

4. ENVIRONMENTAL CONTEXT	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
The hospital/healthcare providers' offices- physical environment / consultation room have everything needed to provide complete care.					
The healthcare providers were non-judgmental and treated me as they would want to be treated did not talk down to me and were personable.					
The healthcare providers carried and introduced self in a respectful manner, used my proper name, obtained information in a systematic and orderly process.					
The healthcare providers acted too businesslike, impersonal and in a carefree manner towards me.					
The healthcare providers treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.					
The healthcare providers were cooperative as they did not ignore what I told them, provided reassurance and guidance if necessary.					
The healthcare providers encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.					
The healthcare providers gave advice about the illness, the way to stay healthy and gave me all the information I was expecting to receive about my health.					

The healthcare provider had respect for culture and their values/beliefs did not affect the communication with me.					

5. DIABETES MELLITUS MANAGEMENT PRACTICES	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
I do follow and adhere to the dietary food intakes as discussed with the healthcare providers.					
I take the medicines according to the instruction and as prescribed by the healthcare providers.					
I do engage in regular physical activities/ exercises as discussed with the healthcare providers.					
I usually come for the follow up clinics on the dates given as per the healthcare providers' instructions.					
I do check my blood sugar levels in monitoring of the glycaemic control while at home on a regular basis as discussed with the healthcare providers.					

6. DEMOGRAPHIC CHARACTERISTICS	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
Age					
I was satisfied with young healthcare providers during our communication interactions.					
I was satisfied with older healthcare providers during our communication interactions.					
Gender					

I was satisfied with the female healthcare providers during our communication interactions.					
I was satisfied with male healthcare providers during our communication interactions.					
Socio Economic Status					
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my financial status.					
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my Quality of life.					
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my Level of assets.					
From the time l was diagnosed with diabetes mellitus to date, I am satisfied with my Ability to save.					

Thank you for participating.

Appendix V: Healthcare Communication Questionnaire for Healthcare Providers

I am conducting a research to determine the effect of healthcare provider patient communication on diabetes mellitus management practices among healthcare providers who attend to patients in this diabetic clinic. Please feel free, be assured that none of your responses can be traced back to you.

Study Number_____ Date_____ Clinic_____

Gender_____ Age_____ Designation_____

Indicate the duration you have been working at the diabetic clinic _____

Communication with patients' is a very important part of quality medical care. We would like to know how you feel about the way your patients communicated with you. Your answers are completely confidential, so please be as open and honest as you can. Read each one of the statements carefully, keeping in mind your experience with the patients you attended to. The researcher is interested in the healthcare provider patient communication during your interaction.

Please use the scale below to rate communication between the patient and you.

1	2	3	4	5
Strongly Agree	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**

How strongly do you AGREE or DISAGREE with each of the following statements? Indicate your answer for each item statements in the type of communication categories by making a tick in the space provided (next page).

1. VERBAL LANGUAGE USE	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
The patients understood and followed the language used in the discussion of the health issues during our interactions.					
The patients understood and were able to follow the vocabulary/words.in which I discussed the health issues during our interaction.					
The patients were comfortable and able to follow the pace/speed at which I spoke as we discussed about the medical condition.					
The patients spoke in a way which I felt communicated that I was caring and concerned about their health problems/needs.					
The patients equally participated in the discussion/conversation to the extent they wished during our interaction.					
The patients' pronunciations of words in sound while speaking enabled me to follow the discussion of the health problem.					
I was comfortable with the kind of loudness in language voice pitch as the patients spoke during our interactions.					
The changing in language and word voice as spoken by the patient was in a way and manner that left me feeling that I was attended to them well.					

2. NONVERBAL COMMUNICATIVE BEHAVIOUR	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
I am not usually in a hurry when providing medical care or treatment in the consultation process and do spend enough time with the patient.					
The body language of the patients during our interaction communicated that I was caring and concerned.					
The patients sat in an appropriate manner and physical distance in relation to me.					
I was encouraged and comfortable by the way the patients were sitting / standing / lying in body posture while attending to or examining them.					
The patient looked at me, did not seem distracted, had genuine interest in me as a person, and listened patiently and carefully to what I had to say.					
The patient kept quiet for reasonable amount time to listen to what I said during our interactions.					
The patient maintained appropriate gaze from the way they looked at me during our interaction.					
The patients found my touch appropriate whenever I examined them and I did seek their permission first.					
The patients' facial expressions encouraged me to keep talking about their disease condition.					

The patients spoke in a voice tone that showed patience and calmness while I was attending to them.					
The general body, hand and head movements of the patients while I was attending to them were appropriate during our interactions.					
The patients did not have to wait for too long for me to attend to them.					

3. NOISE	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
There was noise within the diabetic clinic/hospital surrounding that interfered with the communication between the patients and me.					
The patients were feeling quite unwell to the extent that they were not able to comfortably participate in the discussions during the interactions.					
The patients seemed mentally preoccupied with thoughts that hence affected the discussion about the medical condition.					
The patients were able to understand and follow the language use, words as used and in the way in which I communicated during our interactions.					

4. ENVIRONMENTAL CONTEXT	**Strongly Agree**	**Agree**	**Uncertain**	**Disagree**	**Strongly Disagree**
The hospital/healthcare providers' offices- physical environment / consultation room had everything needed to provide complete care.					
The patients were non-judgmental, treated me as they would want to be treated, did not talk down on me and were personable.					
The patients introduced self in a respectful manner, addressed me appropriately, gave information on the disease in a systematic and orderly process that made me feel comfortable.					
The patients acted in an impersonal and in a carefree manner with no seriousness that made me uncomfortable.					
The patients treated me in a very friendly, courteous manner and showed a compassionate attitude toward me.					
The patients did not ignore what I told them, did seek reassurance and guidance if necessary.					
The patients encouraged open communication, were patient and did not hold their view over mine and vice versa during the interactions.					
The patients acknowledged advice about the illness, the way to stay healthy and asked me all the information they were expected to receive about their health.					
The patients had respect for culture and their values/beliefs did not affect the communication with me.					

5. DIABETES MELLITUS MANAGEMENT PRACTICES	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
The patients do follow and adhere to the nutritional food intakes as discussed with the healthcare providers.					
The patients take the medicines according to the instruction and as prescribed by the healthcare providers.					
The patients do engage in regular physical activities/ exercises as instructed and discussed with the healthcare providers.					
The patients usually attend the follow up clinics on the dates given as per the healthcare providers' instructions.					
The patients usually check their blood sugar levels while at home on a regular basis as advised and discussed with the healthcare providers.					

6. DEMOGRAPHIC CHARACTERISTICS	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Age					
In the course of attending to patients during our interactions I was more satisfied with the young patients.					
While attending to patients during our interactions I was more satisfied with the older patients.					
Gender					
In interacting with patients, I was more satisfied with the female patients.					
During the interactions with the patients I was more satisfied with the male patients.					
Socio Economic Status					
In course of my practice attending to the patients to date, I am satisfied with my financial status.					
In course of my practice attending to the patients to date, I am satisfied with my quality of life.					

In course of my practice attending to the patients to date, I am satisfied with my level of assets.					
In course of my practice attending to the patients to date, I am satisfied with my ability to save.					

Thank you for participating

Appendix VI: Scoring System

The scoring system used in this study and as presented below has been used in other research studies and does postulate that all of the scales and single-item measures range in score from 0 to 100. A high scale score represents a higher response level. The principle for scoring these scales is the same in all cases: 1. Estimate the average of the items that contribute to the scale; this is the raw score. 2. Use a linear transformation to standardise the raw score, so that scores range from 0 to 100; a higher score represents a higher ("better") level of functioning, or a higher ("worse") level of symptoms (Fayers, Aaronson, Bjordal, et al, 2001; Aaronson, Ahmedzai, Bergman, et al, 1993).

Healthcare Communication Questionnaire for Patients and Healthcare Providers

Rating of the effect of verbal language, non-verbal non- communicative behaviour, noise and environmental context on communication between patients and healthcare providers was in a Likert scale between 1 and 5 with the lower scale pointing positive effect. The scale was flipped during analysis to have a higher scale referring to positive response and a lower scale pointing to a negative response in relation to communication questions. This was done as follows:

Actual response		Flipped response
1	→	5
2	→	4
3	→	3
4	→	2
5	→	1

Rating of the demographic characteristics as a moderating factor during healthcare provider patient communication on diabetes mellitus management practices in Kenya was done differently from the rating of other variables as explained above, since for

the demographic variables there was no overall score as each of the aspects in regard to age, gender and socio economic status including their components were rated by the patients and healthcare providers individually and separately and therefore are mutually exclusive to each other. The ratings were in Likert scale of between 1 and 5 with the lower scale pointing to negative effect as it stood for extremely dissatisfied and the upper scale pointing to positive effect as it stood for extremely satisfied.

Verbal language use scoring

Step 1: The Likert scale responses were flipped as shown above

Step 2: The responses for the 8 items were summed up to get the total score for verbal language per respondent. The minimum possible score was 8 and the maximum was 40.

Step 3: The scores were standardized by scaling it to percent score with a possible score between 0 and 100. The following formula was used:

$$Percent\ score\ = \frac{Actual\ total\ score - Minimum\ possible\ score}{Difference\ between\ maximum\ and\ minimun\ possible\ scores}\ X\ 100$$

Example:

A respondent who gives a Likert scale response of 2 across all the eight verbal language items would score a total score of 32 (after flipping scale 2 to scale 4 and multiplying by 8). The score in the percent scale would be as follows:

$$Percent\ score\ = \frac{32-8}{40-8}\ X\ 100 \qquad = 75$$

Non-verbal communicative behaviour scoring

Step 1: The Likert scale responses were flipped as shown above

Step 2: The responses for the 12 items were summed up to get the total score for nonverbal language per respondent. The minimum possible score was 12 and the maximum was 60.

Step 3: The scores were standardized by scaling it to percent score with a possible score between 0 and 100. The following formula was used:

$$Percent\ score\ = \frac{Actual\ total\ score - Minimum\ possible\ score}{Difference\ between\ maximum\ and\ minimun\ possible\ scores}\ X\ 100$$

Example:

A respondent who gives a Likert scale response of 2 across all the twelve non-verbal language items would score a total score of 48 (after flipping scale 2 to scale 4 and multiplying by 12). The score in the percent scale would be as follows:

$$Percent\ score\ = \frac{48-12}{60-12}\ X\ 100 \qquad = 75$$

Noise scoring

Step 1: The Likert scale responses were flipped as shown above

Step 2: The responses for the 4 items were summed up to get the total score for noise per respondent. The minimum possible score was 4 and the maximum was 20.

Step 3: The scores were standardized by scaling it to percent score with a possible score between 0 and 100. The following formula was used:

$$Percent\ score\ = \frac{Actual\ total\ score - Minimum\ possible\ score}{Difference\ between\ maximum\ and\ minimun\ possible\ scores}\ X\ 100$$

Example:

A respondent who gives a Likert scale response of 2 across all the four noise items would score a total score of 16 (after flipping scale 2 to scale 4 and multiplying by 4). The score in the percent scale would be as follows:

$$Percent\ score\ = \frac{16-4}{20-4}\ X\ 100 \qquad = 75$$

Environmental context scoring

Step 1: The Likert scale responses were flipped as shown above

Step 2: The responses for the 9 items were summed up to get the total score for environmental context per respondent. The minimum possible score was 9 and the maximum was 45.

Step 3: The scores were standardized by scaling it to percent score with a possible score between 0 and 100. The following formula was used:

$$Percent\ score\ = \frac{Actual\ total\ score - Minimum\ possible\ score}{Difference\ between\ maximum\ and\ minimun\ possible\ scores}\ X\ 100$$

Example:

A respondent who gives a Likert scale response of 2 across all the eight environmental context items would score a total score of 36 (after flipping scale 2 to scale 4 and multiplying by 9). The score in the percent scale would be as follows:

$$Percent\ score = \frac{36-9}{45-9} \times 100 = 75$$

Diabetes mellitus management practices scoring

Step 1: The Likert scale responses were flipped as shown above

Step 2: The responses for the 5 items were summed up to get the total score for diabetes management practices per respondent. The minimum possible score was 5 and the maximum was 25.

Step 3: The scores were standardized by scaling it to percent score with a possible score between 0 and 100. The following formula was used:

$$Percent\ score = \frac{Actual\ total\ score - Minimum\ possible\ score}{Difference\ between\ maximum\ and\ minimun\ possible\ scores}\ X\ 100$$

Example:

A respondent who gives a Likert scale response of 2 across all the five diabetes management practices items would score a total score of 20 (after flipping scale 2 to scale 4 and multiplying by 5). The score in the percent scale would be as follows:

$$Percent\ score = \frac{20-5}{25-5}\ X\ 100 = 75$$

Appendix VII: Diabetic Attendnce - Jan – Dec 2015 for Kenyatta National Hospital

DIABETIC CLINIC ATTENDANCE - JAN - DEC 2015

Main Clinic - (Fridays)

	New	Revisits	Total
Jan	46	343	**389**
Feb	43	328	**371**
Mar	35	271	**306**
Apr	30	201	**231**
May	48	270	**318**
Jun	31	221	**252**
Jul	44	277	**321**
Aug	33	294	**327**
Sep	42	265	**307**
Oct	53	329	**382**
Nov	46	229	**275**
Dec	40	207	**247**
	491	**3235**	**3726**

Mini Clinic - (Mon - Thur)

	New	Revisits	Total
Jan	5	456	**461**
Feb	0	540	**540**
Mar	0	569	**569**
Apr	0	512	**512**
May	0	447	**447**
Jun	4	478	**482**
Jul	0	531	**531**
Aug	1	537	**538**
Sep	0	565	**565**
Oct	1	462	**463**
Nov	5	365	**370**
Dec	0	319	**319**
Total	**16**	**5781**	**5797**

Source: Health Information Department

03/02/2016

Appendix VIII: MP Shah Hospital Diabetic Mellitus Clinic Patient Attendnce, July 2017 - June 2018

SOCIAL SERVICE LEAGUE NAIROBI

M.P. SHAH HOSPITAL
A Legacy of Care

DATE: 02-11-2018 REF:ADMIN1811006

MP Shah Hospital diabetes mellitus clinic patient attendance from July 2017 to June 2018

1. Total number of patients in a year **2954 for year July 2017/ June2018**
(i) New visits **1030**
(ii)Revisits **1924**

2. Diabetic clinic days - **5 days a week**

3. Number of healthcare providers at the diabetic clinic:
(i) Physicians- **4**
(ii) Nurses- **3**
(iii) Dieticians- **2**
(iv) Clinical officers attending to diabetic patients if any - **None**

4. Profile on Aga Khan university Hospital i.e. its history, location, bed capacity, patient capacity, services provided: visit the hospital website.

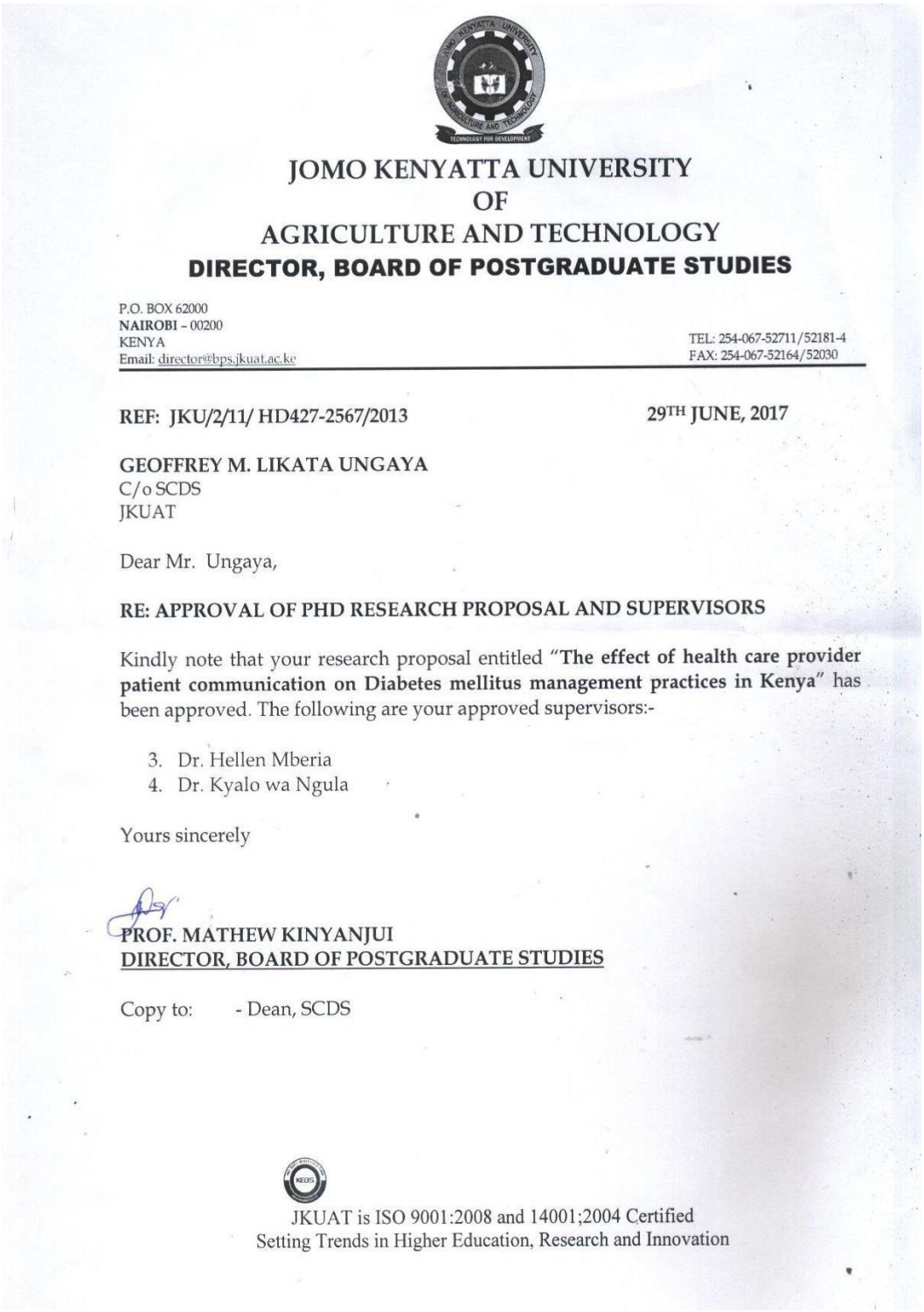
Dr.Saira Sokwalla.....

CONSULTANT PHYSICIAN, DIABETOLOGIST

HEAD OF DEPARTMENT DCC

Shivachi Rd, Parklands info@mpshahhosp.org 020 4291000 0733 606 752 / 0722 204 427 0733 606 113 / 0722 783 350 www.mpshahhosp.org

Appendix IX: Approval Letter from Jomo Kenyatta University of Agriculture and Technology (JKUAT)



JOMO KENYATTA UNIVERSITY
OF
AGRICULTURE AND TECHNOLOGY
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

P.O. BOX 62000
NAIROBI - 00200
KENYA
Email: director@bps.jkuat.ac.ke

TEL: 254-067-52711/52181-4
FAX: 254-067-52164/52030

REF: JKU/2/11/ HD427-2567/2013 **29TH JUNE, 2017**

GEOFFREY M. LIKATA UNGAYA
C/o SCDS
JKUAT

Dear Mr. Ungaya,

RE: APPROVAL OF PHD RESEARCH PROPOSAL AND SUPERVISORS

Kindly note that your research proposal entitled "**The effect of health care provider patient communication on Diabetes mellitus management practices in Kenya**" has been approved. The following are your approved supervisors:-

3. Dr. Hellen Mberia
4. Dr. Kyalo wa Ngula

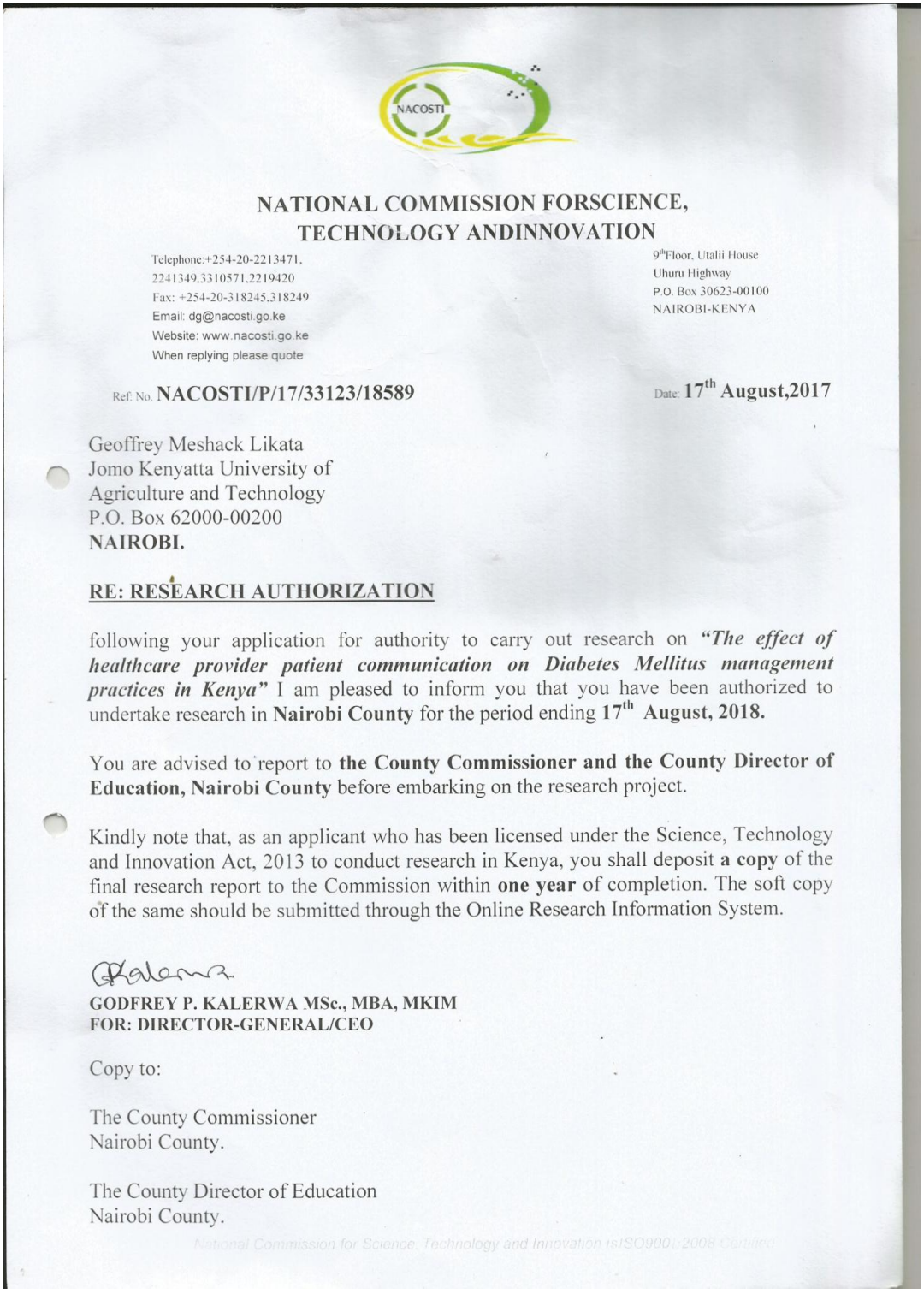
Yours sincerely

PROF. MATHEW KINYANJUI
DIRECTOR, BOARD OF POSTGRADUATE STUDIES

Copy to: - Dean, SCDS

JKUAT is ISO 9001:2008 and 14001;2004 Certified
Setting Trends in Higher Education, Research and Innovation

Appendix X: Approval Letter from National Commission for Science, Technology and Innovation (NACOSTI)



NACOSTI

NATIONAL COMMISSION FORSCIENCE, TECHNOLOGY ANDINNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

9th Floor, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/17/33123/18589**

Date: **17th August,2017**

Geoffrey Meshack Likata
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

following your application for authority to carry out research on ***"The effect of healthcare provider patient communication on Diabetes Mellitus management practices in Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **17th August, 2018.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

National Commission for Science, Technology and Innovation is ISO9001: 2008 Certified

Appendix XI: Approval Letter from Kenyatta National Hospital - University of Nairobi, Ethics Review Committee (KNH-UON ERC)

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/379

18th December, 2017

KENYATTA NATIONAL HOSPITAL APPROVED 18 DEC 2017 KNH/UoN-ERC P.O. Box 20723-00202 NRB.

Geoffrey M. Likata Ungaya
PhD candidate
Dept. of Media Technology and Applied Communication
School of Communication and Development Studies
J.K.U.A.T
Email: ungayag@yahoo.com

Dear Geoffrey

RESEARCH PROPOSAL – THE EFFECT OF HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN KENYA (P416/07/2017)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH- UoN ERC) has reviewed and approved your above proposal. The approval period is from 18th December 2017- 17th December 2018.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc.) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH- UoN ERC within 72 hours.
d) Death and life threatening problems and serious adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH-UoN ERC within 72 hours of notification.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Submission of an *executive summary* report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/ or plagiarism.

For more details consult the KNH- UoN ERC website **http://www.erc.uonbi.ac.ke**

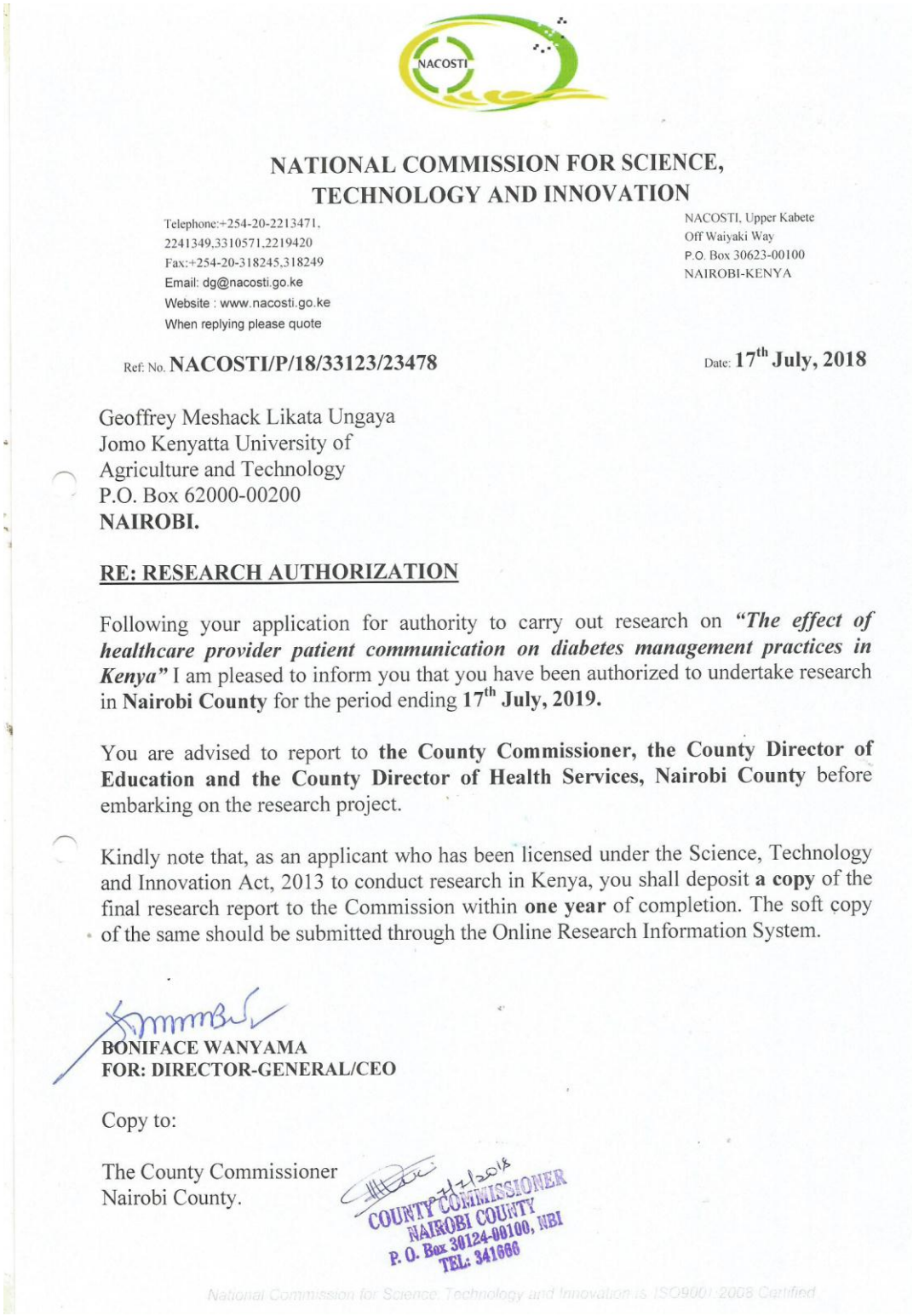
Protect to discover

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UoN ERC

c.c. The Principal, College of Health Sciences, UoN
The Director, CS, KNH
The Assistant Director, Health Information, KNH
The Chairperson, KNH-UoN ERC
Supervisors: Prof. Hellen Mberia(JKUAT), Dr. Kyalo Wa Ngula(African Nazarene University),
Dr. William Kiprono Sigilai(KNH)

Appendix XII: Approval Annual Renewal Letter from National Commission for Science, Technology and Innovation (NACOSTI)



NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471, 2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/33123/23478**

Date: **17th July, 2018**

Geoffrey Meshack Likata Ungaya
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"The effect of healthcare provider patient communication on diabetes management practices in Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **17th July, 2019.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

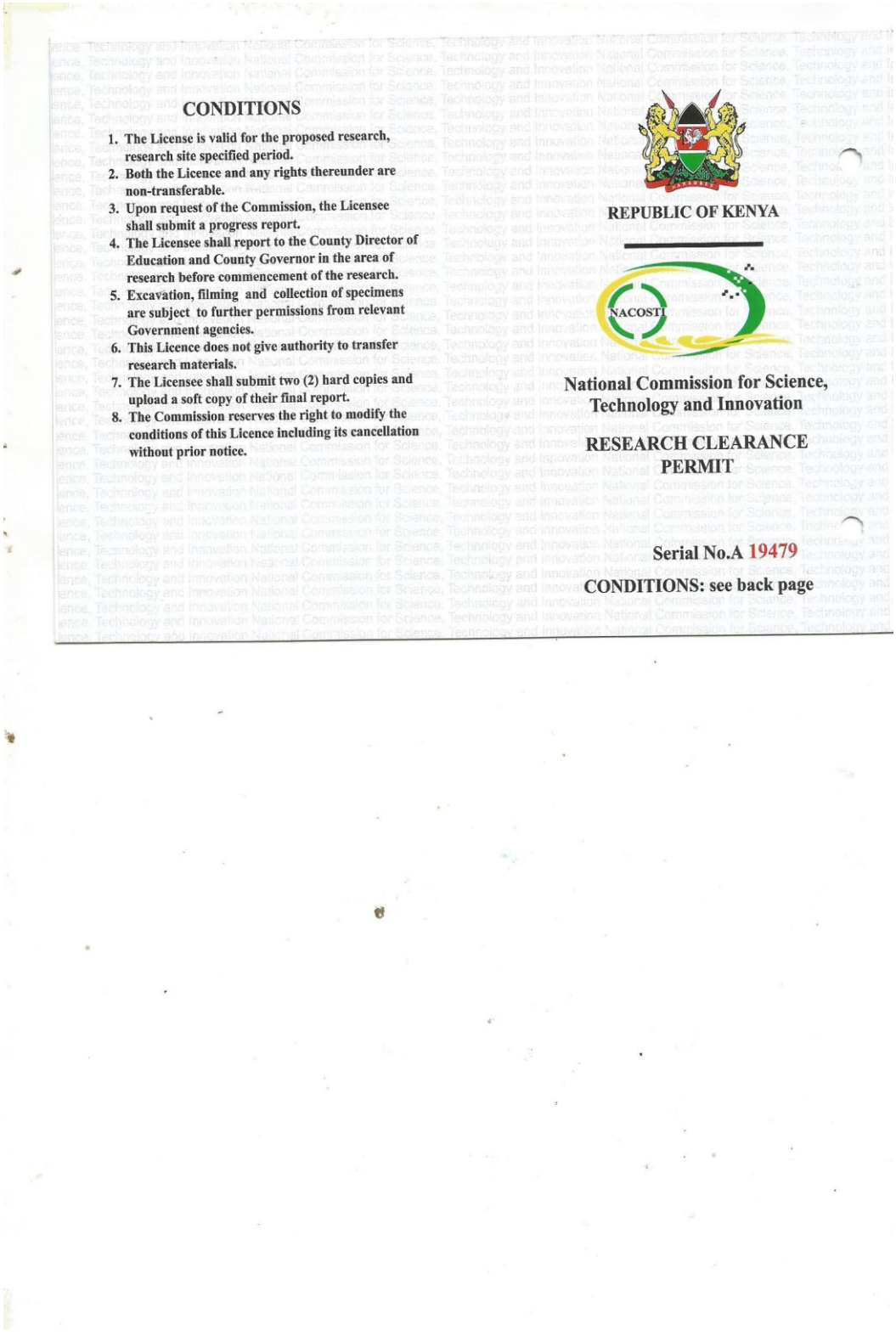
Copy to:

The County Commissioner
Nairobi County.

24/7/2018
COUNTY COMMISSIONER
NAIROBI COUNTY
P. O. Box 30124-00100, NBI
TEL: 341666

National Commission for Science, Technology and Innovation is ISO9001:2008 Certified

Appendix XIII: Annual Renewal Research Clearance Permit (NACOSTI)



CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No.A 19479

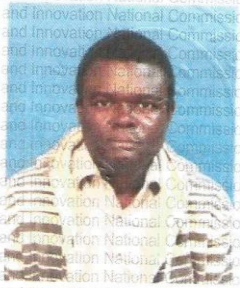
CONDITIONS: see back page

THIS IS TO CERTIFY THAT:
MR. GEOFFREY MESHACK LIKATA UNGAYA
of JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY, 0-50100 KAKAMEGA,has been permitted to conduct research in *Nairobi County*

on the topic: *THE EFFECT OF HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MANAGEMENT PRACTICES IN KENYA*

for the period ending:
17th July,2019

Permit No : NACOSTI/P/18/33123/23478
Date Of Issue : 17th July,2018
Fee Recieved :Ksh 2000



.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

Appendix XIV: Approval annual Renewal Letter from the Ministry of Education

Republic of Kenya
MINISTRY OF EDUCATION
STATE DEPARTMENT OF EARLY LERNING & BASIC EDUCATION

Telegrams: "SCHOOLING", Nairobi
Telephone: Nairobi 020 2453699
Email: rcenairobi@gmail.com
cdenairobi@gmail.com

When replying please quote

REGIONAL COORDINATOR OF EDUCATION
NAIROBI REGION
NYAYO HOUSE
P.O. Box 74629 – 00200
NAIROBI

Ref: RCE/NRB/GEN/1/VOL. 1

Date: 27th July, 2018

Geoffrey Meshack Likata Ungaya
Jomo Kenyatta University of
Agriculture & Technology
P O Box 62000-00200
NAIROBI

RE: RESEARCH AUTHORIZATION

We are in receipt of a letter from the National Commission for Science, Technology and Innovation regarding research authorization in Nairobi County on "**The effect of healthcare provider patient communication on diabetes management practices in Kenya**".

This office has no objection and authority is hereby granted for a period ending **17th July, 2019** as indicated in the request letter.

Kindly inform the Sub County Director of Education of the Sub County you intend to visit.

COUNTY DIRECTOR OF EDUCATION NAIROBI
27 JUL 2018
MINISTRY OF EDUCATION P.O. Box 74629, NAIROBI

JAMES KIMOTHO
FOR: REGIONAL COORDINATOR OF EDUCATION
NAIROBI

c.c.
Director General/CEO
Nation Commission for Science, Technology and Innovation
NAIROBI

Appendix XV: Approval Letter from The Nairobi Hospital Bioethics & Research Committee

THE NAIROBI HOSPITAL

Our Ref. TNH/ADMIN/CEO/10/05/18

10 May 2018

Geoffrey Meshack Ungaya
JKUCAT
Nairobi

Dear Mr. Ungaya,

RE: EFFECT OF HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN KENYA

Reference is made to your request to carry out the above study at The Nairobi Hospital.

We are pleased to advise that approval has been granted after you reviewed the proposal as recommended.

In line with the Research Projects Policy, you will be required to submit a copy of the final audit findings to the Bioethics & Research Committee for records.

Do note that information/data collected and potential findings shall not be in conflict with the Hospital's confidentiality clause which states that "You will not without consent of the Association disclose any of its secrets or other confidential matters to anyone who is not authorized to receive them".

Please note that this approval is valid for the period April 2018 to April 2019, if an extension is required, a fresh application should be done before proceeding with the audit.

Yours sincerely,
FOR: THE NAIROBI HOSPITAL

Gordon Otieno Odundo
CHIEF EXECUTIVE OFFICER

C.c. Chairman - Bioethics & Research Committee

ISO 9001: 2008 Certified

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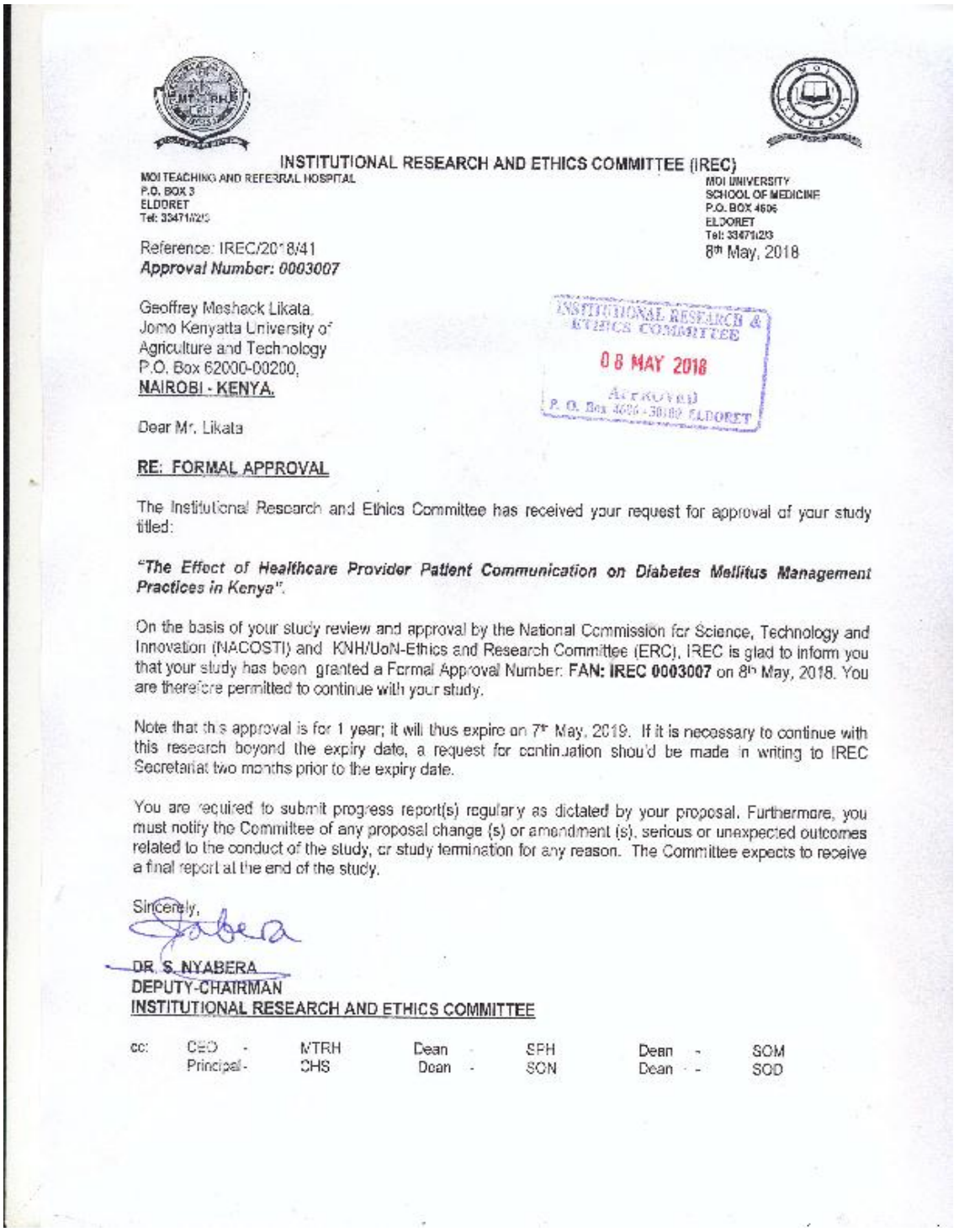
P.O. Box 30026-00100 Nairobi - Kenya • TEL: 254 - 020 - 2845000 • FAX: 254 - 020 - 2728003

Appendix XVI: Approval Letter from the Institutional Research and Ethics Committee (IREC), Moi University, School Of Medicine / Moi Referral & Teaching Hospital



INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
SCHOOL OF MEDICINE
P.O. BOX 4606
ELDORET
Tel: 33471/2/3

Reference: IREC/2018/41
Approval Number: 0003007

8th May, 2018

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
08 MAY 2018
Approved
P. O. Box 4606 - 30100 ELDORET

Geoffrey Meshack Likata,
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200,
NAIROBI - KENYA.

Dear Mr. Likata

RE: FORMAL APPROVAL

The Institutional Research and Ethics Committee has received your request for approval of your study titled:

"The Effect of Healthcare Provider Patient Communication on Diabetes Mellitus Management Practices in Kenya".

On the basis of your study review and approval by the National Commission for Science, Technology and Innovation (NACOSTI) and KNH/UoN-Ethics and Research Committee (ERC), IREC is glad to inform you that your study has been granted a Formal Approval Number: **FAN: IREC 0003007** on 8th May, 2018. You are therefore permitted to continue with your study.

Note that this approval is for 1 year; it will thus expire on 7th May, 2019. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc: CEO - MTRH Dean - SPH Dean - SOM
Principal - CHS Dean - SON Dean - SOD

Appendix XVII: Approval Letter from Moi Referral & Teaching Hospital

An ISO 9001:2015 Certified Hospital

MOI TEACHING AND REFERRAL HOSPITAL

Telephone:(+254)053-2033471/2/3/4
Mobile: 722-201277/0722-209795/0734-600461/0734-683361
Fax: 053-2061749
Email: ceo@mtrh.go.ke/directorsofficemtrh@gmail.com

Nandi Road
P.O. Box 3 – 30100
ELDORET, KENYA

Ref: ELD/MTRH/R&P/10/2/V.2/2010

10th May, 2018

Geoffrey Meshack Likata,
Jomo Kenyatta University of
Agriculture and Technology,
P.O. Box 62000-00200,
NAIROBI-KENYA.

APPROVAL TO CONDUCT RESEARCH AT MTRH

Upon obtaining approval from the Institutional Research and Ethics Committee (IREC) to conduct your research proposal titled:-

"The Effect of Healthcare Provider Patient Communication on Diabetes Mellitus Management Practices in Kenya".

You are hereby permitted to commence your investigation at Moi Teaching and Referral Hospital.

DR. WILSON K. ARUASA, *MBS*
CHIEF EXECUTIVE OFFICER
MOI TEACHING AND REFERRAL HOSPITAL

cc - DCEO, (CS)
- Director of Nursing Services (DNS)
- HOD, HRISM

All correspondence should be addressed to the Chief Executive Officer
Visit our Website: www.mtrh.go.ke
A WORLD CLASS TEACHING AND REFERRAL HOSPITAL

Appendix XIII: Decline Letter from Aga Khan University Hospital

THE AGA KHAN UNIVERSITY

Ref: 2018/REC-35 (v3)
07th June 2018

Geoffrey Meshack Likata Ungaya– Student
Degree of Doctor of Philosophy in Health Communication,
Jomo Kenyatta University of Agriculture and Technology.

Dear Mr Ungaya and team,

Re: THE EFFECT OF HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN KENYA

The Aga Khan University, Nairobi (AKUN), Faculty of Health Sciences, Research Office is in receipt of your appeal dated 30th May 2018; with a request to reconsider including Aga Khan University Hospital, Nairobi (AKUHN) as a research site for the above study.

In further consultation with our faculty at the Diabetes and Endocrinology sections, we still opine that this is a complex study requiring a significant time input from patients and doctors involved at the clinic. Further, due to other commitments, our faculty at the section are unable to take on a supervisory role at this stage; hence, we are indisposed to participate in the study.

I wish you all the best in your endeavor as you seek an alternative research site.

Sincerely,

.....
Prof. Rodney Adam
Chair, Research Committee, AKU (Nairobi)

Copies:
Chairman, Research Ethics Committee, AKU (Nairobi)
Chief of Staff & Associate Dean Clinical Affairs, Hospital Administration
Chair, Department of Internal Medicine AKUH (Nairobi)
Endocrinology Section Head, Department of Internal Medicine AKUH (Nairobi)

Appendix XIX: Approval to Conduct a Study in Medicine Department at Kenyatta National Hospital

KENYATTA NATIONAL HOSPITAL
P. O. Box 20723, 00202 Nairobi

Tel: 2726300/2728450/2726550
Fax: 2725272
Email: knhadmin@knh.or.ke

Ref: KNH/AD-MED/42B/VOL.I/

Date: 26th September 2018

Geoffrey M. Likata Ungaya
Department of Media Technology and
Applied Communication
School of Communication and
Development Studies
J.K.U.A.T

RE: APPROVAL TO CONDUCT A STUDY IN MEDICINE DEPARTMENT

Following approval of your study by the KNH/UoN ERC and completion of the KNH study registration certificate, permission is hereby granted to collect data in Medicine Department, Diabetic Clinic to enable you complete your study on " ***The effect of healthcare provider patient communication on diabetes mellitus management practice in Kenya at*** Kenyatta National Hospital.

Kindly liaise with the Assistant Chief Nurse Incharge Diabetic Clinic for facilitation.

Dr. K. Ndege

DR. K.NDEGE
Ag.HOD - MEDICINE

Copy to: Assistant Chief Nurse - Diabetic Clinic

Vision: A world class patient-centered specialized care hospital

ISO 9001: 2008 CERTIFIED

Appendix XX: Kenyatta National Hospital Study Registration Certificate

KNH/R&P/FORM/01

KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher
   GEOFFREY MESHACK [illegible]
2. Email address: [illegible]@yahoo.com Tel No. 0713039621/[illegible]
3. Contact person (if different from PI) PROFESSOR HELLEN MBERIA
4. Email address: hkmberia@yahoo.com or hellenmberia@gmail.com. Tel No. 0721779229
5. Study Title
   THE EFFECT OF HEALTHCARE PROVIDER – PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN KENYA
6. Department where the study will be conducted MEDICINE
   (Please attach copy of Abstract)
7. Endorsed by Research Coordinator of the KNH Department where the study will be conducted.

   Name: .... Signature .... Date ....

8. Endorsed by KNH Head of Department where study will be conducted.

   Name: Dr. K. [illegible] Signature [signature] Date [illegible]/9/201[illegible]

9. KNH UoN Ethics Research Committee approved study number P416/07/2017
   (Please attach copy of ERC approval)
10. I GEOFFREY MESHACK [illegible] commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Research and Programs.

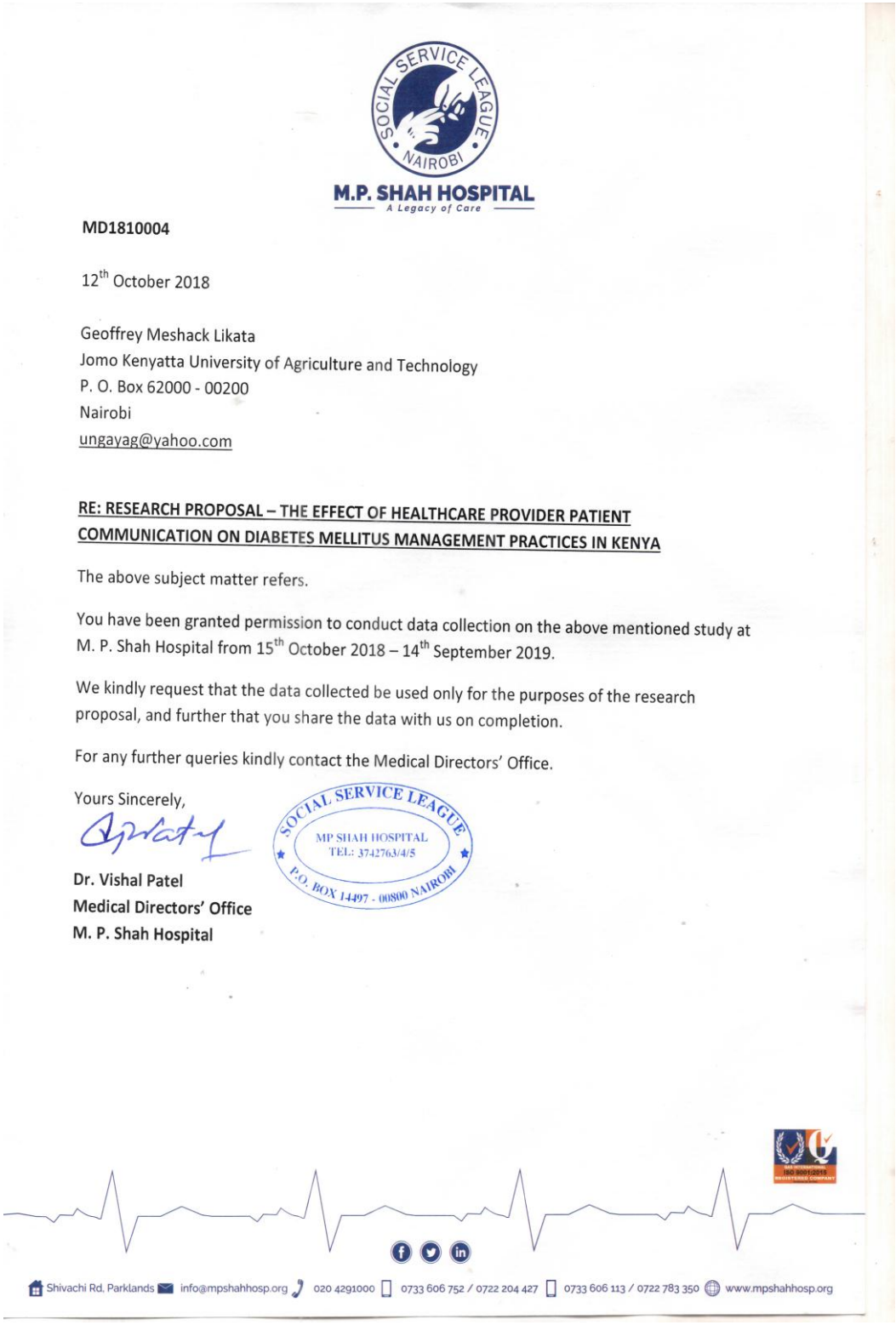
    Signature [signature] Date [illegible]/9/2018

11. Study Registration number (Dept/Number/Year) [illegible] [illegible]/2018
    (To be completed by Research and Programs Department)
12. Research and Program Stamp [stamp: KENYATTA NATIONAL HOSPITAL, 15 OCT 2018, P.O. Box 20723, Research & Resource Centre]

All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Research and Programs and Investigators **must commit** to share results with the hospital.

Version 2: August 2014

Appendix XXI: Approval Letter from MP Shah Hospital



SOCIAL SERVICE LEAGUE NAIROBI

M.P. SHAH HOSPITAL
A Legacy of Care

MD1810004

12th October 2018

Geoffrey Meshack Likata
Jomo Kenyatta University of Agriculture and Technology
P. O. Box 62000 - 00200
Nairobi
ungayag@yahoo.com

RE: RESEARCH PROPOSAL – THE EFFECT OF HEALTHCARE PROVIDER PATIENT COMMUNICATION ON DIABETES MELLITUS MANAGEMENT PRACTICES IN KENYA

The above subject matter refers.

You have been granted permission to conduct data collection on the above mentioned study at M. P. Shah Hospital from 15th October 2018 – 14th September 2019.

We kindly request that the data collected be used only for the purposes of the research proposal, and further that you share the data with us on completion.

For any further queries kindly contact the Medical Directors' Office.

Yours Sincerely,

SOCIAL SERVICE LEAGUE
MP SHAH HOSPITAL
TEL: 3742763/4/5
P.O. BOX 14497 - 00800 NAIROBI

Dr. Vishal Patel
Medical Directors' Office
M. P. Shah Hospital

Shivachi Rd. Parklands info@mpshahhosp.org 020 4291000 0733 606 752 / 0722 204 427 0733 606 113 / 0722 783 350 www.mpshahhosp.org

Appendix XXII: Approval of Annual Renewal Letter from Kenyatta National Hospital - University of Nairobi, Ethics Review Committee (KNH-UON ERC)

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref. No.KNH/ERC/R/233

13th December 2018

Geoffrey M. Likata Ungaya
PhD candidate
Dept. of Media Technology and Applied Communication
School of Communication and Development Studies
JKUAT
Email: ungaya@yahoo.com

Dear Geoffrey

Re: Approval of Annual Renewal - The effect of Healthcare provider patient communication on Diabetes Mellitus management practices in Kenya (P416/07/2017)

Refer to your communication dated November 22, 2018.

This is to acknowledge receipt of your study progress report and hereby grant you annual extension approval for ethics research protocol P416/07/2017.

The approval dates are 18th December 2018 – 17th December 2019.

Approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/UoN ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN- ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within 72 hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.

Protect to discover

g) Submission of an *executive summary* report within 90 days upon completion of the study
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH- UoN ERC website **http://www.erc.uonbi.ac.ke**

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UON ERC

c.c. The Principal, College of Health Sciences, UoN
The Director CS, KNH
The Chairperson, KNH-UoN ERC

Appendix XXIII: Approval of Modification Letter from Kenyatta National Hospital - University of Nairobi, Ethics Review Committee (KNH-UON ERC)

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-021) 2725300 Ext: 44355

KNH-UoN ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/ Mod&SAE/438

20th December, 2018

Geoffrey M. Lukata Ongaya
Reg. No.HD427-2567/2013
School of Communication and Development Studies
Dept.of Media Technology and Applied Communication
J.K.U.A.T

Dear Geoffrey

Re: Approval of modifications– study titled "**The effect of Healthcare provider Patient communication on Diabetes Mellitus management practices in Kenya" (P416/07/2017)**

Your response dated 22nd November, 2018 refers.

Upon review of the revised documents, the KNH-UoN ERC has **approved** the following:

1. Change of study site from Aga Khan University Hospital to M.P. Shah Hospital.
2. Approval of the revised study questionnaire for patients and that for health care providers.

These documents are hereby endorsed and stamped for use.

Yours sincerely,

PROF. M.L. CHINDIA
SECRETARY, KNH-UON ERC

c.c. The Principal, College of Health Sciences, UoN
The Director CS, KNH
The Chair, KNH-UON ERC

Protect to discover