Factors associated with use of herbal medicine among the residents of Gucha sub-county, Kenya

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A thesis submitted in partial fulfillment for the degree of Master of Science in Applied Epidemiology in Jomo Kenyatta University of Agriculture and Technology

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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

I am grateful to God for grace to carry out this research.
I dedicate this work to my husband Isaiah Miruka and our children Klynne and Izon, my late father Zablon Ondicho and mother Ascar Nyabonyi for their love, support and encouragement during the course of this study. May God bless you.

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LIST OF ABBREVIATIONS/ACRONYMS

AHA	Abagusii Herbalist Association
AHSSR-MPHS	Annual Health Sector Statistics Report-Ministry of Public Health and Sanitation
MPHS	Ministry of Public Health and sanitation
CBS	Central Bureau of Statistics
CTMDR-KEMRI	Centre for Traditional Medicine and Drugs Research- Kenya Medical Research Institute
DHMT	Sub-County Health Management Teams
ERC	Ethical Review Committee
GDH	Gucha Level 4 Hospital
GoK	Government of Kenya
IPRSP-GOK	Interim Poverty Reduction Strategy Papers – GOK
ITROMID	Institute of Tropical Medicine and Infectious Diseases-JKUAT
JKUAT	Jomo Kenyatta University of Agriculture and Technology
KDHS	Kenya Demographic and Health Survey
KAIS	Kenya AIDS indicator Survey
KEMRI	Kenya Medical Research Institute
KII	Key Informant Interview
KNBS	Kenya National Bureau of Statistics
KSPAS- GOK	Kenya Service Provision Assessment- GOK
MMERI	Merlin Medical Emergency Relief International

MOH	Ministry of Health
NGO	Non-Governmental Organizations
NATHEPA	National Traditional Health Practitioners Association
NCAPD	National Coordinating Agency for Population and Development
NHA	National Health Accounts
NRTH	National Referral and Teaching Hospital
PPA	Participatory Poverty Assessment
SSC	Scientific Steering Committee
TCM	Traditional Chinese Medicine
THM	Traditional Healing Methods
THP	Traditional Health Practitioner
TM	Traditional Medicine
WHO	World Health Organization
WMS	Welfare Monitoring Survey

ABSTRACT

Medicinal plants have played a key role in world health in spite of great advances observed in conventional medicine in recent decades, herbal medicine still make an important contribution to health care. World Health Organization estimated that 80% of the developing countries depend on herbal medicine to meet their healthcare needs. Due to the increased use of herbal medicine, there is an urgent need for the appropriate systems of quality control in the practice as well as in the production and use of the medicines. The main objective of this study was to determine the factors associated with utilization of herbal medicine among residents of Gucha Sub-county. A cross-sectional study was carried out among 167 purposively selected patients visiting herbal clinics in Gucha Sub-county. Semi-structured questionnaire was administered to the patients and analyzed using Statistical Package for Social Scientist (SPSS) version 20. In-depth interviews were conducted for selected key informant which was was analyzed thematically. Of the 167 patients recruited into the study, 68.9% prefer using herbal medicine. However, 67.7% of the respondents occasionally visit conventional hospital for the same or different health conditions. Respondents' reasons for taking herbal medication were varied and included reasons such as herbs having better efficacy (83%) than conventional medicine, while 27.5% believed that herbal medicines being natural are safe to use. Due to deeply rooted cultural belief that herbal medicine treated certain diseases and maintained good health, (6%) of the respondents preferred to use herbal medicine. The respondents believed in better quality of service offered by the herbalists which was statistically significant in the influence on respondents' choice of healthcare. The respondents mainly used herbal medicine for stomach disorders (39.5%), measles (12.6%) and malaria (8.4%). Relatives had a marked influence on 37.7% of the respondents using herbal medicine while, media also played an important role in creating awareness. An attitude toward using herbal medicines is predictor of the intention to use herbal medicines. The community believes in the importance of herbal medicine for maintaining health thus, positive attitude towards efficacy and safety of herbal medicine. Further research on herbal medicine use in Gucha should be carried out in order to establish the efficacy and safety of the medicines used by the community.

CHAPTER ONE
1.0 INTRODUCTION

1.1 Background and Introduction

Traditional medicine is the sum total of knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses (WHO, 2013). The terms "complementary medicine" or "alternative medicine" are used inter-changeably with traditional medicine in some countries (Zhang, 2000).

Traditional health practitioners are grouped into several categories which include; traditional herbalist, traditional surgeon, traditional midwife, diviner, metaphysists, traditional psychiatry, traditional bone setter, faith healer among others (Sindiga, 1995). Herbal medicines which are part of traditional medicine include herbs, herbal materials, herbal preparations and finished herbal products that contain parts of plants or other plant materials as active ingredients (Calixto, 2000).

Use of herbal medicine is widespread throughout the world and is redefined as comprising therapeutic practices that have been in existence for hundreds of years before the development and spread of modern scientific medicine and are still in use today (WHO, 2005). These practices vary widely, in keeping with the social and cultural heritage of different country (Sofowora, 1996; Akerele, 1992). In Africa, herbalist and herbal products made from plants play an important role in the health of millions of people (Rukangira, 2001).

Traditional medicinal plants have been used since ancient time for human healthcare and still remain the most widely used medication system in developing countries. Traditional healing methods especially herbal medicine have been used by Africans for the prevention, diagnosis and treatment of social, mental and physical ailment of different origins before and even after the advent of conventional medicine (Winkler, Mayer, Ombay, M., Mathias, Schmutzhard, & Jilek-Aall, 2010). The use of herbal products in the world exceeds that of conventional drugs by three-fold (WHO, 2005).

Herbal medicine is still the mainstay of about 75–80% of the world population, mainly in developing countries, for primary health care as the number of patients seeking herbal therapy is also growing exponentially (Kumar, Bajaj, & Mehrotra., 2006).

In recent years the importance of the utilization of herbal medicine in primary healthcare has been emphasized in Kenya. In Kenya, 90% of the population has used herbal medicine at least once for various health conditions (Njoroge & Kibunga, 2007). Ethnobotanical information obtained from relevant literature indicates that traditional medicine is widely practiced in Kenya by the different communities (Kareru, Kenji, Gachanja, Keriko, & Mungai, 2007; Njoroge & Bussman 2007).

The growing incidence of chronic and incurable diseases, such as diabetes, cancer, HIV/AIDS and arthritis, has led to the increased use of herbal medicine in recent years (Kumar *et al*., 2006). The reliance of people on herbal medicine has been for reasons of cost-effectiveness, acceptability, biomedical benefits and accessibility. There has been a continuous growth of demand for herbal medicines in Africa as a result of growth of human populations and the frequently inadequate provision of modern medicine (Lulekal, Kelbessa, Bekele, & Yineger, 2008).

1.1.1 Disease Burden and Health Systems

A country of approximately 37 million people, Kenya has struggled to build a health system that can effectively deliver quality health services to its population. In Kenya, those living below the national poverty line constitute approximately 46.6% of the population (World Bank, 2012). Health facilities are distributed regionally; at the top of the service spectrum are the National, Referral and Teaching Hospitals (NRTH) at Kenyatta National Hospital in Nairobi and Eldoret. The next level is the county hospitals, followed by sub-county hospitals. Beneath the sub-county level, there are health centers, dispensaries and community health organizations. In 2008, there were 6,190 health facilities in Kenya, the equivalent of 16 facilities per 100,000 people, or 11 facilities per 1,000 km^2 (MPHS-GOK, 2008).

Considering this challenging health landscape, utilization of health services is a key factor in improving health outcomes for Kenyans, in both the short- and long-term. The level and access to care varies by region with most facilities per person located in the former Central Province than former Western and Nyanza provinces (Wamai, 2009).

1.1.2 Health seeking behavior

Gucha district ranks among the poorest with 74% of the population living below international poverty line of USD 1 per day (Chuma, Okungu, & Molyneux, 2010; Guyatt, Corlett, Robinson, Ochola, & Snow, 2002a). Due to the high population density, almost all land in Gucha district is put to maximum agricultural use (Guyatt *et al*., 2002). The inhabitants being of low socio-economic status with poor environmental sanitation and limited access to health care (Guyatt *et al*., 2002) and therefore tend to rely on traditional herbal medicine for their primary healthcare (WHO, 2009).

Health services in Gucha are far from adequate, unevenly distributed and lacking in essential medicines (KSPAS- GOK, 2010). Resources are scarce and what is available is neither prioritized nor organized according to health needs (Heffer & Corlett, 2000; Chuma *et al*., 2010; Noor, Gikandi, Hay, Muga, & Snow, 2004). The major diseases in Gucha district are malaria, anemia, pneumonia, meningitis, tuberculosis, measles, coughs and cold, blood pressure, arthritis and rheumatism and gastroenteritis with government hospital bed occupancy rate at 160.3% (MPHS-GOK, 2008; Heffer & Corlett, 2000). The cost of treatment and transport mainly influences the type of treatment sought (Chuma *et al*., 2010).

There are a number of indigenous medical beliefs which have persisted among the Abagusii people, like, measles *(omokururo)* cases are believed that it should not be referred to the hospital, the child will die (Tanaka, 2000). In most cases children with measles are taken to hospital only when complications have developed. It is also believed that infantile diarrhea can be caused by the development of abnormal milk

teeth called *ebisara* which are canine teeth in the process of erupting. The extraction is done at times followed by serious gum infections.

The Gusii people belief in a phenomenon called "evil eye" *(ebibiriria)* where a child develops high fever and breathing becomes difficult. This condition is never referred to the hospital. Some medical experts belief that *ebibiriria* is pneumonia but others are unsure about it. Another believe among the Gusii people is that epilepsy *(endurume)* is contagious, therefore, during fits one can easily get hurt and the life of an epileptic is therefore miserable and lonely (Tanaka, 2000).

This study assessed the role herbal medicine plays in prevention and treatment of diseases in Gucha district. The main objective of this study was to explore patients' practices and attitudes towards using herbal medicine and their sources of information. This study also brings out factors that are associated with utilization of herbal medicines with a view of understanding why people are using the herbal medicine despite intensive government efforts to take health services closer to them.

1.2 Statement of the problem

Patients ordinarily use multiple sources of healthcare. Therefore, knowledge and duration of sickness, the anticipated cost of treatment, and a patient's judgment of the intensity of sickness determine their choice of treatment (Nyamongo, 2002). Medicinal plants have played a key role in world health in spite of great advances observed in modern medicine in recent decades (Kumar *et al*., 2006). In developing countries like Kenya, limited access to conventional medical services and lack of medical staff may have led to adoption of herbal medicines as alternative to conventional medicines. WHO estimated that 80% of the developing countries depend on herbal medicine to meet their healthcare needs (WHO, 2013). In Kenya, 90% used herbal medicine at least once for various health conditions (Njoroge, & Kibunga, 2007). Among the Gusii community, herbalist form part of the community's' cultural belief system and are highly valued and respected in the community (Sindiga, 1995). This makes herbal medicine acceptable to the

community. Ethnobotanical studies show that herbal medicines are being used to treat or manage diseases in the community (Gisesa, 2004).

1.3 Justification

Healthcare is an integral part of human development as it raises human life expectancy. Medicinal plants play a major role in the healthcare sector of developing nations for the management of diseases. The choice of medication used is a public health concern since there are numerous gaps in knowledge on the consequences of their use on patients (Sawalha, 2007). Although studies have shown potential efficacy of some medicinal plants, there are few studies that have looked at the factors that influence the use of herbal medicine. It is therefore, necessary to identify the factors associated with use these medications. It is expected that the study will provide information on the utilization of herbal medicine and inform policy makers and health care providers in addressing these concerns and provide a basis for further research.

1.4 Research Questions

1. What is the preferred source of healthcare among the residents of Gucha sub-county?
2. What are the attitudes towards the utilization of herbal medicine amongst residents of Gucha sub-county?
3. What is the awareness and practices of the residents of Gucha sub-county on the utilization of herbal medicine?
4. What types of herbal medicines are used to treat/manage human diseases in Gucha sub-county?

1.5 Objectives

1.5.1 General Objective

To determine factors associated with the use of herbal medicine among the residents of Gucha sub-County.

1.5.2 Specific objectives

1. To determine preferred source of healthcare among the residents of Gucha sub-county.
2. To determine attitudes towards the utilization of herbal medicine among the residents of Gucha sub-county.
3. To determine awareness and practices of the residents of Gucha sub-county on the utilization of herbal medicine.
4. To document the types of herbal medicine used to treat/manage human diseases in Gucha sub-county.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Use of Herbal Medicine

World Health Organization (WHO) estimates that about 80% of people living in Africa use traditional medicines for the management of their prevailing diseases (WHO, 2013; Marshall, 1998). Although recent advances in molecular biology and physiological chemistry have greatly enhanced the understanding and treatment of diseases, a large segment of the population still depends on herbal medicine as the preferred form of health care (Iwu & Gbodossou, 2000; Fratkin, 1996). Studies have shown that this high use of herbal medicines may be due to accessibility, affordability, availability and acceptability of traditional herbal medicines by majority of the population in developing countries (Tamuno, 2011; Akerele, Blass, Singh, Chowdhury, Kulshreshtha, Kamboj, & Bishaw 1993).

Traditional healers such as herbalists, midwives and spiritual healers constitute the main source of assistance for at least 80-90% of rural population with health problems in developing countries (WHO, 2002). The herbalists are an important national health care resource in South Africa and they are potentially valuable partners in the delivery of health care (Kubukeli, 1999). The use of herbal medicines however, is on the increase even in developed countries because of the belief that herbal remedies are safe because of their natural origin and have little or no side effects (Jacobsson, Jönsson, Gerdén, & Hägg,, 2009).

The increasing widespread use of traditional herbal medicine has prompted the World Health Organization to promotes the use of herbal medicine for health care by; supporting and integrating herbal medicine into national health systems in combination with national policy and regulation for products, practices and providers to ensure safety and quality; ensure the use of safe, effective and quality products and practices, based on available evidence; acknowledge herbal medicine as part of primary health care, to increase access to care and preserve knowledge and

resources; and ensure patient safety by upgrading the skills and knowledge of herbalist (Akerele, 1987; WHO, 2005; WHO, 2008).

Traditional medicine is a vital part of health care in Kenya. Kenya has a rich and diverse range of flora that has been used by various ethnic communities for treatment of different diseases (Kokwaro, 2009; Gachathi, 2007). Indeed, more than 250 plants are used by various ethnic communities in Kenya as purgatives, laxatives and emetics to treat a range of diseases (Maina, Kagira, Achila, Karanja, & Ngotho, 2013). Ethnobotanical surveys in Kenya indicate that traditional medicine is widely practiced in the country by the different communities (Jacob, Farah, & Ekaya, 2004; Kareru *et al*., 2007; Njoroge & Bussmann, 2007).

In Kenya, at least 90% of the population has used herbal medicine at least once for various health conditions (Njoroge & Kibunga, 2007). A survey conducted in Thika district, Kenya showed that 97.45% of that population preferred to treat or manage diarrhea conditions with herbal medicine rather than conventional medicine while 52.5% first seek treatment for diarrhea from herbalists before going to the hospital (Njoroge & Kibunga, 2007). The Samburu people who inhabit the northern part of Kenya make use of a wide range of ethno-medicinal resources comprising of about 120 plant species which are used to treat many diseases including malaria, gonorrhea, hepatitis and polio (Fratkin, 1996). Similar elaborate and rich pharmacopoeia systems have also been documented for other Kenyan communities such as the Maasai, Gusii, Luo, Abaluyia and the Kikuyu people (Gachathi, 2007; Kiringe, 2006; Sindiga, 1995).

The conventional system provides for only 30 per cent of the population, implying that more than two-thirds of Kenyans depend on traditional medicine for their primary health care needs (NCAPD, 2008). The importance of herbal medicines in Kenya is evidenced by the fact that traditional herbalist far outnumber conventional providers. Given the estimated 40,000 herbalist and assuming a population of 38 million Kenyans, there is a herbalist-patient ratio of 1 to 950 (Maina *et al*., 2013).

The dependence on medicinal plants is due to lack of access to modern medical services. Although the majority of Kenyans (80 per cent) live within 5 kilometers of

a health facility, medical services are not always available. Many facilities lack drugs, basic services and amenities and the cost of medicine is high. In addition, there are shortages of health professionals and the ratio of doctors to the population remains low at 15 per 100,000 (NCAPD, 2008).

2.2 Conventional Health System in Kenya

Since Kenya attained her independence in 1963, there has been massive growth and development of health care systems at various levels. The increased population and the demand for health care have outstripped the ability of the government to provide effective health services (Oyaya and Rifkin, 2003). However the government through the Ministry of Health (MOH) is committed to ensuring that accessible, affordable and effective health services which will promote the well-being, improve and sustains the health status of the Kenyan population is made available (MPHS-GOK, 2008; KSPAS- GOK, 2010)

Disease, ignorance, and illiteracy have been found to be the major obstacles in Kenya. The Government of Kenya (GoK) has supported Ministry of Health (MOH) to combat disease, but maintaining financial of MOH has undergone a lot of difficulties (KNHA, 2005). Financing and management of Health services has been a major problem in the MOH. Maintaining growing population without resources, GoK finds it challenging. Despite the reforms in the Ministry of Health that were introduced in Kenya, people still source for health care services elsewhere (Nyamongo, 2002) and a huge population has been using herbal medicine (Lambert *et al*., 2011; Kiringe, 2006).

The poor constitute slightly more than half the population of Kenya and three-quarters of the poor live in rural with Gucha district having 74% of its population living below poverty line of one US dollar per day (Chuma *et al.*, 2009). The inaccessibility of modern medicine to Kenyan's population because of escalating costs has necessitated a search for alternative ways of managing illnesses (Sindiga, 1995).

In the past, modern science had considered methods of traditional knowledge as primitive and during the colonial era traditional medical practices were often declared as illegal by the colonial authorities. Consequently doctors and health personnel have in most cases continued to shun traditional practitioners despite their contribution to meeting the basic health needs of the population, especially the rural people in developing countries (WHO, 2005).

Many practitioners of conventional medicine view the increasing recognition of traditional health systems as a failure by modern medicine to satisfy the health care needs of society while some even feel threatened by a system that they view as unscientific and beyond rational categorization (Sofowora, 1996).

Analysis of various national policies related to public health and medicinal plants usage highlighted some issues for example failure to meet basic health conditions due mainly to the following factors: inadequate decentralization of health services; isolation of some rural communities; and persistence of traditional beliefs regarding pathology. This has led to underutilization of available services in health centers and high cost of services provided by hospitals in relation to the income of the rural population. In addition to recommending measures to raise consumer awareness, the guidelines suggest that governments establish standards of practice, treatment and training for complementary medicine (WHO, 2005). They also encourage collaborations between conventional and traditional care providers to improve results and help reform the health sector in developing nations (Akerele, 1992).

2.3 Herbal Medicine Practice

Human beings have engaged in the development of detailed botanical pharmacopoeia through trial and error with a view to combat illnesses that were often specific to their localities. The practice of herbal medicine in Kenya unlike Asia has largely been considered primitive by the elite (Kigen, Ronoh, Kipkore, & Rotich, 2013).

The high dependence on herbal medicine in most African populations is partly attributed to traditional beliefs and lack of reliable modern health care (Sindiga, 1995). The decision to engage with a particular medical channel is influenced by a

variety of socio-economic variables, sex, age, gender, religion, the type of illness, access to services and perceived quality of services (Tipping & Segall, 1995).

Herbal medicine is commonly chosen by people to treat common diseases and chronic diseases. Many Kenyans believe in the potency of herbal medicine, even when they can access modern medicine (Kigen *et al*., 2013). In many cases they would choose to combine both herbal and modern medicine, especially if they are afflicted with chronic ailments such as HIV/AIDS, hypertension, infertility, cancer and diabetes (Kigen *et al*., 2013). According to a study done in Taiwan, it was established that patients used herbal medicine for muscular and joint problem for lung or respiratory complain while others to promote wellness and quality of life (Daly, Tai, Deng, & Chien, 2009).

2.3.1 Source of Knowledge on Herbal Medicine use

In most Kenyan communities, perhaps due to cultural reasons, the practice was considered a family affair and the practitioner would prefer to transfer the talent to one close relative (Kigen *et al*., 2013). Similarly, the herbalist reported that knowledge about herbal medicine is passed down from parents, relatives and friends and may not necessarily require any formal education (Enwere, 2009).

Family expectations of receiving treatment from herbalist are one of the reasons for continuous dependence on herbal medicine. In addition the influence of relatives, friends and neighbors on health-care seeking behavior for herbal medicines has been reported globally in adults and children, 51.4% in the United States (Bennett & Brown, 2000) and 60%-86% in developing countries (Danesi & Adetunji, 1994; Oshikoya *et al*., 2008; Lanski *et al*., 2003). Moreover, studies have shown that media such as newspapers advertisements, television and radio, play an important role in creating awareness (Bennett & Brown, 2000).

2.3.2 Attitude towards Herbal Medicine

Herbal medicine has been used for centuries and it is claimed to have gained acceptance because of its effectiveness. Studies have shown that the attitudes of

patients have a strong association with the utilization of herbal medicine. A study done in South Africa among Academic and Administrative university staff indicates that patients' have positive attitude towards herbal medicine, with better clinical care and positive outcome after treatment using herbal medicine (van Staden & Joubert 2014).

Studies carried out so far indicate that this increase in use of herbal remedies for management of health conditions could be as a result of people perceiving them as natural and therefore safe, increase in cost of contemporary medicine and increase in advertisement of herbal remedies. In a study carried out in Murang'a District, Kenya among people with diabetes mellitus showed that there was association between the perceptions people have on herbal remedies and use of herbal medicine (Mwangi, 2003).

Similarly, in Ethiopia, a study done to evaluate the perception and practices of modern and traditional health practitioners about traditional medicine indicated that there is a perception that the conventional health system is inadequate to diagnose and treat certain diseases like evil eyes, epilepsy and gonorrhea (Gatachew, *et al.*, 2002).

2.3.3 Phyto-medicine products

Over the past decade, interest in drugs derived from plants has greatly increased. It is estimated that about 25% of all modern medicines are directly or indirectly derived from plants (Cragg & Newman, 2001). The potential of plants as source of conventional drugs exists for example reserpine, an alkaloid was the first anti-hypertensive drug that was isolated from the roots of *Rauwolfia serpentine* (Apocynaceae) in 1952 (Pandey, Debnath, Gupta, & Chikara, 2011). Safety and effectiveness of some of the medicinal plants have been evaluated leading to new antimalarial drugs developed from the discovery and isolation of artemisinin from *Artemisia annua* L., a plant used in China for almost 2000 years (WHO, 2008).

It is clear that there is a lot of potential in Kenyan herbal medicine judging from the published laboratory results from the screening of the plant extracts that have been

analyzed in various institutions. The following Kenyan medicinal plants; *Albizia gummifera , Boscia salicifolia,, Rhus natalensis, Vernonia lasiopus, Rhamnus prinoides, Pentas longiflora and Ficus sur* among others, have shown antiplasmodial activity hence effective in malaria treatment (Gathirwa *et al*., 2007; Rukunga *et al*., 2007; Muthaura *et al*., 2007; Muregi *et al*., 2003). Similarly, the aqueous extract of *Carissa edulis, Prunus Africana and Melia azedarach* have demonstrated the potential anti-viral activities at non-cytotoxic concentrations (Tolo *et al*., 2008). Other studies have shown that water extracts of *Warburgia ugandensis* have antifungal activity against Candida albicans (Olila *et al*., 2001) and also antileishmanial activity (Ngure *et al*., 2009). Similary, pentacyclic triterpenes isolated from A*cacia mellifera* have demonstrated antimicrobial activity (Mutai *et al*., 2009) among other Kenyan medicinal plants.

However, there is need to document the information from herbalists in order to provide a database for future research and potential for development of new drugs. Information obtained from ethno-medicine is now being put on a scientific basis and is therefore important to investigate the knowledge, attitudes and practice on utilization.

CHAPTER THREE
3.0 MATERIALS AND METHODS

3.1 Study Design

A descriptive cross sectional study design was used for this study to determine the factors that are associated with the use of herbal medicine.

3.2 Study Area

The study was carried out in Gucha sub-county within Kisii County of the former Nyanza Province. This study was conducted before the former administrative structures changed from provinces and district to counties and sub-county. The two selected division were Ogembo with a population of 168,686 persons and Sameta with a population of 63,812 persons (KNBS-KDHS, 2010). The sub-county is mainly rural and dominantly agricultural, covering 1,300 sq km. Gucha County is one of the most densely populated sub-counties in Kenya with a population density of 875 persons per sq km, which compares with the Kenya average of 66 persons per sq km (KNBS-KPHC, 2010). Malaria is the most common cause of outpatient attendance and inpatient death in this sub-county accounting for 33.2% of all deaths reported by health facilities, and for 60% of all under-five mortality (Nyamongo, 2011; Heffer and Corlett, 2000).

3.2.1 Study Population

The primary study population consisted of clients who visited herbalist or herbal clinics in Gucha sub-county within the period of April 2011 to July 2011 seeking for medical healthcare. Herbalist is a person who uses plants and other natural substances to improve health, promote healing, and prevent and treat illness. Herbal clinic offers treatment based on herbal products (Ochora, 2004).

3.2.2 Sample Size Determination

The required sample size was obtained using a probability sampling procedures. In Kenya, 90% of the population has used medicinal plants at least once for various

health conditions (Njoroge & Kibunga, 2007). The desired accuracy of the result was at 95%. Using these parameters, sample size was calculated using the Fisher's formula (Cochran, 1963).

$$n = \frac{(Z^2_{\frac{1-\alpha}{2}}\ P\ (1-P)}{d^2}$$

Where:

n = required sample size

$Z^2_{(1-\alpha)/2}$ = area under the normal curve (1.96) (confidence level at 95%)

d = (0.05) level of precision at 5% (Standard value of 0.05)

P= the proportion of the population using herbal medicine (90%) in Kenya (Njoroge and Kibunga, 2007).

q = the proportion of the population that does not have the characteristic (1-p)

$$n = \frac{1.96^{\ 2}\text{X } 0.9 \text{ X } 0.1}{0.05^2} = 138.3$$

Herbal medicine sector is not regulated and the practice is not standardized, therefore, the number of clients visiting the herbalist has not been documented. However, sample size was computed using the proportion of the population using herbal medicine (Tabuti, 2006). The required sample size calculated using the Cochran, (1963) formula is 138.3 subjects. Sample size of 167 was taken for this study to take care of (20%) non-response.

3.2.3 Sampling Method

Purposive sampling technique was used to select the key informants who were herbalist in Gucha sub-county (Tongco, 2007). This sought to collect in-depth information and further understanding the reason for use of herbal medicine and their attitudes towards the same. Snowballing technique was used to select the herbalists (Kurant *et al.*, 2010). Before undertaking the field work, Gucha sub-county local community leaders and residents were approached to assist identify reputable

herbalist in the two divisions, Sameta and Ogembo. A written consent was obtained from the herbalist to allow the principal investigator to collect data from their clients.

Simple random sampling method was used to select 167 primary study participants. Within each of these selected herbalists, the clients entering in a given day were chosen randomly to participate in the study. All clients who met the inclusion criteria were included in the study.

Purposive sampling technique was used to select key information from Ministry of health personnel in Gucha sub-county level four hospital (Tongco, 2007).

3.3 Inclusion and Exclusion criteria for primary population

3.3.1 Inclusion criteria

Clients who visited herbalist or herbal clinics, 18 years and above, reside in the study district and gave consent were recruited for the study.

3.3.2 Exclusion Criteria

Patients who were below 18 years, who did not reside in the study district, and did not consent, were not recruited to take part.

3.4 Data collection tools

3.4.1 Questionnaire for primary population (clients)

Pre tested questionnaires written either in English or Gusii ware used for data collection among sampled participants (Appendix 2). Preferred language was used for each participant due to the various level of education. The questionnaire captured the following; patients socio-demographic characteristics, attitude and practice towards utilization of herbal medicine, motivating factors associated with the use of herbal medicine and health seeking behaviors of the patients visiting herbalist in Gucha sub-county.

3.4.2 In-depth Interview for Herbalist

In-depth interviews were conducted among herbalists who practice in Gucha sub-county. A guide (Appendix 3) was developed and used. The main issues captured in the guide included the herbalist knowledge, attitudes and practice on herbal medicine utilization, medicinal plants used and diseases treated and the factors associated with the use of herbal medicine. The principal investigator moderated interviews while taking notes.

All plant material mentioned by respondents in the study was well labeled in the field showing the vernacular or the local name, mode of preparation and the disease it is used to treat. A voucher specimen of each species was collected for botanical identification by a botanist and deposited at East African Herbarium, National Museums of Kenya. Species nomenclature followed the Flora for Tropical East Africa and also compared with other specimens deposited at East African Herbarium.

3.4.3 Key Informant Interview for Ministry of Health Personnel

Ministry of Health personnel were selected to take part in the study. A guide (Appendix 4) was developed and pre-tested before it was used. The main issues in the guide included the general awareness on utilization of herbal medicine among the residents of Gucha sub-county, their attitudes towards herbal medicine within the same community. The principal investigator moderated interviews while taking notes.

3.5 Data management and storage

The Principal investigator closely supervised the process of data collection. Supervision involved periodic review of questionnaires for completeness and consistency. The data collected from questionnaires was assembled by keying into SPSS version 20.0 database and analyzed with the same program. Summary notes were made form the key informants' interviews and the in-depth interviews according to thematic areas identified. Data was kept in the PI's personal computer protected with the aid of a password. Backs ups were made by keeping the

information on flash disks.

3.5.1 Data Analysis

Data from the questionnaire was analyzed using SPSS version 20.0. Analysis involved descriptive statistics such as frequencies and proportions. Test of association on herbal medicine practice and independent categorical variables were done through bivariate analysis using Pearson's Chi-square test. Level of significance was fixed at 0.05 (p=0.05) with a 95% Confidence interval. p value less that 0.05 was considered significant. Data is presented in tables and bar charts. Qualitative data were analyzed through the scrutiny of words or phrases mentioned by the interviewees and categorized into thematic areas based on the study variables.

3.6 Ethical considerations

3.6.1 Ethical clearance

Ethical clearance for this study was sought from KEMRI National Ethics Review Committee (Appendix 7). Permission to carry out the study was sought from Sub-county Administration at Ogembo (Appendix 9) and Sub-county Medical Officer, Gucha District Hospital (Appendix 8).

3.6.2 Consent

Informed consent was obtained from the participants before their participation in the study. Participants were therefore given an informed consent form (appendix 1) to consent. An explanation into the study including purpose of the study, procedures and benefits were explained by both the Principal Investigator and the research assistants. This was to make the participants familiarize themselves with the study before appending their signatures to respond to the questionnaire. Voluntary participation in the study and right to withdraw at any point without any negative consequences were clearly explained to participant. Appointments with the herbalists and hospital personnel were made on appropriate time and venues for the interviews. Participants were assured that all information obtained from them would be treated with maximum confidentiality and that no names would be used in any report.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Social demographic characteristics of the patients visiting herbalists

A total of 167 questionnaires were completed giving a response rate of 100%. Their ages ranged from 18 to 60 years old. Most respondents 78(46.7%) were in age group 18-30 years while <60 years were very few 8(4.8%). In terms of sex, 67(40.1%) were females and 100(59.9%) were males. Majority of the patients were married 125(74.9%), while 39(23.4%) were single and 3(1.8%) were divorced/ separated respectively. On the level of education, 94(56.3%) had reached secondary school and about a third 58((34.7%) had completed primary school as their highest level of formal education while 6(3.6%) did not have any formal education. A very small proportion 9(5.4%) had attained university education (Figure 4.1).

Retail traders formed the highest percentage, 64(38.3%) of the respondent who were using herbal medicine, while 58(34.7%) were farmers, 13(7.8%) were salaried. The remaining were categorized as others which included students, casual laborers, housewives, self-employed, unemployed being 32(19.2%) as shown in Table 4.1. Out of the 167 patients visiting herbal clinics interviewed, about half 86(51.5%) were protestants while 72(43.1%) were Roman Catholics and a small proportion 1(1.0%) of Muslims. The results are as shown in Table 4.1.

Table 4. 1: Social demographic characteristics of the patients visiting the herbalist

Variables		Division		Frequency	%
		Ogembo	Sameta	N=167	
Age	18-30	43	35	78	46.7
	31-40	29	10	39	23.3
	41-50	18	2	20	12
	51-60	19	3	22	13.2
	>60	8	0	8	4.8
Sex	Male	75	25	100	59.9
	Female	42	25	67	40.1
Marital status	Married	104	21	125	74.9
	Single	11	28	39	23.4
	Separated/ Divorced	2	1	3	1.8
Education level	No Education	5	1	6	3.6
	Primary	48	10	58	34.7
	Secondary	58	36	94	56.3
	Tertiary	6	3	9	5.4
Religion	Roman Catholic	45	27	72	43.1
	Protestant	64	22	86	51.5
	Muslim	1	0	1	0.6
	Other	7	1	8	4.8
Occupation	Farming	44	14	58	34.7
	Salaried	9	4	13	7.8
	Retail traders	57	7	64	38.3
	Others*	7	25	32	19.2

*Occupation others: Student, Casual laborers, self-employed, unemployed

4.2 Preferred source of healthcare among the clients

Herbalists have proficiency in the art and knowledge of plant identification and use of medicinal plants to improve health, promote healing, and prevent and treat illness. Herbal clinic offers treatment based on herbal products (Ochora, 2004). Therefore, this study was conducted among clients visiting the herbalist or herbal clinics with the aim of assessing the client's preferred source of healthcare. Most 115(68.9%) of

the respondents prefer using herbal medicine rather than conventional medicine (Figure 4.1).

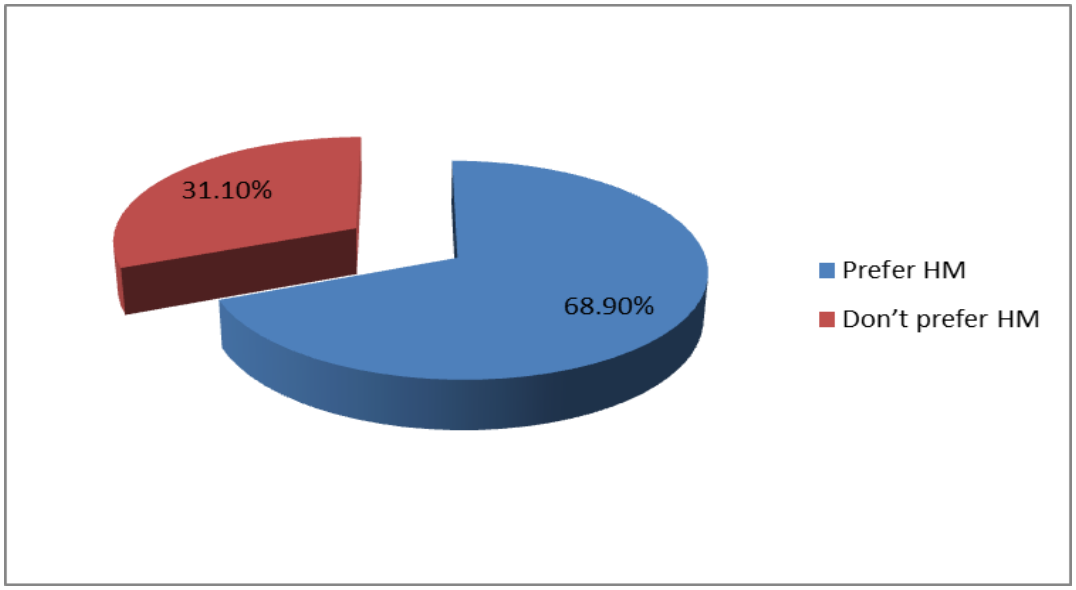


Figure 4. 1: Preferred source of healthcare among the clients

4.2.1 Diseases clients' preferred treating using herbal medicine

Traditional medical system grow out of different rational thus defines and diagnoses diseases differently and cannot be easily translated into biomedical terminology. Therefore, diseases and related health problem the clients mentioned were classified and identified with the assistance of the Ministry of Health Personnel in Gucha sub-district hospital.

The data reveal that herbal medicine is popular among the clients for the treatment of diseases such as malaria (8.4%), arthritis (4.8%), stomach disorders (39.5%), and pneumonia (2.4%) (Figure 4.2).

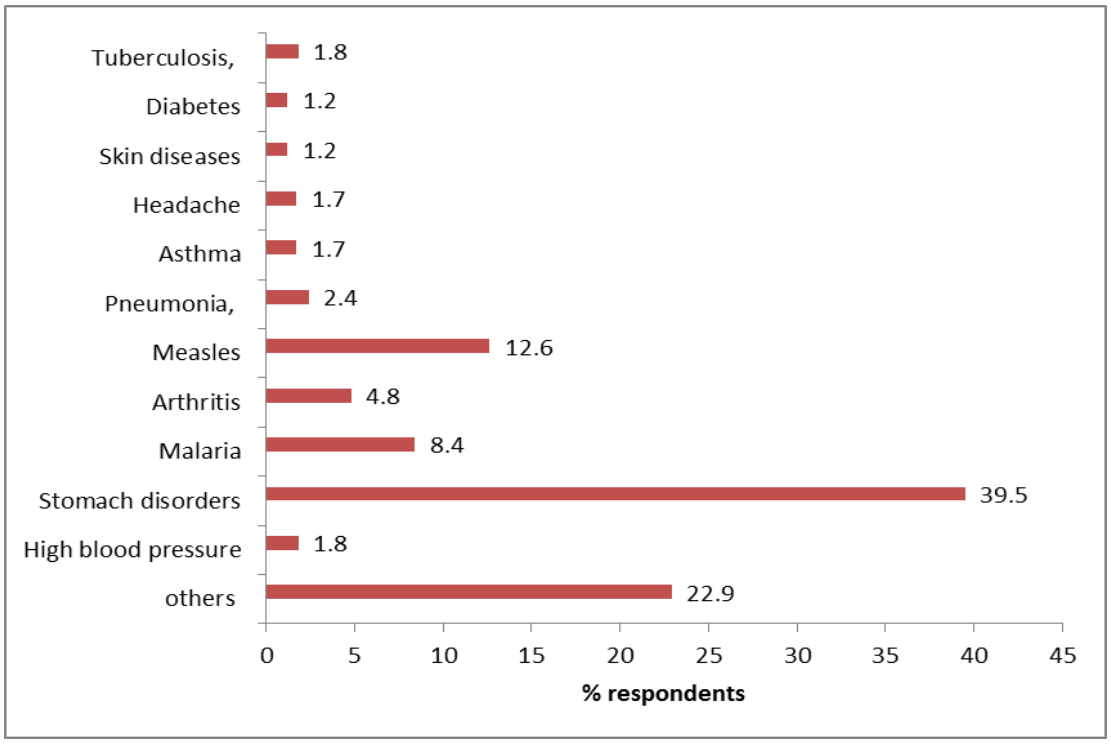


Figure 4. 2: Diseases clients' preferred treating using herbal medicine

4.2.2 Use of herbal medicine among the clients

Almost all 163 (97.6%) the respondents in Gucha sub-county indicated that they use medicinal plants as food supplement, prophylaxis or for medication. Nevertheless, while inquiring about the frequency of herbal medicine use, the study indicated that most of the respondents 67 (40.1%) only used herbal medicine when they fall sick, while 35 (21%) use on daily basis. Majority of the patients interviewed 101 (60.5%), indicated that it was their first time to visit herbalist or herbal clinic for treatment. Nevertheless, the study showed that 54 (32.3%) of the respondents entirely relied on traditionally based plant medication with 113 (67.7%) mentioned that they periodically visited local clinics and dispensaries as their second or alternative health care source as shown in Figure 4.3.

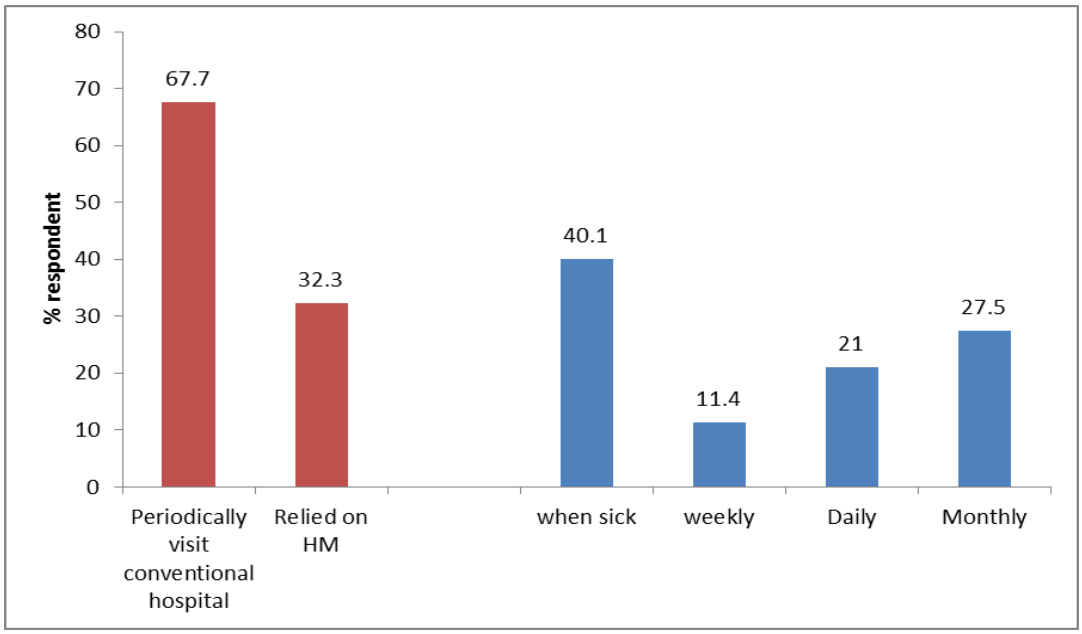


Figure 4. 3: Frequency of use of herbal medicine among the clients

It is evident the respondents had sought treatment from different health facilities in the sub-county as shown in Figure 4.4. Most of the respondent utilized both herbal and conventional medicine while 58(34.7%) entirely rely on herbal treatment with 38(22.8%) indicating they had visited the dispensary and 69(41.3%) the district hospital.

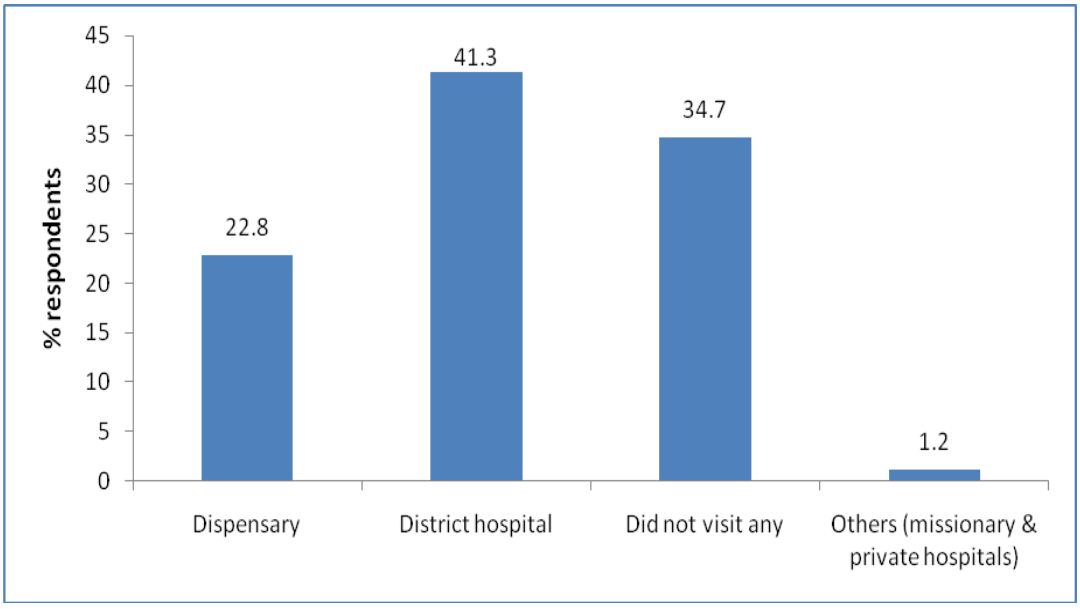


Figure 4. 4: Conventional hospitals visited by the respondents

4.2.3 Preferred source of healthcare in relation to patients' socio-demographic characteristics

All respondents were users of herbal medicine. The associations of hypothetical demographic predictors and preferred source of healthcare were obtained. Multiple logistic regression analyses were used to identify factors influencing preferred source of healthcare as presented in Tables 4.2. There was no significant association between preferred source of healthcare and socio-demographic factors (P>0.05).

Table 4. 2: Preferred source of healthcare in relation to socio-demographic characteristics

Variables		**Preferred source of healthcare**		**Chi-square**	***p* value**
		Herbal	Conventional		
Age	18-30	66.70	33.30	5.740	0.332
	31-40	61.50	38.50		
	41-50	65.00	35.00		
	51-60	86.40	13.60		
	>60	87.50	12.50		
Sex	Male	70.00	30.00	0.150	0.698
	Female	67.20	32.80		
Marital status	Married	69.60	30.40	1.8	0.407
	Single	69.20	30.80		
	Separated/ Divorced	33.30	66.70		
Education level	No Education	83.30	16.70	3.456	0.326
	Primary	72.40	27.60		
	Secondary	68.10	31.90		
	University	44.40	55.60		
Religion	Roman Catholic	68.10	31.90	2.556	0.465
	Protestant	70.90	29.10		
	Muslim		100.00		
	Other	62.50	37.50		
Division	Ogembo	68.40	31.60	0.043	0.494
	Sameta	70.00	30.00		

4.3 Factors associated with the utilization of herbal medicine

Motivating factors for herbal medicine utilization and beliefs about safety, efficacy and quality of services offered by the herbalist are presented in Table 4.3.

4.3.1 Beliefs about Herbal Medicine Efficacy and Safety

Among the respondents interviewed 140 (83.8%) preferred herbal medicine for reasons that it had better efficacy than conventional medicines (Table 4.3). However, there was no statistical association between preferred choice of healthcare and herbal medicine efficacy (p=0.489).

More so, nearly a third 46 (27.5%) of the respondents believed that herbal medicines have minimal side effects thus, they consider herbal medicine to be safe (Table 4.3). The Pearson Chi-Square Tests, ($\chi 2$= 5.595, p=0.018) showed significant difference between those who prefer herbal medicine compared to conventional medicine to those who do not, in terms of the perception that, herbal medicines have minimal or no side effects. Safety of herbal medicines were attributed to their natural origin therefore, have minimal or no side effects.

Table 4. 3: Factors associated with herbal medicine preference

	Variable	Preferred source of healthcare		Freq	%	$\chi 2$	*p*-value
		Herbal	Convectional				
Personal experience	Cures faster/Better efficacy			140	83.8		0.489
	Minimal side effect	82.6%	17.4%	46	27.5	5.595	0.018*
	Good Taste			5	3.0		0.586
	Cheaper/Cost effective			26	15.6		0.072
Cultural belief	Traditional knowledge	70%	30%	10	6.0	0.006	0.936
	No reason			3	1.8		
Quality service	Spend less time			39	23.4		0.757
	Better Attention	58.3%	41.7%	60	35.9	4.842	0.028*
	Herbalist are readily available	82.2%	17.8%	45	26.9	5.28	0.024*
	No queues	77.3%	22.7%	22	13.2	0.836	0.361
	Availability of medicine			36	21.6		0.269
	No reason			3	1.8		

4.3.2 Cultural Beliefs and Cost of Medical Care

Some 26 (15.6%) of the respondents considered herbal medicine to be less expensive compared to most of the conventional drugs (Table 4.3).

The study also showed that traditional and cultural beliefs in herbal medicines are other reasons that respondents cited for using herbal medications. The long period of usage as a proof of efficacy was cited by 10 (6.0%) respondents. There was no statistical significant difference between those who prefer herbal medicine and who do not in terms of cultural belief among the study participants ($\chi 2$=0.006; $p < 0.936$).

4.3.3 Beliefs about Quality of Service

In regard to the quality of service offered by the herbalists, 45 (26.9%) of the respondents considered herbalists to be readily available while 36 (21.6%) believed that herbal medicine is easily accessible. There was statistically significant relationship between availability of the herbalist and the preferred source of healthcare among the study participants ($\chi 2=5.28$; p =0.024) (Table 4.3).

In addition, 39 (23.4%) of the respondents preferred herbal medicine because they spend less time before being served as the herbalists never have long waiting queues compared to conventional hospital. Others 60(35.9%) preferred herbal medicine because they receive better attention from the herbalists as compared to the conventional doctors ($\chi 2=4.842$; p =0.028) (Table 4.3).

4.4 Factors related to accessibility of health facility

4.4.1 Distance to the nearest health facility

A number of factors influence the choice of healthcare including distance from the health facility. It was observed that majority of the respondents who live in Ogembo division, 80(68.0%) prefer herbal medicine to conventional medicine of whom 17(21.3%) and 36 (45%) live less than one kilometer and within 2 to 3 kilometers from the health facility respectively. Among the respondents who live in Sameta division, 35 (70%) prefer herbal medicine compared to conventional medicine, of whom majority 13 (37.1%) and 14 (40.0%) were living less than one kilometer and within 2 to 3 kilometers respectively from the health facility (Figure 4.5) There was no significance relationship between distance to the nearest conventional hospital and preferred source of healthcare ($\chi 2=1.826$; p=0.607).

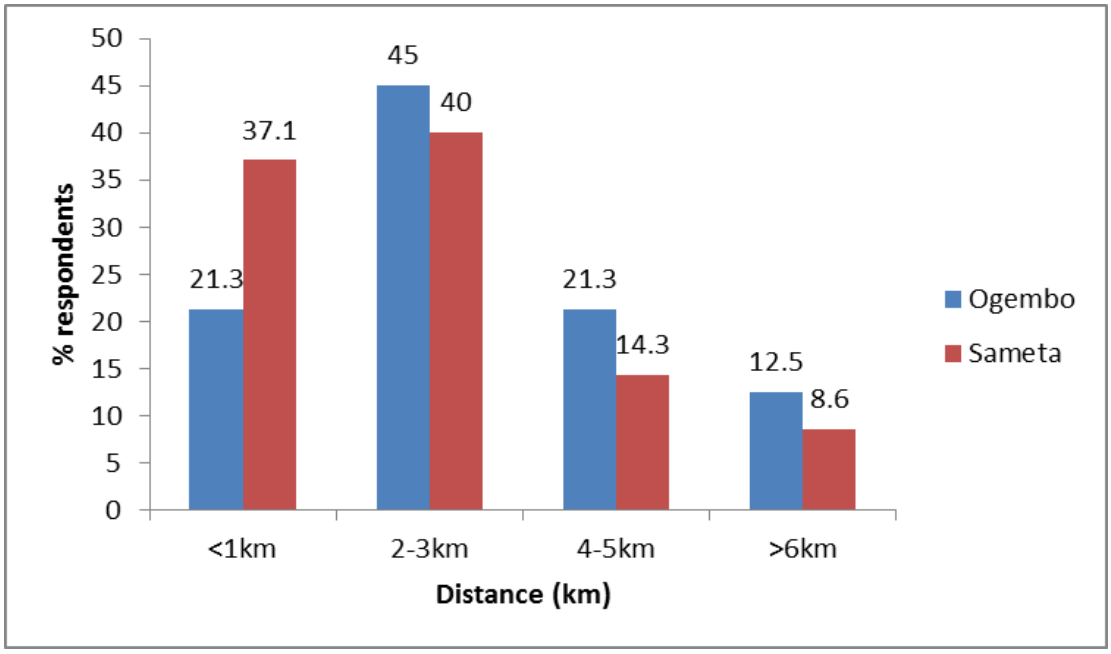


Figure 4. 5: Preference of Herbal Medicine in relation to distance

4.4.2 Mode of Transport

The mode of transport, distance to the nearest health facility, time taken to travel to a health facility, transport cost and the conditions of the roads is often an important aspect in determining the choice of healthcare. Concerning the mode of transport to the nearest health facility, almost half of the respondents 82 (49.1%) had to walk by foot, while 54 (32.3%) used motorbikes and 28 (16.8 %) boarded public service vehicle with 3 (1.8%) were able to cycle to the health facility (Figure 4.6). From the findings of the study, mode of transport did not influence the choice of health care to use ($\chi 2$ value= 5.23. p= 0.163).

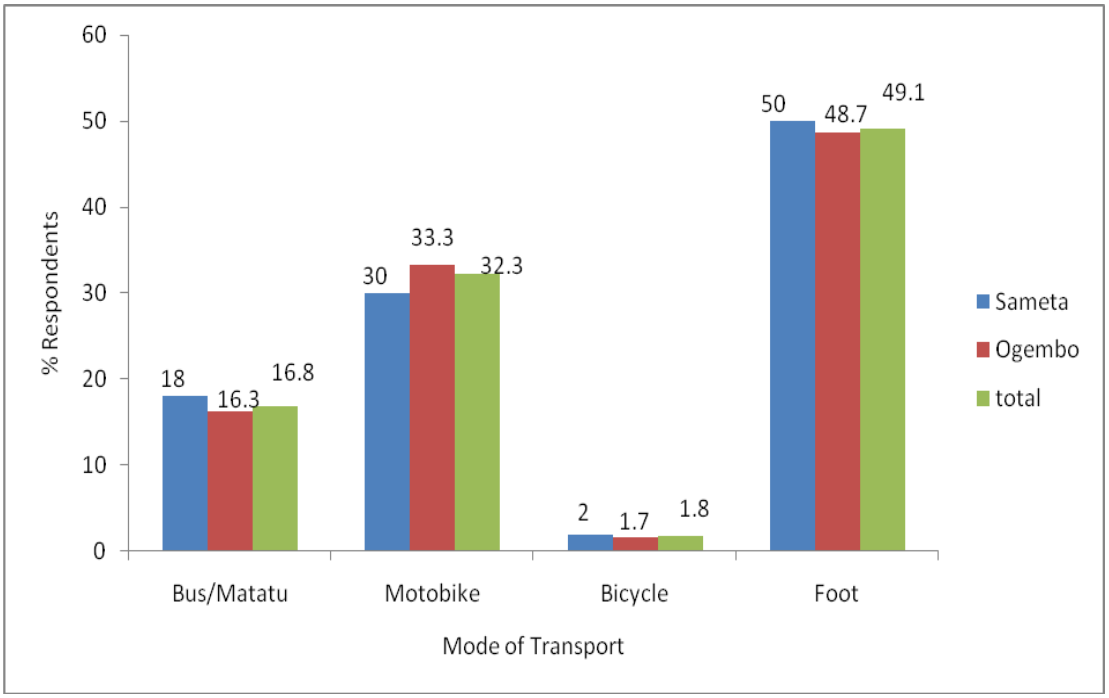


Figure 4. 6: Mode of transport used by patients

4.4.3 Cost of treatment when using herbal medicine

The decision to seek health care is based upon the cost as compared to the perceived benefit. The ability to pay determines the use of health services. The average treatment values are reported in Figure 4.7. It was observed that more than half 63(54.8%) of the respondents who prefer to use herbal medicine spent between ksh100 to ksh500 per year when seeking treatment from the herbalists.

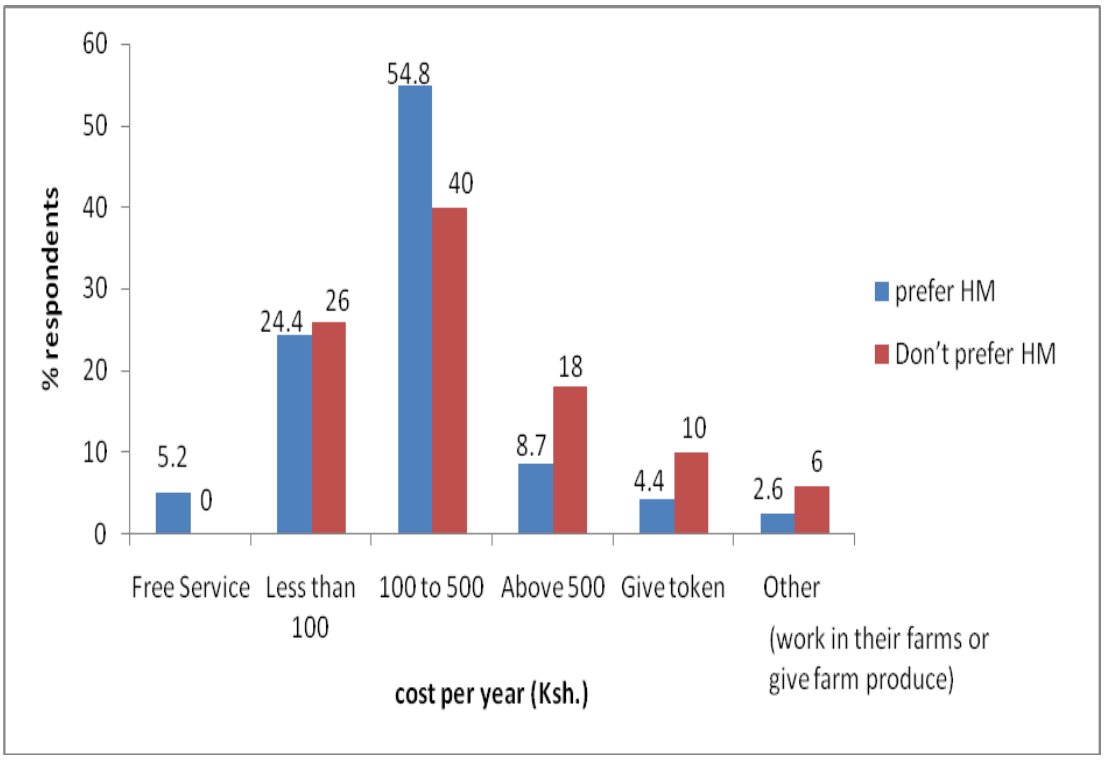
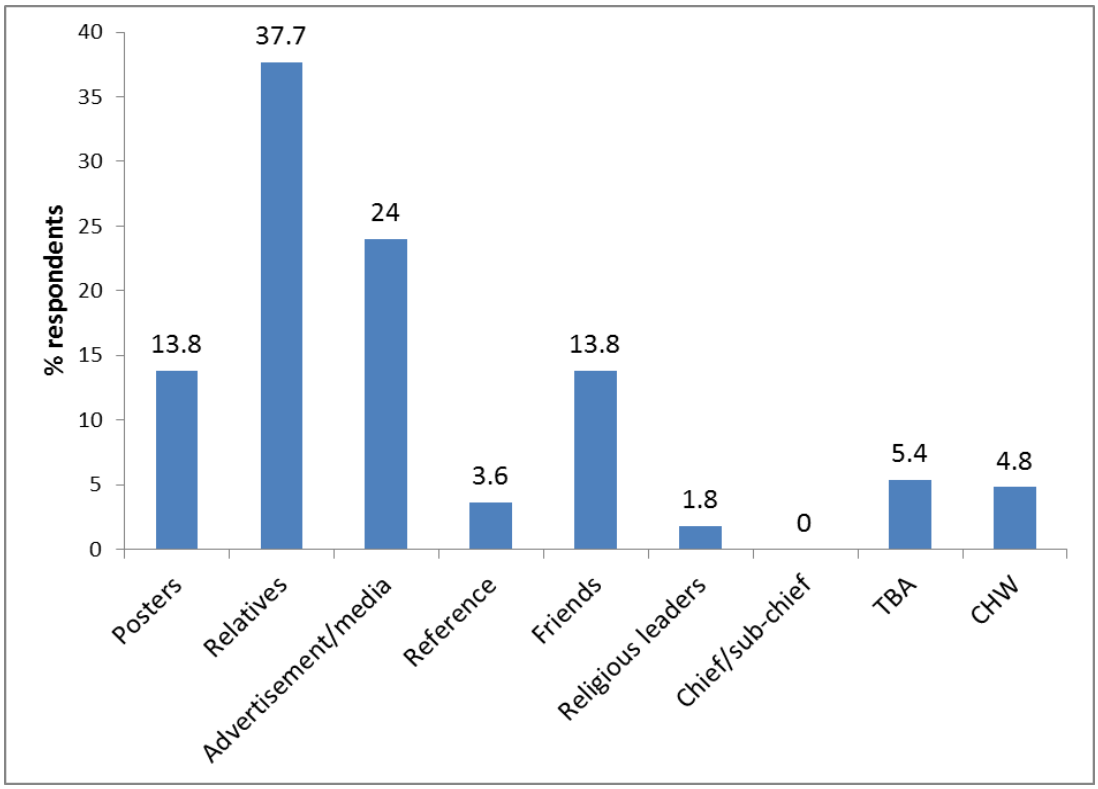


Figure 4. 7: Cost of treatment when using herbal medicine

4.5 Awareness, attitudes and practices on herbal medicine

4.5.1 Clients' awareness on utilization of herbal medicine

All 167(100%) the respondents were familiar with herbal medicine, herbalists and herbal clinics while education status was not statistically associated with herbal medicine preference (p=0. 326). The respondents' immediate associations with herbal medicine included words such as 'safe', 'natural', 'non-addictive' and 'pure'. Most 63(37.7%) of the respondents attained information on herbal medicine from parents, spouses and relatives who influenced them to use herbal medicine (Figure 4.8). The respondents' other source of information about herbal medicine included advertisement/media 40(24.0%), posters 23(13.8%), neighbors and friends 23(13.8%), traditional birth attendant 9(5.4%), community health worker 8(4.6%), reference 6(3.6%) and religious leaders 3(1.8%).



TBA-Traditional Birth Attendants; CHW- Community Health Workers

Figure 4. 8: Source of information on use of herbal medicine

4.5.2 Patients' Attitudes towards Herbal Medicine

The respondents believed in the importance of herbal medicine for maintaining health. Some 25 (14.9%) of the respondents agreed that herbal medicine is well accepted by the community. While most 50 (30%) of the respondents believed that they yielded perceived relief to their respective diseases. Equally important, is the respondents belief that 10 (5.9%) they felt satisfied and that herbal medicine sometimes cure the ailment faster than the conventional medicine. Others 26 (15.7%) simply have faith in herbal medicine since they have been using it several times with positive results thus they have proof of the healing power of it. The study also revealed that 4 (2.4%) of the respondents appreciates the quality of service offered by the herbalist towards patients claiming that the medical practitioners have negative attitude (Figure 4.9).

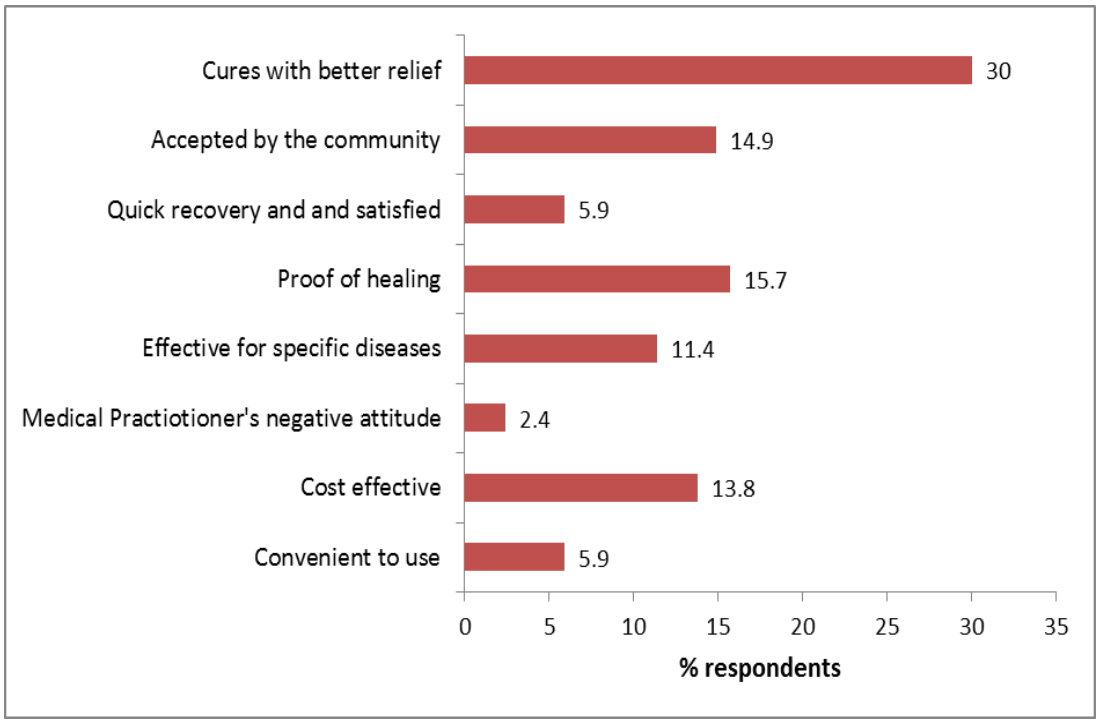


Figure 4. 9: Respondents attitudes towards herbal medicine in comparison to conventional drugs

4.6 In-depth Interviews with the herbalist

4.6.1 Social demographic characteristics of the herbalists

Twenty two herbalist interviewed, 18(81.8%) male with four 4(18.2%) female. Majority 8(36.4%) of the herbalist were in the category of 41– 50 years old. Most of the herbalist/healers were Christians 21(95.5%) and only 1(4.5%) Muslim participated in the study. With regard to the level of education, those who had no formal education were 3(13.6%) while 5(22.7%) had primary school education, majority, 14(63.6%) had attained secondary school education with none having university education as shown in Figure 4.10.

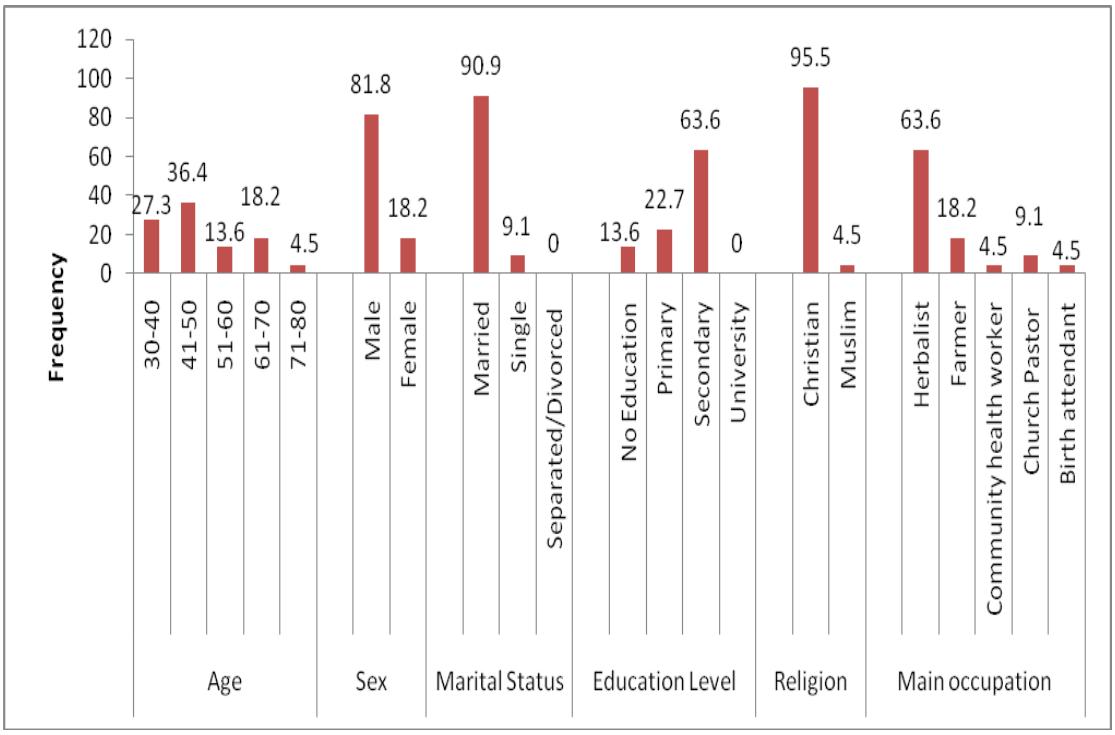


Figure 4. 10: Social demographic characteristics of the herbalists

4.6.2 Herbal Medicine Practice among the Herbalist

Figure 4.11 shows that most of the interviewees had over 11 years of practice with 18.2% male and 13.6 % female having practiced for less than 10 years, 27.3% male and 4.6% female for 11–20 years, 22.7% male for 21–30 years while 13.6% had over 31 years of practice.

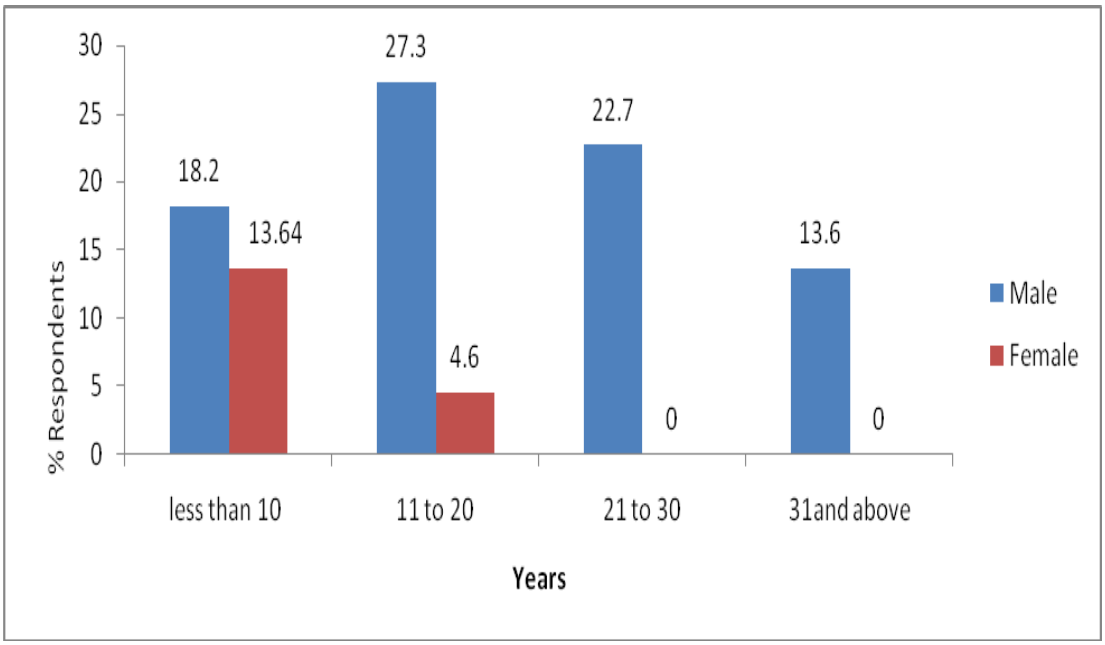


Figure 4. 11: Duration of practice among the herbalists

Majority17(77.3%) of those interviewed were practicing from their houses while 5(22.7%) had clinics, but they all occasionally visit the patients at homes and once in a while go to the market place. Only 6(27.3%) of the interviewees had their practice recognized by the Ministry of National Heritage and Culture and National Traditional Health Practitioners Association while 12(54.5%) were affiliated to Abagusii Herbalist Association, the remaining 4(18.2%) were not affiliated to any association.

4.6.3 Herbalists' awareness, attitude and practice on utilization of herbal medicine

Table 4.4 shows the herbalist response on the awareness, attitude and practice on utilization of herbal medicine in the study area.

Table 4. 4: Herbalist responses to questions on utilization of herbal medicine

Theme
Awareness about herbal medicine The healing skill is passed on from parents and grandparents through word of mouth; therefore no formal training is required to become a herbalist. *"I learnt herbal medicine from my grandfather; he would walk with me to the garden and forests. Therefore I learnt how to identify the medicinal plant, how to prepare the medication. More so I learnt to diagnose and treat diseases, with time I became as good as he was, and so...he passed the information to me"* (KII, Male, 51years).
Cultural beliefs about herbal medicine The desires to maintain traditional knowledge. The fact that herbal medicine has existed for many years, therefore proof of healing. *"Herbal medicine has been part of our culture. Our mothers and grandmothers did not take us to hospital they first gave us herbal medicine, we grew up knowing that these herbs are good source for treatment. Therefore is evident that herbal medicine heals since it has been used all the years." KII, Female, 37 years)*
Attitudes Personal experience and attitude towards herbal medicine. Herbal medicines are believed to have better efficacy than conventional medicine *"Herbal medicine works better than hospital drugs. Some of the patients go to hospital to be treated and they don't get healed, so they end up using herbal medicine to see if they can feel*

better and for sure they confess that are much better. It's more effective with preventive effects than hospital medicine……" (KI, Male, 44years).

Belief that herbal medicine has no side effects compared to conventional medicine.

"Herbal medicine has no chemical additives. They are fresh and direct from nature. Treats faster. Some children diseases like evil eyes (ebibiriri) are healed by herbal medicine not in hospital" (KI, Male, 58years).

Belief that herbal medicine is accepted by the community

"*Herbal medicines have been used from our fore fathers. We all grew up knowing that these herbs are used to treat different ailments and it's not something new to us as the Abagusii therefore it is well a accepted by everyone around here*" (KI, Male, 38years).

Herbal medicine is believed to be cheap and affordable to the community.

"The herbal medicines are cheap due to the fact that they can be collected in the environment or home cultivated. I do self-medication using herbal medicine therefore the cost is almost zero" (KI, Male, 35years).

Practices

The herbalists get their clients through referral from other clients and also through posters advertisement.

"When one patient heals spreads the news to others. Patients to patient transmission. Everybody in the community knows about me therefore they refer patients to me" (KI, Male, 64years).

The number of clients who visit the herbalist per day depends on the season.

"I get more than twenty patients per day depending with a season for example during heavy rains there are very many patients, but a low season I see close to ten patients a day" (KI, Male,38years).

Forests and domestic farms are the main source of medicinal plants

"Depends with the type of medicinal plant, some are domestic plants/ weeds which I get from the farm which they grow as weeds while some I get from the forest" (KI, Male,53years).

Disease diagnosis through experience of signs and symptoms, also send the clients to conventional hospital for diagnosis

"Normally I look at the patients then ask how they are feeling. Then I send the patient to the hospital for diagnosis then they come back to me for treatment. But some diseases I look for swellings in small children, if the body is yellowing for a disease like "(omonyamorero) translation: *red eyes"* (KI, Male, 58years).

There is no standardized way of preparation and administration of herbal medicine, varies with the medicinal plant and the disease

"…different medicines are prepared differently, some, you boil the roots in water for a few minutes then drink one cup three times a day depending with the disease severity" (KI, Male, 44years).

4.7 Key Informant interview with Ministry of Health Personnel

4.7.1 Ministry of Health Personnel responses to questions on attitudes, awareness and practices on herbal medicine

Awareness, practices and attitude towards herbal medicine were determined from health professionals. The following question and response were evident (Table 4.5).

Table 4. 5: Ministry of health personnel awareness and practices on herbal medicine use

Theme	
Awareness about herbal medicine use Ministry of health personnel are aware of herbal medicine use in the community.	
	...that is a common trend here people are using herbal medicine" (KI, Male, 29years).
Attitudes	
As much as the health personnel are aware of herbal medicine use, they believe that there is a high risk of side effects when using these herbal medicines, therefore not safe and no scientific evidence on safety and efficacy.	
	"Forefathers have been using this herbal medicine, but the problem is, some of the herbalist are fake therefore cannot be trusted, no scientific research has been done on this herbs that they are dispensing, they are not standardized, no correct dosage and methodology" (KI, male, 29years).
Practices	
The some of the patients visiting hospital do not disclose their use or previous use of herbal medicine.	
	"Some inform that they have taken herbal medicine, some after

interrogation one realizes that they had used herbal medicine, some vomit as a result of using herbal medicine while others are silent without mentioning" (KI, Male, 43years).

The most common diseases the patients present in the hospital include malaria, pneumonia, road accidents among others.

"Malaria, diarrhea, Upper respiratory conditions, HIV related conditions, Pneumonia are the common diseases presentation in this hospital" (KI, Male, 35years).

"Common malaria, Child diseases like Pneumonia, Gastroenteritis with dehydration. Road traffic accident, Few meningitis cases, Common poisoning triatrix at least one per day and HIV opportunistic infections some of the diseases we attend to…" (KI, Male, 29years).

The some of the common reasons why the patients use herbal medicine in the community are; Medical culture, maintain of traditional knowledge, long experience as proof of healing evidence

"There are several reasons why people seek herbal medicine among them is their culture. They cling to their culture saying that some diseases can only be treated at home with herbs and also their low literacy level could also contribute to the use of herbal medicine" (KI, Male, 32years).

"There are several reasons why people seek herbal medicine among them is their culture. They cling to their culture saying that some diseases can only be treated at home with herbs and also their low literacy level could also contribute to the use of herbal medicine" (KI, Male, 32years).

"There are several reasons why this community seek herbal medicine among them is their culture, Low literacy levels. The costs of treatment in public facilities have been subsidized

	greatly. Patients pay ksh.20 as 'card' fee, but still people go for herbal medicine. In this region people are so poor that they cannot afford to pay the 'card' fee, even the medication prescribed or hiring an ambulance is a nightmare for them" (KI, male, 29 years).

4.8 Types of Medicinal plants used to prepare herbal medicine

Among the herbalist interviewed, they were all familiar with medicinal plants and were asked to document at least ten medicinal plants with the exact local name, what diseases it is used to treat and mode of preparation. Appendix 5 shows the most frequently mentioned and used plant species, collection code number, families, the vernacular names and diseases being treated by the Abagusii community. A voucher specimen of each medicinal plants mentioned by the herbalist was collected for taxonomical identification by a botanist and deposited at East African Herbarium, National Museums of Kenya using the method described by (Odugbemi, 2006). Species nomenclature follows the Flora for Tropical East Africa and compared with other specimens deposited at the East African herbarium.

In this study, a total of 38 medicinal plant species distributed in 25 families used for treatment of human ailments collected (Appendix 5). This 38 species were cited three or more times during the field surveys. Some of the species mention frequently were mainly from the following families; Amaranthaceae, Apocynaceae, Asteraceae, Cactaceae, Caesalpiniaceae, Canellaceae, Commelinaceae, Compositae, Cucurbitaceae, Euphorbiaceae, Fabaceae, Labiatae, Lamiaceae, Lauraceae, Malvaceae, Mimosaceae, Moraceae, Myrsinaceae, Myrtaceae, Oxalidaceae, Papilionaceae, Rosaceae, Rutaceae, Solanacea, Urticaceae.

Most of the species were found to have more than a single therapeutic use as reported by the herbalist. No side effects were reported by respondents who had used or administered these herbal medicines.

4.9 Discussion

4.9.1 Social demographic characteristics

The decision to engage with a particular medical channel is influenced by a variety of socio-economic variables, sex, age, gender, religion, the type of illness, access to services and perceived quality of services (Tipping and Segall, 1995). This study did not find any demographic factor to be a significant predictor of herbal medicine usage. Respondents of all age groups under investigation visited herbal practitioners alike ($p>0.05$), a pattern that has also been reported in other studies (Singh *et al*., 2004; Amira and Okubadejo, 2007). However, other studies that examined similar demographics showed association between age, sex, marital status and occupation of respondents and the use of herbal medicine (Fakeye *et al*., 2009; Seedhom *et al*., 2011; Hughes *et al*., 2013) showing that the older generation tends to use herbal medicine as compared to the younger generation.

However, herbal medicine has been used for centuries and it is claimed to have gained acceptance because of its effectiveness. The study indicates that religion does not influence significantly the use of herbal medicine ($p>0.05$), despite 94.6% of the people being Christians, they still prefer using herbal medicine. Strong social cultural factors probably could have influenced the use of herbal medicine despite the religion (Kumar *et al*., 2006; Harun-Or-Rashid *et al*., 2011).

Similar to other studies on demographics of the herbalist, there were more (81.8%) male herbalists (Keter and Mutiso, 2012; Ragunathan *et al*., 2010; Akerele *et al*., 1993). The men are more knowledgeable about the uses of medicinal plants since parents prefer to pass on their knowledge to their sons rather than their daughters.

4.9.2 Preferred Source of Healthcare

The decision to engage with a particular medical channel is influenced by a variety of socio-economic variables, the type of illness, access to services and perceived quality of services (Tipping and Segall, 1995).This study found that 68.9% of the respondents preferred herbal medicine to meet their primary healthcare needs.

Kiringe, (2006) in a similar study reported that the Maasai of Southern Kajiado, Kenya preferred to use herbal medicine for treatment. Similarly, studies have indicated that herbal medicines are culturally preferred in a particular societies thus a motivating factor for its utilization (Oreagba, *et al.*, 2011; Bussmann, *et al.*, 2007; Sindiga, 1995; van Andel & Carvalheiro, 2013).

4.10 Factors associated with utilization of herbal medicine

The main reasons given for visiting herbalist rather than conventional hospital were numerous. This study identified a range of factors associated with the use of herbal medicine in Sameta and Ogembo in Gucha sub-county. Underlying attitudes for using herbal medicine were categorized in two main groups, cultural beliefs and personal experience coupled with defensive attitude towards conventional medicine (Table 4.3).

4.10.1 Belief about Herbal Medicine Efficacy

Most (83.8%) respondents in the present study believe herbal medicine had better efficacy than conventional medicines (Table 4.3). Basically, the respondents indicated that the use of herbal medicine was the desire for quick and additional relief. Inherently, belief about herbal medicine efficacy is that, certain disease conditions are traditionally cured by herbal medicine. This result is comparable to a studies done among pregnant women in the Nigeria (Fakeye, *et al.*, 2009) and also in Bukina Faso where respondents were of the opinion that herbal medicines could be effective (Pouliot, 2011). These data suggested that seeking herbal or conventional medicine appeared to depend on type of illness and severity of illness. Similarly, the perceived efficacy of herbal medicine for some specific illnesses is one of the main motivations for the use of herbal medicine (Cunningham, *et al.*, 2008).

4.10.2 Belief about Safety of Herbal Medicine

The study established belief about herbal medicine safety influenced significantly the respondents choice of healthcare ($\chi 2= 5.595$, $p=0.018$) (Table 4.3). The respondents used herbal medicines because they perceive them to be safe with very minimal side

effects on the human. Safety of herbal medicines were attributed to their natural origin therefore, have minimal or no side effects. Immediate associations with herbal medicine included such words as 'safe', 'natural', 'non-addictive' and 'pure'. It is clear that the phrase itself gives patients a sense of reassurance and safety (Adams and Cannell, 2001). Similarly, it a common belief on herbal medicines has no chemical additives and they are from natural origin, therefore safe to use (Jacobsson *et al*., 2009). Respondents also believed herbal medicines have been used for many years thus evidence of their safety. Studies done on the utilization of herbal medicine confirms the finding about patients believe in herbal medicines safety therefore an important motivating factor for its utilization (Galabuzi *et al*., 2010; Fakeye *et al*., 2009; Kumar *et al*., 2006; Vickers *et al*., 2006).

4.10.3 Cost of medication

Households remain the largest (35.9%) contributors of health funds in Kenya, treatment costs continue to limit access to care especially by the poor. It is estimated that 16% of the sick do not seek medical care due to financial barriers, while 38% must dispose their assets or borrow to pay for medical bills (Luoma *et al.*, 2010). Cost of medication is therefore an important factor to evaluate.

This study established that 15.6% of the respondents prefer using herbal medicine since it is cheaper than buying conventional drugs. Similar studies, found cost of medication influences respondents' choice of healthcare since it is affordable to the poor who cannot afford the cost of treatment to conventional medical care (Lambert *et al*., 2011; Chuma *et al*., 2010; Ragunathan *et al*., 2010; Hughes *et al*., 2013; Osamor and Owumi, 2010).

4.10.4 Accessibility to the conventional hospital

The choice of healthcare services is influenced by a number of factors such as distance from the health facility, availability of transportation and the conditions of the roads. This study observed that only 12.6% live more than 5km radius to the conventional health facility, yet 68.9%, prefer herbal medicine. This finding indicate that the Gucha residents have better accessibility to the health facilities as compared

to a study done by Kenya Service Provision Assessment in rural Kenya where it is estimated at 52% based on the 5km radius of a health facility (KSPAS- GOK, 2010).

However, this accessibility is limited due to inadequate infrastructure in the management of diseases in Kisii County where roads are impassable and lack of proper transportation system (Nyamongo, 2002). This is an indication that treatment accessibility is a major determinant in the treatment-seeking behavior of ill people in the study region. Other studies have indicated that the presence of dispensary in a village improves access to modern treatment (Müller *et al*., 2003) and thus decreases the reliance on herbal medicine.

4.10.5 Cultural believes practices

Culture is a complex term referring to values, practices, meanings and beliefs which are transmitted from one person to another. This study established that traditional and cultural belief towards herbal medicine, influenced choice of healthcare among the Gucha sub-county residents. A study done in Kisii County to determine socio-cultural factors that affect health seeking behavior on malaria, found that local people believed in the efficacy of indigenous herbs and used them (Nyamongo, 2002). Previous studies have established the influence of cultural beliefs and customs on health seeking behavior (Bussmann *et al*., 2007; van Andel & Carvalheiro, 2013). Therefore, culture is often considered a barrier to health services which can influence knowledge and beliefs of illness as well as the course of treatment for illness.

4.11 Awareness and source of information on Herbal Medicine

The study established that friends and family had a marked influence on creating awareness to clients using herbal medicine (Figure 4.8). In addition, family expectations of receiving treatment from herbalist are one of the reasons for continuous dependence on herbal medicine. The influence of relatives, friends and neighbors on healthcare seeking behavior for herbal medicines has also been reported globally (Bennett and Brown, 2000; Danesi & Adetunji, 1994; Oshikoya *et al*., 2008; Lanski *et al*., 2003).

Moreover, this study established advertisement and media plays important role in creating awareness regarding herbal medicine (Figure 4.8). Similar observations were made among patients in Central Texas City who gathered their information on herbal remedies from the popular media and based their use decisions primarily on the recommendations of friends and/or relatives (Bennett and Brown, 2000).

Herbal medicine practice and development has been through trial and error with a view to combat illnesses that were often specific to their localities (Kigen *et al.*, 2013). The study established that knowledge and practice about herbal medicine is passed on from one generation to another by word of mouth (Table 4.4). Therefore, this sector does not require formal training, herbal medicine knowledge and healing skills are normally passed through word of mouth (Sindiga, 1995; Enwere, 2009).

Studies have shown that education influences health based behaviours of most people where patients with higher degree of education are more likely to choose conventional health services (Addai, 2000) and are likely to avoid using herbal medicine (Benyoussef and Wessen, 1974).

However, this study established no behavioural differences between respondents with different education level, indicating that the user rate of herbal medicine was 68.9% and was not significantly associated with the educational level of the client (Table 4.2). The result of the current study concurs with a study done by Mehrotra *et al*., (2004) among diabetes patients.

4.12 Attitude towards using herbal medicine

Attitude toward using herbal medicines is predictor of the intention to use. This study established that the clients had positive attitude towards herbal medicine efficacy and safety (Table 4.9). Herbal medicine satisfied the respondents' expectations of healthcare because it has greater consistency with their own understanding about health, illness, and healthcare where they felt satisfied (Figure 4.9). As proposed by some studies, positive attitude might influence future use of these alternative medicines (Kashani *et al*., 2013; Rahman *et al*., 2009; Galabuzi *et al*., 2010). However, previous studies have associated severe acute renal failure (Abt *et al*.,

1995) and hepatic failure (Oshikoya *et al*., 2008) to the use of herbal medicines therefore caution should be taken.

This study also established respondents' choice of healthcare is influenced significantly by the quality of service offered ($\chi 2$=4.842; p =0.028). The clients appreciate good attentions from the herbalist claiming medical practitioners have negative attitude and they have no time and keen interest with them more so, the herbalist are readily available (Table 4.3). A similar study done in Germany observed that patients prefer herbal medicine for reasons that they feel that conventional doctors do not take them seriously (Joos *et al*., 2012)

4.13 Herbal Medicine Practices among the respondents

There is heavy dependence use of herbal medicine for general well-being and maintenance of health where 97.6% use herbal medicine as food supplement, prophylaxis and for treating different ailments. While 21% of the respondents indicated daily use of herbal medicine, 27.5% indicated monthly use (Figure 4.3). In a similar study among hypertensives living in South Africa established, frequency of use of herbal medicine is indicative of heavy dependence on herbal medicine for treatment, general well-being and maintenance of health (Hughes, *et al.,* 2013).

The study revealed that the clients use herbal medicine but they occasionally use conventional drugs for the same or different health conditions (Figure 4.3). This however poses a threat to the health of the participants as the possibility of herb-drug interaction for those who use dual therapy. Similar health seeking behavior was made among malaria patients in Kisii district (Nyamongo, 2002).

Malaria and gastro-intestinal problems were the common indication for herbal medicine use in this study. This observation is congruent with a study done in Iran among infertile patients and in Kisii County among malaria patients as they used herbal medicine mainly when treating gastrointestinal diseases (Kashani, *et al., 2013* and Nyamongo, 2002)

4.14 Types of medicinal plant species used

A lot of indigenous knowledge has been retained within Kenyan community on different plant resources that are of medicinal value (Sindiga, 1995; Kiringe, 2006). Similary, this study has documented a diverse of medicinal plant species and associated ethnomedicinal knowledge for a variety of health conditions such as malaria, respiratory tract infections, arthritis and rheumatism, gastro intestinal diseases, headache, skin diseases among others (Appendix 5). These are some of the leading causes of morbidity and mortality in Kenya (Heffer and Corlett, 2000).

Some of the plant families mentioned in this study are consistently documented in different ethnobotanical surveys and used in other parts of Kenya (Keter and Mutiso, 2012; Kiringe, 2006; Gisesa, 2004; Kipkore *et al*., 2014) and other countries (Ssegawa and Kasenene, 2007; Lulekal *et al*., 2008). Such widespread use of these plants by different groups of societies in different countries could to a certain extent be attributed to their efficacy.

Some of the medicinal plants used to treat or manage diarrhea, stomachache, typhoid among other diseases were *Oxalis corniculata L: Solanum aculeastrum, Ocimum lamiifolium, Plectranthus barbatus, Maesa lanxeolata Forssk, Solanecio mannii.* Different studies have shown these plant species as having potential efficacy against antimicrobial and antifungal activity (Wanyonyi *et al*., 2003; Koduru *et al.*, 2006; Raghavendra *et al*., 2006; Ahmad and Beg, 2001; *Rahman et al.*, 2010) with some exhibiting significant anti-inflammatory activities and anti-amoebic activity (Woldesellassie Mequanint *et al*., 2011).

In addition, this study documented *Achyranthes aspera* L treat syphilis, malaria, toothache and stomach problems. Several studies done have shown *Achyranthes aspera* L. to have anti-plasmodial activity (Inbaneson *et al*., 2012), anti-infalmatory effects (Khuda *et al.*, 2013) and anti-herpes virus (Mukherjee *et al*., 2013).

Other studies have also shown *Carissa edulis* (Forssk.) to have anti-plasmodial activity (Kebenei *et al*., 2012) and anti-viral activity (Tolo *et al*., 2008). Similarly, *Warbugia ugandensis is* also reported to have anti-plasmodial activities (Were *et al*.,

2010), antibacterial and antifungal activity (Olila *et al*., 2001). *Commelina benghalensis L.* and *Tephrosi nana* (Kotschy and Schweinf.) has been found to have good antibacterial activity (Dhankhar *et al*., 2014).

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Preferred choice of healthcare

Herbal medicine still continues to play a significant role in healthcare of many rural families in Gucha sub-county. The most (68.9%) preferred source of health care among the clients residing in Gucha sub-county is use herbal medicine (Figure 4.1). However, they occasionally visit conventional hospital for the same or different health conditions thus possible interaction between herbal medicine and conventional medicine (Figure 4.3).

5.2 Attitudes towards herbal medicine use among the residents of Gucha sub-county

This study reports adequate attitude about use, effectiveness, safety, availability and affordability of herbal medicine among clients visiting herbalist (Figure 4.9). The respondents were highly satisfied with herbal medicine and ready to recommend others.

From the study on attitudes towards utilization of herbal medicine, the clients believes in the importance of herbal medicine for maintaining health thus, positive attitude towards efficacy and safety of herbal medicine. Belief about herbal medicine safety influenced significantly the respondents choice of healthcare ($\chi 2= 5.595$, $p=0.018$) (Table 4.3).

Herbal medicine satisfied the respondents' expectations of healthcare because it has greater consistency with their own understanding about health, illness and healthcare, where they felt satisfied (Figure 4.9). The perceived efficacy of herbal medicine for some specific illnesses is one of the main motivations for the use of herbal medicine, therefore, positive attitude influence future use of these alternative medicines

Attitudes towards traditional and cultural believe practices influence choice of healthcare among the Gucha sub-county residents (Table 4.3). Cultural beliefs and customs can influence knowledge and beliefs of illness as well as the course of

treatment for illness thus on health seeking behavior for specific diseases.

Respondents' choice of healthcare is influence significantly by the attitude towards the quality of service offered ($\chi 2=4.842$; p =0.028) (Table 4.3). The clients appreciate availability of herbal products, the herbalists and they have confidence in the quality of services offered by the herbalists.

5.3 Awareness and Practices of the residents of Gucha sub-county on the utilization of herbal medicine

From the study on the awareness of herbal medicine use, friends and family had a marked influence on creating awareness to clients using herbal medicine (Figure 4.8).Therefore, family expectations of receiving treatment from herbalist is one of the reasons for continuous dependence on herbal medicine. It was also found that the clients gathered their information on herbal remedies from the popular media/advertisement and based their use decisions primarily on the recommendations of friends and/or relatives.

Frequency of use of herbal medicine is indicative of heavy dependence on herbal medicine for treatment, general well-being and maintenance of health. The clients occasionally use conventional medicine for the same or different health conditions (Figure 4.3). Therefore, poses a threat to the health of the participants as the possibility of herb- drug interaction for those who use dual therapy. Malaria, arthritis, measles and stomach disorders were problems were the common indication for herbal medicine use (Figure 4.2).

5.4 Documentation on the types of herbal medicine used to treat/manage human diseases in Gucha sub-county.

This study documented a diverse of medicinal plant species and associated ethnomedicinal knowledge for a variety of health conditions such as malaria, respiratory tract infections, arthritis and rheumatism, gastro intestinal diseases, headache, skin diseases among others (Appendix 5).

5.5 Recommendations

There is need to formulate policy and legal framework to govern the herbalist, herbal medicine practices paying specific attention to issues of efficacy, quality and mode of herbal preparation and herbal medicine products.

5.6 Limitations of the study

The study was not able to look at the effectiveness or safety of the medicinal plants that were mentioned.

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APPENDICES

Appendix 1: Consent form

Introduction

How are you? I am Joyce Ondicho, from Kenya Medical Research Institute / Jomo Kenyatta University of Agriculture and Technology. This information form seeks informed consent for your participation in a study that seeks to determine factors associated with the use of herbal medicine among the residents of Gucha sub-County. If there are any questions or clarifications regarding this study, please feel free to ask me prior to signing the consent form.

Title of the study:

Factors associated with use of herbal medicine among the residents of Gucha sub-county, Kenya.

PART A

Background

People are affected by series of diseases in developing countries including Kenya. Although modern medicine is well developed in most of the world, 80% of the population still relies on herbal medicines for their primary care. Studies have shown that this practice is performed for some reasons.

You are therefore invited to participate in this study whose main objective of is to determine factors associated with the use of herbal medicine among the residents of Gucha sub-County. We kindly request you to read this form and ask any questions you may have before agreeing to participate in the study.

Purpose of the study

The main objective of the study is to determine factors associated with the use of herbal medicine among the residents of Gucha sub-County. The information gathered from this study will be used to advise policy and to modify intervention programmes

which will go a long way in improving the medical status and the general quality of life of patients in this region and Kenya at large.

Study procedures

If you agree to take part in this study, you will be interviewed on various issues such as awereness, attitude and practice on the utilization of herbal medicine. You will also be asked about the factors associated with the utilization of the same. Finally, you will be required to mention some indigenous herbal medicine used to treat/manage human diseases amongst the Abagusii community.

Risks of study participation

There are no risks anticipated to cause pain or discomfort to you. The investigators will explain the procedures to you.

Research benefits

If you agree to participate, any patient who requires any medical attention, you will be advised accordingly. The information gathered from this study will be used to modify intervention programs which can improve the health of the community.

Study costs

If you accept to take part in this study, there will be no payment to you and for the study procedures.

Confidentiality

The information collected from you will be strictly private and confidential and will be kept under lock and key. Your names will not be used in any report of this study, or in any reports, publications or presentations. In case the officials from Institute of Tropical Medicine and Infectious Diseases (ITROMID, KEMRI), or Jomo Kenyatta University of Agriculture and Technology will review your records for the study, they will protect your privacy.

Participation information

Participation is voluntary and there are no risks at all. It is your decision to participate or not to participate in this study. If at any time you wish to withdraw from participating in the study, you can do so, and this will not affect any future participation or relations with anyone or any institution.

Contacts and questions

The researcher conducting this study is Joyce Ondicho. You may ask any questions you have now, or if you have any questions later, you are encouraged to contact her through mobile telephone number: 0720 266 862, or email jondicho@kemri.org

If you have any questions or concerns regarding the study and would like to talk to someone other than the researcher (s), you are encouraged to contact the following:

The Director,

Institute of Tropical Medicine and Infectious Diseases (ITROMID)

Jomo Kenyatta University of Agriculture and Technology (JKUAT)

P.O.Box 62000- 00200, Nairobi

Telephone No: 067- 52711

Email: itromid@nairobi.mimcom.net

OR

The Chairman

KEMRI National Ethical Review Committee,

S.L.P. 54840 00200, Nairobi

Telephone No: 2722541, 2713349, 0722 205901

Email: info@kemri.org

Part B: Participant consent form

Please read the information sheet (PART A) or have the information read to you carefully before completing and signing this consent form. If there are any questions you have which are not clear to you regarding this study, please feel free to ask the investigator prior to signing the consent form.

Participant Statement

I, (Dr, Mr, Mrs, Miss,) ……hereby give consent to Joyce Ondicho to include me in the proposed study entitled **"Factors associated with use of herbal medicine among the residents of Gucha sub-county, Kenya"**

I have read the information concerning this study, and I fully understand the aim of the study and what will be required of me if I accept to take part in the study. The risks and benefits have been explained to me. Any questions I have concerning the study have been adequately answered and I am satisfied. I understand that I can withdraw from this study anytime if I wish so without giving any reason and this will not affect my access to normal health care and management.

Name of Participant or respondent.....

Signature..... (Or) Thumb print

Date.....

Name of the person taking consent……

Signature …..... Date ……

Name of the investigator ……

Signature ….....Date ……...

Appendix 2: Questionnaire

Questionnaire for Patients on information concerning attitudes, practices and utilization of indigenous herbal medicine

Serial number: …….

Division……

Location ……..

Name of Interviewer……

Name of respondent (optional) ……..

Social Demographic Characteristics

1.	How old are you?	(1) 18-30	☐
		(2) 31-40	☐
		(3) 41-50	☐
		(4) 51-60	☐
		(5) >61	☐
2.	Gender	(1) Male	☐
		(2) Female	☐
3.	What is you marital status?	(1) Married	☐
		(2)Single	☐
		(3) Separated/Divorced	☐
4.	What level of education did you attain?	(1)No Education	☐
		(2) Primary	☐
		(3) Secondary	☐
		(4)Tertiary	☐
5.	What is your occupation?	(1)Farming	☐
		(2)Salaried	☐
		(3)Retail trader	☐
		(4)Others (specify)	……..
6.	What religion do you belong to?	(1)Roman Catholic	☐
		(2) Protestant	☐

(3) Muslim ☐

(4) Others (specify) ……

Knowledge on herbal medicine

7. What is your understanding about herbal medicine?

……

8. How did you know of herbal medicine?

(1) Posters ☐

(2) Relative ☐

(3) Advertisement- media ☐

(4) Reference ☐

(5) Neighbors ☐

(6) Religious leader ☐

(7) Chief/ Sub-chief ☐

(8) Traditional birth attendant ☐

(9)Community health worker ☐

(10) Others (specify) ……

Preference and utilization of herbal medicine

9. Is it your first time to visit a herbalist?

(1) Yes ☐ (2) No ☐

10. Have you used herbal medicine before as food supplement, prophylaxis, treatment purposes etc? (1)Yes ☐ (2)No ☐

11. What is your preferred source of healthcare?

(1) Herbal ☐

(2) Conventional ☐

12. How often do you use herbal medicine?

(1) Monthly ☐

(2) Daily ☐

(3) Weekly ☐

(4) When sick ☐

Factors influencing use of herbal medicine

13. Why do you prefer herbal medicine compared to conventional medicine?

(1)Minimal side effect Yes ☐ No ☐

(2) Good Taste Yes ☐ No ☐

(3)Cures faster/Better efficacy Yes ☐ No ☐

(4) Cheaper/ Cost effective Yes ☐ No ☐

(5) Cultural belief Yes ☐ No ☐

(6) Don't know Yes ☐ No ☐

14. If **No (**Q.11), state why you don't prefer herbal medicine.

……

15. What is the approximate distance to the conventional health facility?

(1) Less than one kilometer ☐

(2) 2-3 kilometers ☐

(3) 4-5 kilometers ☐

(4) More than 6 kilometers ☐

16. What is the main transport mode to the nearest hospital?

(1) Foot ☐

(2) Bicycle ☐

(3) Motorbike ☐

(4) Bus/ matatu ☐

(5) Other (specify)……

17. How much do you spend on treatment when you visit herbalist?

(1) Free services ☐

(2) Less than ksh100 ☐

(3)Between ksh100 and ksh500 ☐

(4) Above ksh500 ☐

(5) Give token ☐

(6) Others (specify) ……..……

Patients attitude towards herbal medicine

18. What quality of service do you get from herbal clinic compared to a convectional hospital?

(1) Spend less time ☐

(2) Attention ☐

(3) Herbalists are readily available. ☐

(4) No queue ☐

(5)Availability of medicine ☐

(6) Other (specify)……..

19. What is your attitude towards herbal medicine/? Agree (1) Disagree (2)

		Agree	Disagree
(1)	Convenient to use	(1) ☐	(2) ☐
(2)	Cost effective	(1) ☐	(2) ☐
(3)	Medical practitioners have negative attitude	(1) ☐	(2) ☐
(4)	Effective for specific diseases	(1) ☐	(2) ☐
(5)	Have proof that HM heals	(1) ☐	(2) ☐
(6)	Quick recovery and satisfied	(1) ☐	(2) ☐
(7)	Accepted by the community	(1) ☐	(2) ☐
(8)	Cures with better relief	(1) ☐	(2) ☐

Practices regarding herbal medicine

20. How are you feeling? (Disease or the condition)(optional)

……

21. Did you seek medical assistance for this condition from a conventional health system?

(1) Yes ☐

(2) No ☐

22. If **Yes** in (Q.21) which institution did you visit?

(1) Dispensary ☐

(2) District hospital ☐

(3)Other (specify)…….. ……

Thank you very much for your cooperation in answering to the questions above.

Appendix 3: Key informant guide for the herbalist

Introduction

How are you? I am Joyce Ondicho, from Kenya Medical Research Institute (KEMRI) / Jomo Kenyatta University of Agriculture and Technology (JKUAT). This study seeks to determine factors associated with the use of herbal medicine among the residents of Gucha sub-County. If there are any questions or clarifications regarding this study, please feel free to ask me.

A. General Information

Serial Number …….

Date of Interview……..

Village……...

Sub-location……..

Division……

B. Socio-Demographic Data

1. Gender of the respondent
2. What is your name (optional)
3. What is your age?
4. Are you married?
5. What is your main occupation?
6. What level of education did you attain?
7. What religion/denomination do you belong to?

C. The Herbalist Practice Details

8. How long have you been a Traditional Health Practitioner (THP)/ Herbalist?

   Probe: How you acquire the skills/ knowledge

   Your registration

   Your affiliation to any organization

9. Do you have a Clinic?

Probe: What do you treat?

How do you get your patients?

How many patients do you treat on daily basis (average)?

Do you keep record of your patients?

What does the record contain?

10. Do you sell medicinal herbs? Yes or No

Probe: Do you charge for your services?

How do you arrive at the charge?

What is the price range?

D. Medicinal plants and Diseases Treated

11. How many diseases do you have a definite cure for? Can you list them?

12. What medicinal plants are used to treat or manage human ailments and conditions

13. How do you obtain you plants?

E. Diagnosis and Treatment of Disease(s)

14. When a patient comes to you how do you determine what they are suffering from?

15. What symptoms and Signs do you look for?

F. Administration of herbal medicine

16. How do you administer your herbs?

17. Do you apply combination therapy of herbal medicine with conventional drugs/medicines?

18. What steps do you take if a patient does not respond to your medicines?

19. Do you refer your patients to a conventional doctor?

G. Factors associated with the use of herbal medicine

20. In your view explain why people seek herbal medicine?

Thank you very much for your cooperation in answering to the questions above.

Appendix 4: Key informant interview guide for the health facility personnel

Introduction

How are you? I am Joyce Ondicho, from Kenya Medical Research Institute (KEMRI) / Jomo Kenyatta University of Agriculture and Technology (JKUAT). This study seeks to determine factors associated with the use of herbal medicine among the residents of Gucha sub-County. If there are any questions or clarifications regarding this study, please feel free to ask me.

1. What is your name? (optional)
2. What is your age?
3. Gender
4. What is your qualification?
5. What is your position in this district hospital?
6. How long have you been in this position?
7. How many patients visit this health facility per day?
8. Are you aware of herbal medicine use among the residents in this area?
9. Which are the common diseases patients seek hospital care for in this facility?
10. Do patients admit or inform the doctor if they had sort treatment elsewhere other than a hospital?
11. Are there side effects presented in this hospital which may be related to utilization of herbal medicine?
12. Are there late presentations of certain conditions from patients because they had initially visited herbalist?
13. In your view, explain, why do you think some patients seek herbal medicine?
14. Would you refer any patient to herbalist?
15. What are your attitudes towards herbal medicine?

Thank you very much for your cooperation in answering to the questions above.

Appendix 5: Types of herbal medicine used

Most frequently mentioned and used medicinal plant species by the study group

Scientific name/Code number/Family	Gusii name	Mode of preparation	Disease treated
Senna didymobotrya (Cassia didymobotrya) (Fresen.) / JM001/ Caesalpiniaceae	Omobeno	A mixture of stem and leaves are boiled in water for one hour then drunk Roots are boiled then added in water bath and some drunk	Fever relieve, emetic against malaria, ring worms, gonorrhea, appetizer for children, measles, stomach problem, backache
Solanum aculeastrum (JM002) / Solanacea	Omotobo	Roots are boiled in water than drunk three times daily	Diarrhea, Gonorrhea, Vomiting, Toothache, Syphilis, Abdominal pains
Solanum incanum L/ (JM003) / Solanacea	Omoratora	Roots decoction or infused then drunk three times daily	Tonsillitis, muscular cramps , Diarrhea, gonorrhea, Vomiting, Toothache, Syphilis, Abdominal pains, Snake bite
Urtica massaica/ (JM004)/ Urticaceae	Rise	Fresh whole plant is macerated in water then strained and drunk twice daily	Purgative for children, labour pains, rheumatism, Gonorrhea, intestinal parasites, Stomachache, diarrhea, Gastroenteritis and Promote conception
Oxalis corniculata L. (JM005) / Oxalidaceae	Enyonyo enene	Leaves are infused in water then drunk, eye drop, topical application	Stomach ache, Painful periods, Diarrhea, ringworms
Galinsoga parviflora Cav/ (JM006). Asteraceae	Omenta	Leaves are macerated in water	Cold, Sores, Hypertension, Eye problems, Wounds helps coagulate fresh blood
Bidens pilosa (JM007) Asteraceae	Ekemogamogia	Flowers macerated, mixed with salt and applied to wound. Stop blood flowing and hasten healing	Wounds-stop bleeding and hasten healing, Earache, Stomachache, Remove intestinal worms, Constipated children, Pain reliever, Stop diarrhea, Relieve colic
Eucalyptus calophylla (JM008)/ Myrtaceae	Omoringamu	Macerate the leaves, mix with boiling water and honey	Asthma, Cold, Flu, Chest problems

Appendix 5 continued: Types of Herbal Medicine used

Scientific name/Code number/Family	Gusii name	Mode of preparation	Uses (Disease treated)
Amaranthus spp./ (JM009) /Amaranthaceae	Emboga	Boil and drink the soup. Press the juice and apply to the boil	Immune booster, boils
Triumfetta rhomboidea. Jacq (JM011)/ Malvaceae	Omomiso	Leaves macerated and pasted on the wound	Wounds
Tithonia divesifolia (Henms) (JM012)/ Asteraceae	Riuga rironro	Boiled leaves for stomach ache. Leaves warmed on fire for massage	Stomach pains, dislocated joints
Solanum nigrum L. (JM013)/Solanaceae	Rinagu	Macerate the leaves mix with lotion apply on the affected area	Scabies, ringworms
Ricinus communis L.(exotic) (JM014)/ Euphorbiaceae	Omobono	Oil extracted from the seeds is drunk as a laxative or purgative	Constipation
Croton macrostachysus Del. (JM015/ Euphorbiaceae	Omosocho	Grind dried leaves, mix with hot water then drunk	Diarrhea , dysentery
Ocimum lamiifolium (JM016)/ *Lamiaceae*	Esuracha	Boil and drink decoction. Also press the sap and apply on the wound	Ulcers, Wound, Abdominal and stomachache
Pachycereus pecten-aborigimum L. /(JM020)/ Cactaceae	Omobimbera ngumbu	Macerated leaves used to clean wounds	Wound healing
Toddalia asiatica /(JM019)/ Rutaceae	Ekenagwa ekagarori	Leaves are boiled before drinking	Congested chest, Cold, Coughs, stomachache
Plectranthus barbatus(JM017)/ Lamiaceae	Omoroka	Make leave infusion for drinking for stomachache. Wrapped on the swollen part	Stomachache, Measles, Swollen legs
Persea gratissima/(JM018)/ Lauraceae	Avocado	The seed is mashed and applied to the tooth. Mashed seeds are boiled and drunk. Leaves are boiled and drunk.	Relieves headache, toothache, Rheumatism, Diarrhea, Removes cholesterol in the body, Lowers high blood pressure

Appendix 5 continued: Types of Herbal Medicine used

Scientific name/Code number/Family	Gusii name	Mode of preparation	Uses (Disease treated)
Spilanthes mauritiana (A. Rich) /(JM021)/ Asteraceae	Kenyunyuta monu	Infused leaves are drunk.	Diarrhoea, excess menstrual bleeding, oral thrush
Achyranthes aspera L. /(JM022)/ Amaranthaceae	Esarara	Stem shoots and twigs are chews together with salt as toothbrush Whole plant is dried and burnt into ash mixed with water and drunk for stomach problems	Syphilis an emesis anti-malaria, toothache and stomach problems
Soluanum mauritianum Scop. /(JM023)/ Solanaceae	Omonsarigo	Macerated leaves mixed with lotion and applied in the affected parts	Itching in the virginal or anus, ringworms
Acacia Seyal var. *fistula/* (JM024)/ Mimosaceae	Omonyenya	Gum mixed with honey, stirred and drunk	Sore throat , digestion problems
Carissa edulis (Forssk.) Vahl. /(JM025)/ Apocynaceae	Omonyangateti	Roots boiled in water mixed with honey then drunk daily	Gonorrhoea, pelvic pain, backache indigestion, lower abdominal pains, malaria chest pains
Warbugia ugandensis/ (JM026)/ Canellaceae	Esoko	Both root and stem bark are boiled and drunk	Malaria, pneumonia
Commelina bengalensis L. / (JM027)/ Commelinaceae	Rikongiro	Boiled leaves for bathing	Fever
Oxalis Latifolia (kunth)./ (JM028)/ Oxalidaceae	Enyonyo enene	Macerate the leaves the infused then drunk for stomach ache. Macerated leaves are applied directly on the ringworms	Stomach ache, diarrhea ringworms, coughs

Appendix 5 continued: Types of Herbal Medicine used

Scientific name/Code number/Family	Gusii name	Mode of preparation	Uses (Disease treated)
Ficus sur Forssk/ (JM029)/ Moraceae	Omoraa	Ash from burnt leaves mixed with water then drunk	Stomach problems
Maesa lanxeolata Forssk /JM030)/ Myrsinaceae	Omoteretere	Leaves decoction in water is drunk until the diarrhea or dysentery stops	Diarrhea and dysentery
Indigofera arrecta A. Rich./(JM031) Papilionaceae	Omocheo	Roots infused in water then drunk	Stomach problems
Tephrosi nana Kotschy and Schweinf.(JM032)/ Papilionaceae	Omochengechenge	Decoction of roots and pepper are drunk	Rheumatic fever, malaria fever and excessive thirst
Ajuga remota Benth.(JM033)/ Labiatae	Omosinyonta	The leaves and the stem are boiled together for constipation among small children	Constipation
Erythrina abyssinica DC. (JM034)/ Fabaceae	Omotembe	Boiled grounded bark mixed with roots is drunk	Antihelmintic, gonorrhea, syphilis and snake bite
Solanecio mannii (Hookf.)(JM035)/ Compositae	Omotagara	Infused macerated leaves is drunk	Stomach ache
Prunus africana(JM036)/ Rosaceae	Ekeburabura	Dried and grounded bark is infused in water then drunk	Purgative and prostate gland problems
Mimosa pudica (L.) Del. (JM037)/ Fabaceae	Ekiebundi	The whole plant is boiled in water and drunk for several days	Sexually transmitted diseases
Albizia gumífera (JF Gmel.)(JM038)/ Mimosaceae	Omogonchoro	The gum mixed with honey then drunk during bedtime	Digestive problems and sore throat

Appendix 6: KEMRI Scientific Steering Committee Approval Letter

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

ESACIPAC/SSC/6938 7th October, 2010

Joyce Ondicho

Thro'
Director, CTMDR
NAIROBI

Forwarded GMR. 14-10-10

REF: SSC No. 1900 (Revised) – Knowledge attitude, practices and utilization of indigenous medicinal plants among the Abagusii residing in Gucha District, Kenya

I am pleased to inform you that the above-mentioned proposal, in which you are the PI, was discussed by the KEMRI Scientific Steering Committee (SSC), during its **172nd meeting** held on **5th October, 2010** and has since been approved for implementation by the SSC.

The SSC however, advises that work on this project can only start when ERC approval is received.

Sammy Njenga, PhD
SECRETARY, SSC

13/10/10

Appendix 7: KEMRI Ethical Review Committee Approval Letter

KENYA MEDICAL RESEARCH INSTITUTE

P.O. Box 54840 - 00200 NAIROBI, Kenya
Tel: (254) (020) 2722541, 2713349, 0722-205901, 0733-400003; Fax: (254) (020) 2720030
E-mail: director@kemri.org info@kemri.org Website:www.kemri.org

KEMRI/RES/7/3/1 January 31, 2011,

TO: JOYCE ONDICHO (PRINCIPAL INVESTIGATOR)
TM306-0603/2009
ITROMID STUDENT

THRO': DR. GEOFFREY RUKUNGA,
THE DIRECTOR, CTMDR,
NAIROBI

Forwarded
31/1/2011

RE: SSC PROTOCOL NO. 1900 (*INITIAL SUBMISSION*): KNOWLEDGE, ATTITUDES, PRACTICES AND UTILIZATION OF INDIGENOUS MEDICINAL PLANTS AMONG THE ABAGUSII RESIDING IN GUCHA DISTRICT, KENYA

Thank you for your response to the issues raised by the Committee. This is to inform you that the issues raised during the 184th meeting of the KEMRI/ERC meeting held on 9th November 2010, have been adequately addressed.

Due consideration has been given to ethical issues and the study is hereby granted approval for implementation effective this **31st day of January 2011,** for a period of twelve (12) months.

Please note that authorization to conduct this study will automatically expire on **30th January 2012.** If you plan to continue with data collection or analysis beyond this date, please submit an application for continuing approval to the ERC Secretariat by **30th September 2011.**

You are required to submit any amendments to this protocol and other information pertinent to human participation in this study to the ERC prior to initiation. You may embark on the study.

Yours sincerely,

RCKithinji

Caroline Kithinji,
FOR: SECRETARY,
KEMRI/NATIONAL ETHICS REVIEW COMMITTEE

Date 31/1/2011

In Search of Better Health

Appendix 8: Medial Officer of Health, Gucha District Approval

INSTITUTE OF TROPICAL MEDICINE AND INFECTIOUS DISEASES (ITROMID)

JKUAT OFFICE - P.O. BOX 62000 - 00200 NAIROBI, KENYA, TEL: 254-067-52711/52181-4; FAX: 254-067-52030; E-MAIL: itromid@jkuat.ac.ke
KEMRI OFFICE - P.O. BOX 54840 - 00200, NAIROBI, KENYA, TEL: 254-020-2722541, FAX:254-020-2720030, E-MAIL: itromid@nairobi.mimcom.net

March 3, 2011

Approved

MEDICAL OFFICER OF HEALTH
GUCHA DISTRICT.

KEMRI/ITROMID/TM306-0603/2009

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: JOYCE ONDICHO REG NO. TM306-0603/2009

This is to confirm that the above named is a bonafide registered student of Institute of Tropical Medicine and infectious diseases (ITROMID), a collaboration between Kenya Medical Research Institute (KEMRI) and Jomo Kenyatta University of Agriculture and Technology (JKUAT).

The student submitted her research proposal Entitled "The Attitude, practices and utilization of indigenous medicines plants among the Abagusii residing in Gucha District, Kenya.

This proposal has received approvals by the KEMRI Scientific Steering Committee (SSC) and National Ethical Review Committee (ERC).

The purpose of this letter is to kindly request for your permission to enable her introduce the research topic and collect data in Gucha District, Kenya.

Thank you for your continuous support.

Yours faithfully,

OFFICE OF THE GRADUATE PROGRAMME COORDINATOR ITROMID

Charles Mutai, PhD.
AG. GRADUATE PROGRAMME COORDINATOR, ITROMID.

Appendix 9: District Officer, Ogembo Division Approval Letter

OFFICE OF THE PRESIDENT
Provincial Administration & internal Security

Telegrams "DC'S OFFICE"; GUCHA
Telephone (058) 4131024/4131028
When replying please quote

The District commissioners office
Gucha District
P.O.BOX 2
OGEMBO

Ref: GCA/ED/12/7/TY/5

31ST MARCH 2011

THE DISTRICT OFFICER
OGEMBO DIVISION

ATT: MR LANGAT

RE: RESEARCH AUTHORIZATION

JOYCE ONDICHO REG. NO.TM 306-0603/2009

The above named is a student of the Institute of Tropical Medicine and Infectious diseases (ITROMID), a collaboration between Kenya Medical Research Institute (KEMRI) and Jomo Kenyatta University of Agriculture and Technology (JKUAT).

Ms Ondicho intends to carry out a research on indigenous medicine plants among the Abagusii residing in your Division.

Kindly accord her the necessary support to enable her collect data.

E. A. ATEMI
FOR: DISTRICT COMMISSIONER
GUCHA DISTRICT

cc. Joyce Ondicho