EFFECTIVENESS OF COMMUNITY BASED HEALTH EDUCATION INTERVENTION ON PROSTATE CANCER KNOWLEDGE, SELF-VULNERABILITY, FATALISM AND SCREENING IN KIAMBU COUNTY, KENYA

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Effectiveness of Community Based Health Education Intervention on Prostate Cancer Knowledge, Self-Vulnerability, Fatalism and Screening in Kiambu County, Kenya

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DECLARATION

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

Signature…… Date……

Ruth Gathoni Mbugua

This thesis has been submitted for examination with our approval as the university supervisors.

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DEDICATION

I wish to dedicate this work to my late father who fought the fight but lost his life following a diagnosis of advanced prostate cancer and to all men and families affected by prostate cancer.

ACKNOWLEDGEMENT

I would take this opportunity to thank the almighty God for his guidance and protection during this entire journey of my doctoral studies. Special thanks to my dear husband and daughter for always believing in me and encouraging me throughout the process. I would like to extend my utmost appreciation to my supervisors, Prof. Simon Karanja and Prof. Sherry Oluchina for their tireless effort, technical support, and mentorship during the entire process. Your great support and dedication to ensure that this thesis is completed were tremendous, may almighty God bless you abundantly.

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ABBREVIATIONS/ ACRONYMS

ACS	American Cancer Society
ASR	Age specific rate
BUN	Blood urea nitrogen
CHA	Community Health Assistant
CBHE	Community Based Health Education
CBHW	Community Based Health Workers
CHW	Community Health Worker
CHV	Community Health Volunteer
CORP	Community Owned Resource Person
CU	Community unit
DRE	Digital Rectal Examination
HCW	Health Care Worker
KDHS	Kenya Demographic Health Survey
KEMRI	Kenya Medical Research Institute
MMS	Ministry of Medical Services

MOH	Ministry of Health
MOPH&S	Ministry of Public Health and Sanitation
PAPM	Precaution Adoption Process Model
PC	Prostate cancer
PSA	Prostate Specific Antigen
RCT	Randomized control trial
UHC	Universal Health Coverage
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Awareness The state of being cognizant of prostate cancer

Community Based Health Education Health education on prostate cancer delivered by Community Health Volunteers through a face-to-face visit in the households.

Effectiveness The capability of the intervention to enhance the uptake of prostate cancer screening.

Fatalism The belief that the occurrence of cancer events is pre-destined and death is inevitable.

Knowledge Deep understanding of prostate cancer acquired through experience or health education.

Perceived self-vulnerability The belief an individual has regarding the likelihood of developing prostate cancer.

Prostate cancer An adenocarcinoma that affects the prostate gland in the male reproductive system.

Prostate Specific Antigen An important prostate cancer marker produced by the cells lining the prostate gland.

Proximity of cancer The experience of the devastating impact of cancer among family members and friends.

Tumor staging The classification of tumours in relation to their spread to assess how far they are beyond the prostate gland.

ABSTRACT

Globally, prostate cancer is the second most frequently diagnosed cancer and fifth leading cause of death among men. Disparities exist regarding the mortality rates of prostate cancer with majority occurring among African men and the highest mortality rates occuring in Asia and African continents, which is attributed to high case fatality rates. The main aim of the study was to assess the effectiveness of Community Based Health Education on prostate cancer knowledge and awareness, self-vulnerability, fatalism and screening among men aged 40-69 years in Kiambu County. This quasi-experimental study adopted an explanatory sequential mixed-method approach. The intervention site was Gatundu North sub-county while the control was the Kiambu sub-county. Participants in the intervention arm received health education delivered by a Community Health Volunteer in their households. Baseline and post-intervention (after six months) assessments were carried out among 288 men aged 40-69 years in each arm. Stratified random sampling was applied. Quantitative data were collected using an interviewer-administered structured questionnaire. Qualitative data was collected using Focus Group Discussion and Key Informant Interview guides. Quantitative data were analyzed using SPSS version 22. Chi-square, Fisher's exact, and multivariate logistics regression were used to assess for the association between variables. Inductive content analysis was applied for the qualitative data. The proportion of respondents screened for prostate cancer increased significantly from 4.5% to 20.4% (X^2=32.809, df=1 P=<0.05) in the intervention arm while in the control arm there was no significant change (X^2=0.133, df=1 P=0.716). Socio-demographic factors (age, marital status and religion) were not significantly associated with screening (P>0.05). Socio-economic factors (land acreage) were associated with screening. Participants owning 1-3 acres of land were 16 times more likely to take up screening (OR=15.672 CI (1.256- 195.478) P= 0.033). The facilitators to screening included the experience of symptoms, the proximity of cancer, accessibility of services and advocacy. Barriers to screening included lack of knowledge, fatalistic beliefs, low perception of self-vulnerability, stigma and male dominance. Awareness of prostate cancer significantly increased from 83.3% to 99.3% (X^2=36.607, df=1 P<0.001) in the intervention arm while in the control arm where there was no significant change. Knowledge significantly increased in the intervention arm post-intervention while there was no significant difference in the control arm. Perception of self-vulnerability significantly increased in the intervention arm while in the control arm there was no significant change. Fatalism significantly decreased in the intervention arm while there was no decrease in the control arm. In conclusion, Community Based Health Education was effective in increasing knowledge and awareness, perception of self-vulnerability and screening and decreasing fatalism. Community Based Health Education is an effective strategy for the enhancement of uptake of prostate cancer screening. There is a need to consider the utilization of Community Based Health Education delivered by Community Health Volunteers to enhance uptake of prostate cancer screening.

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Globally the burden of cancer is increasing rapidly, especially in developing countries, and has been cited as the most vital barrier to increasing the life expectancy across all countries (WHO, 2018a). According to the (GLOBOCAN) 2020 cancer estimates, worldwide, cancer is a leading cause of mortality and is estimated to have contributed to 10 million deaths and caused 19.3 million new cases in 2020. It is estimated that one in five men will develop cancer in their lifetime. Prostate cancer is estimated to account for 1.4 million cases of the cancers diagnosed in men in 2020 and 375,000 deaths in men and hence is the second most frequently diagnosed cancer and the fifth leading cause of death from cancer among men (Sung et al., 2021). Disparities exist regarding the mortality rates of prostate cancer with a slight preponderance among men of African descent (Adeloye, et al. 2016; White et al., 2011; Altekruse et al., 2010). This has been attributed to late diagnosis and an increased likelihood of metastatic disease among African men in comparison to other men (Mahal et al., 2017). The highest mortality rates from prostate cancer are reported in Asia and African continents which is attributed to high case fatality rates (Sung et al., 2021; WHO, 2018b; Bray et al., 2018).

Prostate cancer is a major public health problem in Sub-Saharan Africa and remains underestimated due to lack of screening and is anticipated to continue rising as a result of urbanization and growth in the population (Cassell et al., 2019; Adeloye et al., 2016). The major challenge with prostate cancer in developing countries is the late presentation of patients when the disease has undergone metastasis (Salako et al., 2009; Adeloye et al., 2016). A majority of men in Kenya continue to present for treatment in advanced stages of the disease and more aggressive tumours (MOH, 2018; Wasike & Magoha, 2007). This could be attributed to a lack of knowledge and the existence of barriers to seeking early diagnosis and treatment. Globally, the screening rates are higher in

developed countries with rates of up to over half of the male population in the USA being reported (Drazer et al., 2015). Generally, the underserved populations that include men of African descent have reported lower screening rates (Kudadjie-Gyamfi et al., 2006; Odedina et al., 2009; Patel et al., 2013). Studies conducted in Africa have reported low levels of knowledge on prostate cancer and low screening rates (Yeboah-Asiamah et al., 2017; Wachira et al., 2018; Bugoye et al., 2019). In Kenya, the rate of screening is low, as only 3% of men have undergone prostate cancer screening (KDHS, 2014). This is despite over 80% of the patients in Kenya seeking treatment in advanced stages of prostate cancer (MOH, 2018).

Several barriers to the uptake of screening have been reported which include low perceptions on self- vulnerability to prostate cancer and fatalistic beliefs held mainly by men of African descent (Shavers et al., 2009). Perception of self-vulnerability influences uptake of screening as men who perceive themselves at risk of developing prostate cancer are more likely to take up screening (Ogunsanya, 2017; Yeboah-Asiamah et al, 2017; Ajape et al., 2010). Fatalistic beliefs have been associated with the under-utilization of prostate cancer screening (Powe et al., 2009; Cobran et al., 2013; Mutua et al., 2017). Fatalistic beliefs are more prevalent among African men in comparison with Caucasian men (Odedina et al., 2009; Cobran et al., 2013). In Kenya, a significant proportion of men have been reported to hold fatalistic beliefs and this has been associated with the intention to take up prostate cancer screening (Mutua et al., 2017).

The reduction in ethnic disparity in mortality and morbidity for prostate cancer is highly dependent on early detection of the disease through screening. Prostate-Specific Antigen (PSA) testing has contributed significantly to the survival of men diagnosed with prostate cancer across many countries (Allemani, et al., 2015; Carlsson et al., 2015; Lundgren et al., 2018; Hugosson et al., 2019). Internationally, prostate cancer screening remains a controversial issue with discrepancies in the screening guidelines across countries. Nonetheless, men of African descent who are are at higher risk would benefit from prostate cancer screening (American Cancer Society, 2018). Several agencies have made different recommendations regarding prostate cancer screening with a

predominant agreement on the need to adopt informed shared decision-making. The current guidelines in Kenya have recommended shared decision-making during screening among men aged 40-69 years at frequencies guided by the PSA levels and family history. The clinicians are required to share information with the men about prostate cancer before screening and involve the men in the decision-making process (MOH, 2018). It is therefore critical to educate men on prostate cancer as participation in such complex decision-making warrants the men to be knowledgeable.

The mortality rate of cancers can be tremendously decreased through the implementation of adequate prevention and control strategies as more than 30% of cancer deaths are preventable (WHO, 2015). A well-organized community mobilization plan is vital for an increase in awareness (MOH, 2017). The Alma Ata declaration of 1978 identified Community Health Workers (CHWs) as the cornerstone of Primary Health Care. CHWs were identified as community resource persons with the ability to improve access to health care among poor and underserved communities (WHO, 2007). The second National Health Sector Strategic Plan; introduced the Kenya Essential Package of Health (KEPH). The main idea behind KEPH was the delivery of services at the community level and empowering the communities to take charge of their health (MOH, 2006, MOH, 2005). Additionally, Kenya is a signatory to the Astana Declaration (2018) that highlights the relevance of community health services in the achievement of UHC. Kenya has adopted primary health care as the approach to deliver UHC. The first level of service delivery in the health system in Kenya is the Community Health service. Community health is implemented through a Community Health Unit (CHU) that serves a defined geographical area of approximately 5,000 people. It's constituted of 1 Community Health Assistant and 10 Community Health Volunteers (CHVs). The CHVs provide preventive, curative, promotive, and rehabilitation services in the community (MOH, 2020). CHVs can be utilized to increase awareness of prostate cancer to circumvent the already existing shortage of health care workers (WHO, 2018a).

Globally, men tend to have poor health outcomes; higher mortality and morbidity rates across most diseases than women (Baker et al, 2014; Roth et al, 2018; Jamison et al.,

2013). Male dominance has been postulated as a barrier to the engagement of men in health promotion activities (Marmot et al., 2012). Globally cancer affects more men than women and men of African origin continue to suffer disproportionately from prostate cancer in comparison to men of other races (Sung et al., 2021). Despite the disparities in the mortality from prostate cancer, the level of prostate cancer screening among men of African descent remains low. Given the increased presentation of prostate cancer patients in advanced stage in Kenya and the paucity of interventions to address this problem, this study aimed to examine the effectiveness of a Community based health education intervention delivered face to face by CHVs on enhancing uptake of prostate cancer screening.

1.2 Statement of the problem

Globally, prostate cancer is the second most frequent cancer among men and is estimated to account for 1.3 million cases of the cancers diagnosed and 359,000 deaths in men in 2018. Globally the incidence rate for all cancers combined was about 20% higher in men in comparison to women. African men suffer disproportionately from prostate cancer compared to other men in the world and the mortality is higher among men in Sub-Saharan Africa (Sung et al., 2021; WHO, 2018b; Bray et al., 2018). The Global Burden of Disease study 2017, estimated that disability-adjusted life years from prostate cancer increased by 127.2% from 1990 to 2017 in Sub-saharan Africa (Roth et al., 2018). Prostate cancer is ranked as the most common cancer in males in 2020 in Kenya at 21.9% (Sung et al., 2021). A review of cancer registry records in Kenya found that prostate cancer was the most common cancer among males with an Age Standardized Incidence Rate (ASR) of 40.6 per 100,000 (Korir et al., 2015). A review of the trends of cancers diagnosed in Kiambu County from 2013-2017 reported prostate cancer as the 3rd leading cancer affecting men (Warui et al., 2021).

Prostate cancer is mostly asymptomatic, and is diagnosed in the majority of the cases after its progress to an advanced stage whereby the prognosis is poor hence the mortality rate increases (American Cancer Society, 2018). In Kenya majority of patients present

with advanced prostate cancer due to the lack of knowledge on the disease and the low uptake of screening (MOH, 2017; MPH&S/MMS, 2012). The majority (80%) of prostate cancer patients are diagnosed in stage III and IV, when very little can be done to enhance the survival of the patient (Wasike & Magoha, 2007; MOH, 2018). In Kenya, men present with advanced and more aggressive tumors in comparison with men from other countries. The late presentation is mainly attributed to inadequate knowledge and low uptake of screening (MOH, 2018).

The uptake of prostate cancer screening is generally low among men of African descent (Patel et al., 2013, Drazer et al., 2015). The low uptake of screening among African men has been attributed to low knowledge levels on prostate cancer (Adeloye et al., 2016, Bray et al., 2018). The proportion of men who are reported to have undergone prostate cancer screening in Kenya is low at 3% (KDHS, 2014). Unfortunately, the number of men presenting with advanced aggressive PC is on the rise with an alarming increase in mortality attributed to low uptake of screening (MOH, 2018). Despite the recommendation of shared decision-making in the current screening guidelines, which is only feasible when men are well informed about prostate cancer, studies conducted among Kenyan men have reported low levels of knowledge (Wanyaga, 2014; Wachira, 2018; Mutua et al., 2017). According to KDHS 2014, Kiambu County is within the Central region of Kenya where prostate cancer screening is low at 3.4%. Despite many studies conducted on Community Health Volunteers, there are no existing studies done in Kenya to assess the effectiveness of education delivered by Community Health Volunteers on uptake of prostate cancer screening.

1.3 Justification

The study is relevant as it addresses Goal number 3 of the Sustainable Development Goals, which is to ensure healthy lives for all at all ages. This goal also highlights the reduction of one-third of unnecessary deaths from non-infectious diseases through prevention and treatment, and promotion of mental health and wellbeing by 2030. The number of patients presenting with advanced prostate cancer continues to increase thus,

there is an urgent need to assess the effectiveness of Community Health Workers with the aim of reduction of the economic cost of cancer which is estimated to be approximately US$ 1.16 trillion (WHO, 2018a). When prostate cancer is diagnosed early before metastasis, the 5-year survival rate increases to almost 100% (American Cancer Society, 2018).

The study supports the Non-Communicable Diseases 2013-2020 global action plan. It also builds on the government's commitment to enhancing early detection of cancer in line with the Kenya National Cancer Control Strategy 2017-2022, Kenya Health Policy 2014-2030 and Kenya Cancer Policy 2019-2030. Prevention and early diagnosis of prostate cancer is a critical factor in decreasing the disease burden and increasing the survival rate of patients as 30-50% of cancers are preventable through prevention strategies (WHO, 2018). Early diagnosis of cancer is associated with better prognosis and clinical outcomes. Low uptake of prostate cancer screening, which has been attributed to low levels of knowledge, myths and misconceptions and negative beliefs justifies a community-based health education intervention delivered by CHVs.

The findings will be used to make relevant recommendations to the Ministry of Health and the county government, regarding the implementation of strategies that can be used in the prevention and control of prostate cancer with the main aim of reducing the disease burden in the community and country level. The findings will also guide the MOH and county governments in planning for strategies that can be used to leverage on the already existing structures of the community strategy to decrease the barriers to seeking health care early through enhancing the level of knowledge on prostate cancer that will result in the decrease of negative beliefs. This is envisioned to reduce the presentation of patients in an advanced stage of the disease and enhance the survival of the patients. The findings will also be used in guiding of decision-making regarding collaborative services that should be incorporated in prostate cancer prevention in the community.

Globally it's estimated that there will be a shortage of up to 18 million health workers to enable the achievement of UHC by 2030 and to address this shortage there is a renewed interest in CHWs to strengthen the health care system (WHO, 2018a). The effectiveness of Community Based Health Workers in improving disparities of cancer outcomes has been documented amongst the medically underserved populations (Roland et al., 2017). Engaging CHVs is an evidence-based practice in Public Health supported by the 2011 National Prevention Strategy and Centre for Disease Control (CDC). There is a need to investigate the effectiveness of CHV delivered education on uptake of prostate cancer screening in the community.

1.4 Research Questions

1 What proportion of men aged 40-69 years in the intervention and control arms have taken up prostate cancer screening in Kiambu County?
2 What socio-demographic and socio-economic factors influence the uptake of prostate cancer screening in Kiambu County?
3 What are the barriers and facilitators to the uptake of prostate cancer screening among men aged 40-69 years in Kiambu County?
4 What proportion of men aged 40-69 in the intervention and control arms have knowledge and awareness on prostate cancer in Kiambu County?
5 What proportion of men aged 40-69 years in the intervention and control arms have the perception of self-vulnerability towards prostate cancer among in Kiambu County?
6 What proportion of men aged 40-69 years in the intervention and control arms have prostate cancer fatalism in Kiambu County?

1.5 Objectives

1.5.1 Broad Objective

To assess the effectiveness of Community Based Health Education (CBHE) on prostate cancer knowledge and awareness, self-vulnerability, fatalism and screening among men aged 40-69 years in Kiambu County.

1.5.2 Specific Objectives

1. To determine the proportion of men aged 40-69 years screened for prostate cancer in the intervention and control arms in Kiambu County.
2. To determine socio-demographic and socio-economic factors influencing uptake of prostate cancer screening among men aged 40-69 years in Kiambu County.
3. To explore the barriers and facilitators to the uptake of prostate cancer screening among men aged 40-69 years in Kiambu County.
4. To determine the proportion of men aged 40-69 years with knowledge and awareness on prostate cancer in the intervention and control arms in Kiambu County.
5. To determine the proportion of men aged 40-69 years with the perception of self-vulnerability towards prostate cancer in the intervention and control arms in Kiambu County.
6. To determine the proportion of men aged 40-69 years with prostate cancer fatalism in the intervention and control arms in Kiambu County.

1.6 Hypothesis

$H_0$1: Community Based Health Education is not effective in enhancing uptake of prostate cancer screening.

$H_0$2: Community Based Health Education is not effective in increasing knowledge on prostate cancer in Kiambu County.

$H_0$3: Community Based Health Education is not effective in increasing perception of self-vulnerability towards prostate cancer in Kiambu County.

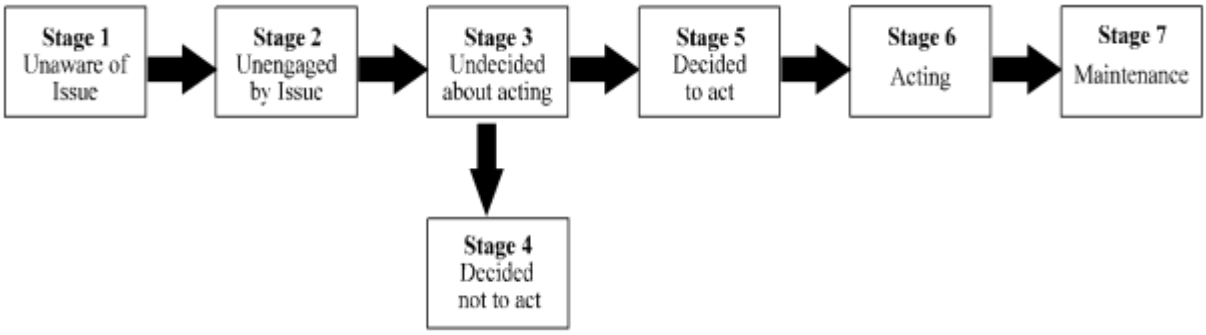
$H_0$4: Community Based Health Education is not effective in decreasing prostate cancer fatalism in Kiambu County.

1.7 Theoretical and conceptual framework relating to the study

1.7.1 Theoretical Framework

The Precaution Adoption Process Model (PAPM), a theory that explains the process of adoption of new healthy behaviors guided the study. This model explains that a person requires to transition through various stages that occur within one's conscious awareness. It explains how an individual decides to take up a healthy behavior and how they put it into action following a decision-making process and in the future maintain that practice.

The PAPM outlines seven stages that an individual moves through, from the stage of lack of awareness of an issue to the level where they take action. In stage one; the person is unaware of a particular health-related issue. Then they progress to stage two when they are aware of the issue but not engaged with the issue. For the person to get to decision-making, they are engaged with the issue and start considering adoption of the healthy behavior which represents stage three. At this point, an individual may not progress and remain in that stage of indecisiveness or they may decide not to adopt the behavior, which is the fourth stage, or they may progress to stage five where they decide to adopt the behavior. A person who decides to take up the healthy behavior puts their decision into action, which represents stage six. The seventh stage involves the maintenance of the adopted behavior, which may include regular screening for prostate cancer as per the recommendations. This stage may not be relevant in some cases whereby correction of behavior is not continuous.



Source: (Weinstein, Sandman, & Blalock, 2008)

Figure 1.1: Precaution Adoption Process Model

The PAPM is a suitable model for this intervention community-based study as it includes some particular stages for "unaware" and “actively deciding" persons. "Awareness" and prior prostate cancer knowledge on screening might be a requirement to behavioral interventions with the aim of enhancing screening and its adherence in the future. The PAPM is quite relevant as it asserts that a man must have heard of prostate cancer for them to be able to form an opinion about it and decide whether to take up the test or not. This theory unlike other behavioral theories also brings out the fact that men faced with the difficulty of making up their minds might go back to the second stage where they are unengaged with the taking up of screening. This brings out the relevance of carefully assessing the barriers and facilitators to screening with a particular population

1.7.2 Conceptual Framework

Screening is very vital in the prevention of prostate cancer as early diagnosis of prostate cancer enhances treatment before metastasis of the disease. Several factors play a vital role in the facilitation of screening which includes the socio-demographic and socio-economic factors. These factors may influence the knowledge and perceptions towards prostate cancer, which deter the uptake of screening services. Knowledge of prostate

cancer can increase risk perception, which is likely to contribute positively to the transition of the men from having the intention to take up screening to eventually deciding to take up screening.

Certain barriers may prevent men from taking up prostate cancer screening despite them being aware of the disease. These barriers may include; lack of adequate knowledge, low perception of self- vulnerability, fatalism and cultural beliefs. A major barrier to uptake of prostate cancer screening that has been posited is fatalism. Cancer fatalism is an individual's belief that they have no control over preventing themselves from cancer and after a cancer diagnosis death is inevitable regardless of interventions utilized (Cobran, 2013; Powe, 2006). The existence of fatalistic beliefs among Kenyan men has been identified as a barrier towards prostate cancer screening (Mutua et al., 2017; Wachira et al., 2018). The level of knowledge on prostate cancer has been associated with prostate cancer fatalism (Powe et al., 2009). An education intervention delivered to men who are at risk of developing prostate cancer is anticipated to increase the level of knowledge on prostate cancer, which may overcome negative beliefs. This may result in enhancing the transition of men to a stage where they have the intention to take up screening and eventually take up screening.

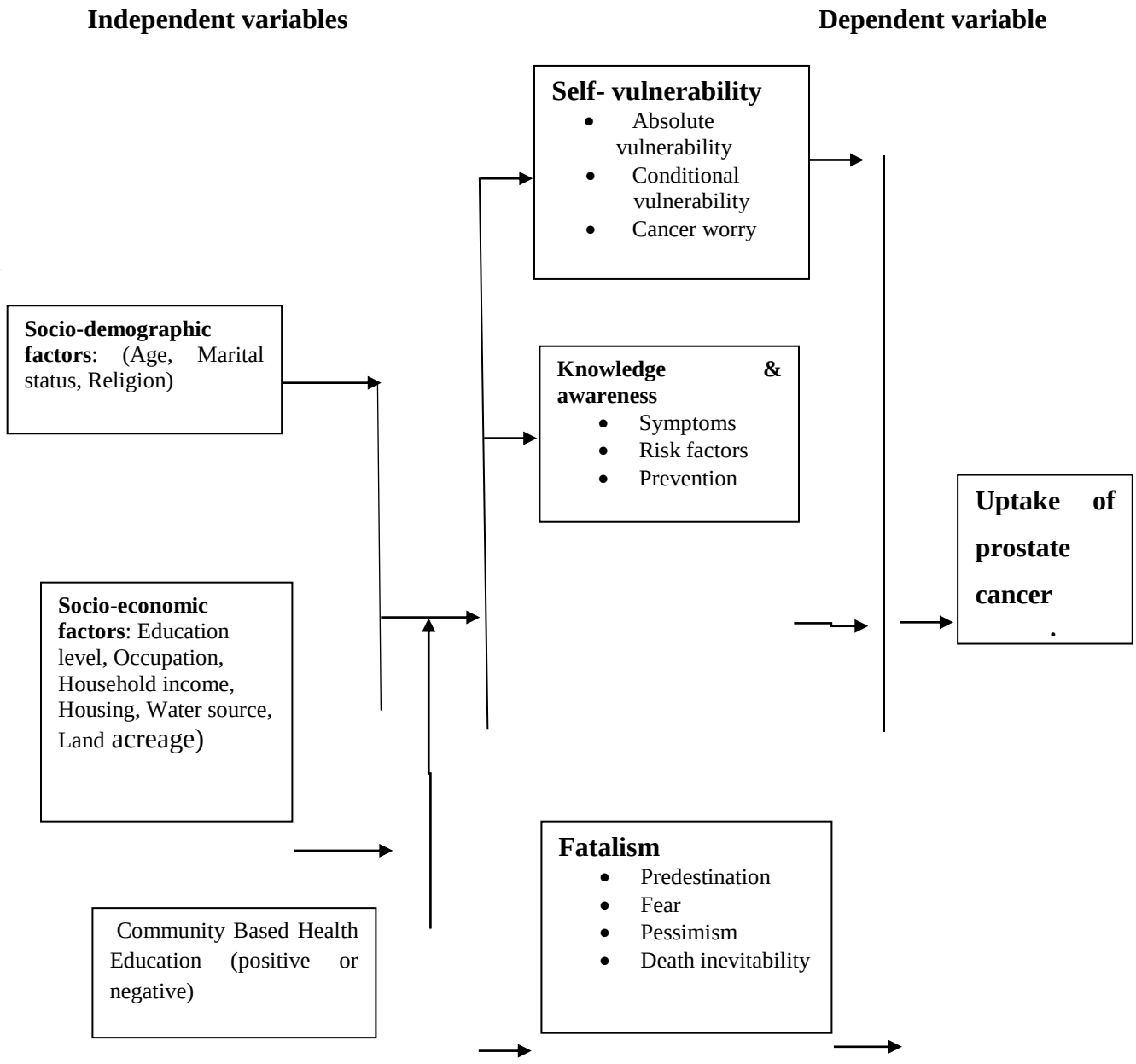


Figure 1.2: Conceptual Framework (source: author)

The independent variables in the study included: Socio-demographic factors (Age, marital status, religion) and socio-economic factors (Education level, total household

income, type of housing, land acreage and source of water). These factors may influence knowledge on prostate cancer including; awareness of the existence of prostate cancer, the signs and symptoms and prevention and perceptions towards prostate cancer which include the perception of self-vulnerability (absolute vulnerability, conditional vulnerability and cancer worry) and prostate cancer fatalism (predestination, pessimism, fear, death inevitability). The dependent variable in the study was the uptake of prostate cancer screening.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Prostate cancer is an adenocarcinoma that affects the prostate gland that lies anatomically below the bladder and lies in front of the rectum in the male reproductive system. Prostate cancer is mainly a slow growing tumour, which evolves aggressively and with time undergoes metastasis mostly in the lymph nodes and bones of the affected man. Seventy- five percent of all prostate cancer grow slowly and are relatively non-harmful. Prostate cancer mainly starts as asymptomatic in the early stages and mainly becomes symptomatic in the later stages. Symptoms experienced include frequent and difficulty in urination, incomplete voiding of the bladder, pain in the back and hip region, erectile dysfunction and the presence of blood in urine and semen (American Cancer Society, 2018).

Prostate cancer is ranked fifth among the cancers that affect men and the second most frequently diagnosed cancer among men. There are discrepancies across countries with the majority of the registered cases occurring in developed countries. This is mostly attributed to the widespread routine Prostate Specific Antigen (PSA) testing done in the regions. This has contributed to an over 25 –fold world-wide variance in the incidences of prostate cancer. The highest incidence rates are in Australia, America and Europe. High incidence rates of prostate cancer are also reported in some developing regions including the Caribbean and Sub-Saharan Africa (WHO, 2018b; Bray et al, 2018). A Prostate Cancer diagnosis is mainly through screening which accounts for approximately 90% of the cases (Adeloye et al., 2016; Hoffman, 2011). The uptake of screening for prostate cancer in developing countries has been low contributing to an increase in mortality especially in Sub-Saharan Africa (WHO, 2018). The low uptake of prostate cancer screening in developing countries has been attributed to several barriers which include lack of knowledge, the existence of myths and misconceptions, the

embarrassment of taking the test, low perceived risk and fatalistic beliefs related to a cancer diagnosis (Yeboah-Asiamah et al., 2017; Bugoye et al., 2019; Zare et al., 2016; Mutua et al., 2017).

2.2 Prostate cancer risk factors

The risk factors correlated with prostate cancer include age, family history, race, environment, hormonal imbalances, nutritional habits and lifestyle. However, the strongest risk factors for prostate cancer include a family history of the disease, older age and black race (American Cancer Society, 2018; Hoffman, 2011; Wilson, et al., 2012). The strongest factor suggested among the others is age although other factors play a significant role (Burford et al., 2010). Prostate cancer majorly affects older men as it is rarely diagnosed in men before they are 40 years old whereas death related to prostate cancer rarely occurs before the age of 50 years. The median age for diagnosis and mortality for prostate cancer is 67 years and 81 years respectively (Altekruse et al., 2010; Hoffman, 2011).

Family history of prostate cancer is greatly associated with a diagnosis of prostate cancer. Men from families where their father was diagnosed with prostate cancer have twice the risk in comparison with other men with no paternal history. The risk increases to three fold if the man has a brother diagnosed with prostate cancer and ninefold if both a brother and father are diagnosed. The risk for developing prostate cancer increases three times in men who have an affected brother and nine times if both a brother and a father are affected by prostate cancer. Studies done among twins show that prostate cancer incidence is highly influenced by genetic factors as the diagnosis of a man within the family indicates an increased risk of developing prostate cancer or dying from it. Prostate cancer has been classified among the most heritable cancers with over 40% of prostate cancer variability being linked to genetic factors (Wilson et al., 2012; American Cancer Society, 2018).

The incidence and mortality rates of prostate cancer vary across different races which explains the disparities across regions. African- Americans are the most affected as they have the highest incidences and mortality in the United States. The chances of an African-American man dying from prostate cancer are 2.4 times higher than a caucasian man (Wilson et al., 2012). Generally, black men irrespective of their origin are at a higher risk of developing prostate cancer and present in the advanced stage in comparison with Caucasian men (Altekruse et al., 2010; Hoffman, 2011).

The food consumed has been associated with prostate cancer. Certain foods have been associated with prostate cancer but most of the findings have differed across various studies. Several studies investigating the association of red meat and prostate cancer have found no association. However, Giovannucci et al. (2010) concluded that there was a strong association between animal fat and red meat with prostate cancer. Similar results were also reported in a study carried out in East Algeria. The study postulated that the chances of developing prostate cancer are increased as the number of times red meat is consumed in a week increases. Lassed, et al. (2016) reported that the more an individual consumes red meat, the more the animal fat consumed is positively associated with the risk of developing prostate cancer.

2.3 Prostate cancer screening

The reduction in the disparities existing in mortality due to prostate cancer is dependent on screening (Adeloye et al., 2016). The rationale for screening for prostate cancer is early detection of prostate cancer since it is mainly asymptomatic in the earlier stages. It’s important to note that an effective screening of the disease requires a reliable, accurate and simple test that will diagnose the disease before the advancement to late stages and hence increase the likelihood of a better treatment outcome. The main screening tests for prostate cancer include the Prostate Specific Antigen (PSA) test and the Digital Rectal Examination (DRE) (American Cancer Society, 2018).

2.3.1 Prostate Specific Antigen (PSA)

A Prostate-Specific Antigen (PSA) test is a diagnostic test that is used to measures the level of the PSA in blood. PSA is a glycoprotein that is produced by the epithelial cells that line the acini and ducts of the prostate gland. Disruption of the normal anatomy of the prostate gland as a result of prostate cancer, trauma, infection, inflammation of the prostate or Benign Prostatic Hyperplasia (BPH) results in the elevation of PSA levels in the blood. The increment of PSA levels in serum is very vital in the diagnosis of prostate gland diseases including prostate cancer, prostatitis and BPH (Carroll et al., 2013; Greene et al., 2013).

The discovery of PSA screening has enhanced the early diagnosis of prostate cancer in asymptomatic patients especially in developed countries. In the USA, the use of the PSA test has made a tremendous contribution with over 90% of the cases being discovered in early curable stages (Adeloye et al., 2016). Though internationally the screening using PSA test for early stages of prostate cancer has been faced with many controversies, PSA screening and DRE remains the only means for early diagnosis of men at risk of prostate cancer. The American Cancer Society recommends the screening of men in high-risk groups within the age of 40-69 years based on race and family history (American Cancer Society, 2018). The U.S. Preventive Services Task Force recommended that screening for prostate cancer should be individual based and the men should be informed on the benefits and risks of screening (USPTF, 2018).

The prostate cancer screening guidelines in Kenya recommend shared decision-making among well-informed men aged ≥40 years of African descent, 55-69 years for men of Caucasian or Asian origin and 40-55 years for men with a family history of prostate cancer. The frequency of screening stipulated is dependent on age and PSA levels. Asymptomatic & 55-69-year-old men with a PSA < 1 ng/ml should be screened every two (2) years while men aged ≥ 40 years with a PSA level of 1- 4ng/ml should be screened annually. However, men aged >60 years with PSA levels of 2ng/ml should be screened after every two years. Further, a PSA level of >10ng/mL should trigger a

biopsy with values PSA 4-10 ng/mL should be investigated further with adjunctive investigations. Clinicians should recommend screening in a well-informed patient and any PSA values above 4 ng/ml should be referred to a urologist for further management (MOH, 2018).

2.3.2 Digital Rectal Examination (DRE)

The Digital Rectal Examination (DRE) is an important screening test for men experiencing urinary tract problems like urgency, painful micturition and presence of blood in the urine that could be indicative of prostate cancer. DRE involves the insertion of a finger in a man's rectum lower part by a health care provider. This allows for the assessment of nodules which can be felt by palpation. The presence of a hard prostate gland that sometimes has nodules that can be palpated is suggestive of prostate cancer. However, normal findings during the examination should not be indicative of the absence of prostate cancer. The early stages of prostate cancer are not likely to produce changes and therefore it cannot be detected through a DRE (Burford et al., 2010). The DRE was initially utilized as the main test for prostate cancer diagnosis over many years but this has changed over the years due to aspects like inter-examiner variability and the recognition of the tumour at a late stage (Hoffman, 2011).

2.4 Uptake of prostate cancer screening

Globally developed countries have reported high rates of prostate cancer screening amongst men while developing countries have reported low rates of screening (WHO, 2018b, Bray et al., 2018). This has contributed greatly to the diagnosis of prostate cancer in late stages when very little can be done in terms of the treatment and eventually causing a rise in mortality especially in African countries (Adeloye et al., 2016). A study conducted among men of African origin aged 45 years and above found that 49.6% had undergone prostate cancer screening (Roberts et al., 2018). Similar results were reported among African Americans living in rural South Alabama where 60% reported undergoing prostate cancer screening (Oliver, 2008). A study conducted in Canada

found that 47.5% of the men had received prostate cancer screening during their lifetime (Beaulac et al., 2006). Morlando et al. (2017) in their study in Italy found that 29.6% of men had undergone screening. However, a population-based survey conducted in China found a low screening rate for prostate at 10% among the participants (So et al., 2014). A similar study conducted among South Asian ethnic minorities in Hong Kong found a lower screening rate of 4.9% (So et al., 2020). A study carried out in Iran amongst retired men found that the rate for prostate cancer screening was at low at a rate of 7.5% (Zare et al., 2016).

Several studies conducted across African countries have reported low uptake of prostate cancer screening and low levels of knowledge among men. A study conducted in Nigeria found that 4.5% of the men had taken up prostate cancer screening (Oladimeji et al., 2010). A population-based study in Nigeria reported a screening rate of 10.2% among men (Ojewola et al., 2017). In Namibia, 16% of the men reported having ever undergone prostate cancer screening (Kangmennaang et al., 2016). Bugoye et al. (2019) in their study among men in Tanzania found that only 7.7% of the men had ever undergone prostate cancer screening. Similar findings were reported in a study in Kenya in Nairobi County, which found that only 4.1 % of the respondents reported having ever undergone prostate cancer screening (Wanyaga, 2014). Similarly, a study conducted in a level three health facility located in a slum in Kenya found that only 1% of the men had undergone prostate cancer screening (Wachira et al., 2018). Kinyao et al. (2018) in their study among men from a rural community in Kenya, found that only 2.4 % of the participants had been screened for prostate cancer. The findings of these studies corroborate the Kenya Demographic Health Survey, 2014 which reports the level of screening for prostate cancer as 3% (KDHS, 2014). These findings are an indication that the uptake of prostate cancer screening is abysmally low among men considered at risk in Kenya.

2.5 Socio-demographic and socio-economic characteristics influencing uptake of prostate cancer screening

Socio-demographic and economic characteristics have been associated with uptake of prostate cancer screening in various studies. A study conducted among Caribbean black males in the USA found age and education level to be significantly associated with screening for prostate cancer within the last year (Cobran et al., 2013). Another study comparing blacks and whites of low socio-economic status in the USA found that marital status, high education level and income increased the likelihood of uptake of prostate cancer screening in both groups (Moses et al., 2017). In a study conducted in Canada, older age and higher income increased the likelihood of prostate cancer screening among the participants (Richardson et al., 2007). A study conducted in Iran among men reported an association between the age of participants, their occupation, level of education and marital status (Jeihooni et al., 2015). The marital status, age and type of housing and education level were associated with the uptake of prostate cancer screening among Brazilian men aged above 60 years (Lima et al., 2018). In their population-based study in Nigeria, Ojewola et al. (2017) found that the only characteristic that influenced prostate cancer screening was the education level of the participants. A hospital-based study conducted in Kenya found that age, occupation and level of education were associated with screening (Makori, 2014). In their study, Mirzaei-Alavijeh et al. (2018) found that the predictors of early detection behavior included the level of education and age above 60 years of the participants.

However, on the contrary, several studies conducted across countries have reported no association between socio-demographic characteristics and prostate cancer screening. A study conducted in Ghana found no association between prostate cancer screening and socio-demographic characteristics (Yeboah-Asiamah et al., 2017). Similarly, a study conducted in Nairobi County, Kenya found no association between screening and socio-demographic characteristics. (Wanyaga, 2014). Similarly, Mutua et al. (2017) found that age, marital status and education level did not significantly contribute to intention to screen among men from a rural community in Kenya.

2.6 Barriers and facilitators to the uptake of prostate cancer screening

2.6.1 Facilitators to the uptake of prostate cancer screening

The knowledge and awareness on prostate cancer have been documented as a facilitator to screening among men. Effective dissemination of information on prostate cancer has been postulated as a facilitator to prostate cancer screening among men (Ferrante et al., 2011). Sanchez et al. (2007) found that a major factor influencing the uptake of screening among African American men was knowledge and awareness on prostate cancer and the clinical screening services. A study conducted among Filipino men reported the education of men by health care providers and the increase of awareness through mass media as facilitators to the uptake of screening (Conde et al., 2011). Similarly, Enaworu et al. (2016) reported knowledge and awareness on prostate cancer as a facilitator to screening among Nigerian men. Similar findings were reported among men in Tanzania (Bugoye et al., 2019).

The experience of signs and symptoms and a health care worker's recommendation have been reported in several studies as major facilitators to the uptake of prostate cancer screening (James et al., 2017, Rai et al., 2007). So et al. (2014) in their study found that a major facilitator to screening among Chinese men was the experience of signs and symptoms and the recommendation by a health care worker. Similar findings were reported among African American men where men reported relying on the health care workers recommendation to screening (Owens et al., 2015). Conde et al. (2017) in their study found that the major facilitators to uptake of prostate cancer screening reported among Filipino men were the presentation of urinary symptoms and recommendation by a health care worker. A study conducted among men in Ugandan reported that the presentation of symptoms would be a major facilitator to uptake of screening (Nakandi et al., 2013). Studies conducted among Nigerian men have similarly found that the major facilitator to screening includes the presentation of symptoms and recommendation by a health care worker (Enaworu et al., 2016; Ojewola et al., 2017).

The experience of the negative outcomes of prostate cancer among family members or friends has also been reported as a major facilitator to prostate cancer screening. Men who had witnessed the distressing outcomes of cancer among their family or friends were prompted to undergo screening (Ocho et al., 2013; McFall et al., 2006). This is could be attributed to more awareness of the disease and increased perception of risk. Similarly, the support and encouragement from family members or friends has also been reported as a facilitator to the uptake of prostate cancer screening (James et al., 2017). The support of a spouse or partner has been reported as a facilitator to screening among African American men (Blocker,2006). Bancroft et al. (2015) found that the constant reminder of spouses to men facilitated the decision-making process about prostate cancer screening. The support of spouses /partners during the screening process has also been cited as a facilitator to the uptake of screening (Jones et al., 2010). A study in Nigeria found that the experience of having a person in the family affected by prostate cancer was a drive for men to take up screening (Ugochukwu et al., 2019). Familial influence in decision-making was reported as a facilitator to screening among Kenyan men (Mutua et al., 2017).

2.6.2 Barriers to the uptake of prostate cancer screening

Prostate cancer screening enhances early detection, which is an important intervention in enhancing the survival of men and reducing morbidity and mortality from prostate cancer. Several studies have concluded that Caucasian men are more likely to undergo prostate cancer screening in comparison to African American men (Kudadjie-Gyamfi et al., 2006; Odedina et al., 2009; Patel et al., 2012). This is attributed to several barriers, which vary across populations and different ethnicities. Pedersen et al. (2011) found that African and Caribbean black males perceived prostate cancer as a taboo topic and the tradition of African-American communities did not include regular medical checkups or other preventive care. Similarly, it was found that the failure to undergo routine medical check-up in the absence of symptoms was a barrier to the uptake of prostate cancer screening among Filipino men (Conde, et al., 2011).

The uptake of prostate cancer screening is highly dependent on the awareness and knowledge of prostate cancer. The lack of knowledge on prostate cancer was reported as a barrier to screening among Filipino men (Conde et al., 2011). A study conducted in Iran found that lack of knowledge was a barrier to the uptake of screening among men (Akbarizadeh et al., 2016). Lack of knowledge has been reported as a barrier to the uptake of prostate cancer screening among men from the sub-Saharan region (Baratedi et al., 2019). A study conducted in Burkina Faso found poor knowledge on prostate cancer as a barrier to screening (Kabore et al., 2013) Similar findings were reported in a study conducted among men in Tanzania (Bugoye et al., 2019). A population-based study in Nigeria reported a low level of knowledge among men aged above 40 years as a barrier to prostate cancer screening. Mutua et al. (2017) in their study in a rural community in Kenya reported similar findings among Kenyan men. Misinformation regarding prostate cancer, which associates prostate cancer with sexual practices, which is mainly attributed to lack of knowledge has also been documented as a barrier to screening (Ojewola et al., 2017; Yeboah Asiamah et al., 2017; Nakandi et al., 2013; Conde et al., 2011).

The lack of accessibility to health care services and insurance medical cover, have been reported as barriers to prostate cancer screening (Reynolds, 2008). Talcott et al. (2007) found the inaccessibility to health care and lack of good medical cover as barriers to uptake of prostate cancer among African American men. These results are also reflected in a study by Cobran et al. (2017) which found the major barriers towards the uptake of prostate cancer screening among Caribbean black men and African-American men as the inability to afford health care and lack of a medical insurance cover. Similarly, Patel et al. (2010) found that not having health insurance and failure to afford screening were obstacles to prostate cancer screening among low-income African American men. Lack of health insurance and inaccessibility to screening services among Namibian men were reported as barriers to the uptake of screening for prostate cancer (Kangmennaang et al., 2016). Similarly, a major barrier to screening reported among Nigerian men was

financial constraints with the participants recommending the provision of free screening services (Ugochukwu et al., 2019).

The low perception of risk among men has been reported in several studies as a barrier to uptake of screening. Ogunsanya et al. (2017) found that there was a low perception of risk towards prostate cancer among black men. Muliira et al. (2017) in their study reported low perception of risk as a barrier to intention to screen among men in Oman. Similarly, Yeboah-Asiamah et al. (2017) in their study in Ghana found that low perception of risk was a barrier to uptake of prostate cancer screening. A study conducted in Tanzania reported that a low perception of risk was a barrier to the utilization of prostate cancer screening (Bugoye et al., 2019). Similarly, Kinyao et al. (2018) in their study in Makueni County Kenya found a low perception of risk towards prostate cancer among men aged 30 years and above which hindered their uptake of prostate cancer screening.

A major barrier documented in several studies is male dominance factors. The fear of loss of one's sexuality following the diagnosis of prostate cancer has been reported in several studies (Blocker et al., 2006, James et al., 2017, Engelen et al., 2016, Hunter et al., 2015). Pederson et al. (2012) similarly reported that African American men declined prostate cancer screening due to fear of erectile dysfunction, sterility and decreased sex drive. The uptake of screening among asymptomatic men has been considered as not socially acceptable among men as it's associated with women (Ng et al., 2013; Rashid et al., 2007). This has contributed to men avoiding seeking prostate cancer screening services. Men have similarly felt that a diagnosis of prostate cancer would jeopardize their manhood and masculinity (Friedman et al., 2012; Fyffe et al., 2008; Ford et al., 2006). A study conducted among African American men found that men avoided prostate cancer screening due to fear of the effects of the disease on their masculinity (Ogusanya et al., 2016). Given the low participation of men in cancer screening in comparison to women documented by Marmot et al. (2012), uptake of prostate cancer screening has complex social and cultural dynamics that warrant a lot of attention.

Fatalistic beliefs, which associate cancer with death and negative outcomes, have been documented as barriers to the uptake of prostate cancer screening. A study among African Americans in South Carolina found a major barrier to screening among men as the fear of a cancer diagnosis related to perceived adverse outcomes (Friedman et al., 2012). A study among African and Caribbean black men reported the respondents' perception of prostate cancer as a death sentence coupled with the fear of a prostate cancer diagnosis as an obstacle to uptake of screening. Cobran et al. (2017) reported fatalistic beliefs as a major barrier towards the uptake of prostate cancer screening. Wachira et al. (2018) found that Kenyan men from a low socio-economic urban population held relatively high fatalistic beliefs towards prostate cancer that hindered them from undergoing prostate cancer screening. Other barriers to prostate cancer screening documented in studies include cultural beliefs, religious influences, mistrust of the health care providers and negative attitudes towards Digital Rectal Examination (Ocho et al., 2013; Conde et al., 2011; Ferrante et al., 2011).

2.7 Effectiveness of education interventions on uptake of screening, knowledge & awareness, perception of self-vulnerability and fatalism

2.7.1 Effectiveness of education intervention on uptake of prostate cancer screening

The interventions used across countries for enhancement of cancer screening include the use of mass media, group education, face-to-face education, client reminders and incentives. The findings from a systematic review found that patient reminders and the health care provider's feedback were effective strategies in increasing the uptake of screening for breast, cervical, and colorectal cancers. However, Face to face education interventions were more effective in enhancing the uptake of cancer screening at the community level (Brouwers et al., 2011).

An assessment of the effectiveness of a computer tailored intervention on the prostate cancer screening decision making process found that the participants were more likely to actively participate in decision making on prostate cancer screening post-intervention

(Allen, 2009). Williams et al. (2013) reported a significant increment in the level of screening at post-intervention following the use of a decision aid in comparison to baseline. Carter et al. (2010) similarly reported a significant increase in prostate cancer screening among black American men following an education intervention. A community-based intervention that involved the utilisation of a barber as a health adviser found a significant increase in the likelihood of discussing prostate cancer screening in the future with a physician or nurse following the intervention (Luque et al., 2011). A study on the effectiveness of the use of a decision support instrument found a significant increase in the intention to screen among African American men (Frencher et al., 2016). A study that assessed the effectiveness of health education based on PRECEDE model found an improvement in screening behaviors and a decrease in barriers to uptake of screening after the intervention (Jeihooni, 2019). Zare et al. (2016) concluded that a health education program based on Health Belief Model (HBM) improved the knowledge levels of retired men aged 50-70 years in Iran and enhanced uptake of prostate cancer screening. A study conducted among men in Iran reported a significant increase in the rate of screening in the intervention in comparison to the control group following an education intervention (Molazem et al., 2018).

The concept of Community Health Workers has gained loads of attention in developing countries with a focus on addressing the shortage of health care workers. The effectiveness of Community Based Health Workers (CBHW) has been documented in health promotion in medically underserved populations (WHO, 2018a). Utilisation of CHWs has the potential to affect the communities they serve positively through improving health-seeking behaviour and enhancing the adoption of healthy behaviours. Wells et al. (2011) found that CHWs intervention led to an increase in screening in the USA. Frances et al. (2012) found that CHWs were effective in enhancing knowledge and awareness on colorectal cancer screening in a medically underserved population in Appalachian Kentucky. In their literature review, Kim et al. (2015) concluded that CBHW interventions are a cost- effective model for particular health conditions like blood pressure and diabetes and uptake of screening for breast cancer and cervical

cancer especially in minority and underserved populations. Tong et al. (2017) in their randomized control trial reported effectiveness of Lay Health Educators in enhancing uptake of screening among among Americans. There is paucity of research assessing the effectiveness of utilisation of CBHWs on the uptake of prostate cancer screening. There is a need for a more rigorous evaluation of the role of CBHW interventions on prostate cancer prevention and control.

2.7.2 Knowledge and awareness on prostate cancer

Low levels of knowledge on prostate cancer have been reported among African American men and men form developing countries in several studies. Pedersen et al. (2011) reported poor knowledge on prostate cancer among men of African descent and Caribbean men. Zare et al. (2016) similarly, found low levels of knowledge on prostate cancer among retired men in Iran. Lack of knowledge about screening can create a barrier towards the uptake of screening especially amongst geographically underserved communities. A study conducted among Filipino men reported that majority of the men had poor knowledge on prostate cancer (Conde et al., 2011). Similar findings were reported among Turkish men where they were found to have low levels of knowledge (Arli et al., 2018). In the study conducted in Jordan, Saudi Arabia and Egypt by Arafa et al. (2012) to assesss the knowledge and screening among men found poor knowledge on prostate cancer. In their study in the USA, Ogusanya et al. (2017) found that the levels of knowledge were low among black men. Similar findings have been reported among underserved groups, such as African- Americans, Hispanics and generally black men. (Forrester-Anderson, 2005; Baker et al., 2014). Studies conducted in Italy and Jamaica found that the men had moderate knowledge on prostate cancer (Morlando et al., 2017; Morrison et al., 2017). However, a study conduted in Brazil found that majority (63.8%) of the men had good knowledge on prostate cancer (Paiva et al., 2010).

Several studies have reported low levels of knowledge and prostate cancer screening among African men. Ikuerowo et al. (2015) found that the level of knowledge on prostate cancer was low among Nigerian men. A population-based study in Nigeria

similarly, reported low levels of knowledge on prostate cancer among the study participants (Ojewola et al., 2017). Mofolo et al. (2015) reported that majority of the participants were aware of prostate cancer and the level of knowledge on prostate cancer was poor among men aged above 35 years of African origin in South Africa. A populatin based study conducted in Tanzania among men aged above 40 years found that majority of the respondents had poor knowledge on prostate cancer (Bugoye et al., 2019).

Studies in Kenya have reported high levels of awareness and low knowledge on prostate cancer among men. A population-based study done in Kenya among men aged 15-54 years, found that 61.9% of men in Kenya had ever heard about prostate cancer (Erena et al., 2020). A study done in Nairobi County Kenya, found that 84.6% of men had ever heard of prostate cancer disease. However, despite the high level of awareness among the respondents 47.7% had poor knowledge on prostate cancer (Wanyaga, 2014). Makori (2014) in a hospital -based study at a National Teaching & Referral Hospital in Kenya, found that the knowledge level was low among majority of men regarding prostate cancer. Wachira et al. (2018) similarly found that 80% of the respondents in an outpatient department at a level three hospital in Nairobi County were aware of prostate cancer while the level of knowledge was low in the population. This reflects that despite high levels of awareness knowledge on prostate cancer remains low.

Several studies have reported low levels of knowledge on prostate cancer despite a lot of effort to disseminate the information. Several studies have found that majority of men acquired most of the information through mass media (Wachira et al., 2018; Ugochukwu et al., 2019; Ojewola et al., 2017). This highlights on some gaps existing in advocacy within the communities and on the role of hospitals and health care providers in dissemination of information on prostate cancer. Although many men could be getting the prostate cancer message through diferent channels of communicatiion, there is need to consider the utilization of educational interventions and health education by health care providers to improve knowledge on prostate cancer. The increase of prostate cancer

knowledge will assist men to understand their risk and provide guidance in the decision making process about screening.

2.7.2.1 Effectiveness of interventions on prostate cancer knowledge and awareness

Lack of awareness and knowledge on prostate cancer has been posited as a major barrier towards people undergoing screening. Several interventions have been utilised to enhance the level of knowledge on prostate cancer successfully. An evaluation of the impact of an education intervention conducted among African American men found that there was a signicant increment in knowledge and awareness of prostate cancer (Carter et al., 2010). An assessment of the effectiveness of education intervention through a mobile tablet among African American men found that knowledge increased significantly following the intervention (Sultan et al., 2014). Ashorobi et al. (2017) found that prostate cancer knowledge increased significantly among medically underserved multi-ethnic men following an educational video on prostate cancer. Molazem et al. (2018) in their study conducted among men in Shiraz, Iran reported significant positive increase in knowledge and awareness in the intervention group following an education intervention. A similar study conducted in Shiraz, Iran using an education intervention found that knowledge increased significantly in the intervention group following the education of the participants (Jeihooni et al., 2019). Patel et al. (2012) in their community-based study found that knowledge among African Americans significantly increased following an education intervention that utilised a brochure with health messages on prostate cancer. A study among African-American men in suburban California reported a significant increase in knowledge following the use of a decision aid and education intervention (Sandiford & D'Errico, 2016).

A qualitative study conducted to assess the effect of education of men at the work place on prostate cancer reported that a simple work place education inetervention would not be effective in enhancing knowledge and uptake of screening. The study concluded that a multi-faceted approach should be utilised based on combination of various education interventions that include information from cancer survivors, health professionals and

brochures to overcome masculinity, which is a major barrier (Ilic, 2012). Similar findings were reported in a study that investigated the effect of web-based education and reminders among Turkish men. The study found that there was no significant difference in the knowledge level of the participants following the intervention (Capik & Gozum, 2012).

Several studies have reported an increase in cancer knowledge through interventions by Community Based Health Workers especially in rural and medically underserved populations. Frances et al. (2012) found a significant increase in knowledge and awareness on colorectal cancer screening following a CHW led education intervention among a medically underserved population in Appalachian Kentucky. A review of the effectiveness of CHWs in low, middle and high-income countries found that CHWs increased knowledge and awareness on colorectal, cervical and breast cancer, which led to an improvement in screening behaviours (Perry et al., 2014).

2.7.3 Perception on self –vulnerability towards prostate cancer

Perception to self- vulnerability refers to an individual's belief regarding their susceptibility to a particular condition. It reflects on the person's belief of the probability of a health hazard (Gerrard & Houlihan, 2008). Perception of vulnerability is the process of transition from lack of awareness of the threat to perception of one's personal risk of acquiring the condition (Weinstein et al., 2008). Perception of self -vulnerability plays a significant role in prostate cancer screening behaviors of men as the greater the perception of vulnerability the greater the threat perception and the higher the likelihood to take up preventive measures of prostate cancer cancer. Weinstein et al. (2008) posited that people generally tend to have unrealistic optimism towards their vulnerability of health problems in comparison to their peers. The construct of perceived vulnerability has been assessed using different items in several studies. Majority of the assesments include; Absolute Perceived Vulnerability that involves the individual's perception that something negative is likely to happen to them. Comparative assessment of vulnerability has also been included which entails the individual's perception of his risk in

comparison with their peers. Others measures include: conditional perceived vulnerability, which measures the likelihood of adoption of risk behavior or preventive measures towards a health problem (Gerrard & Houlihan, 2008). Similarly, the affective aspect of vulnerability is recognized as it is expected that individuals use their emotions to make judgement about a risk and non-pathological worry has been defined as a mechanism that maintains the awareness of the threat (Shiloh et al., 2013).

Several studies conducted have reported a low perception of self- vunerability among men of African descent, which has been associated with low levels of knowledge on prostate cancer. Shavers, et al. (2009) found that race significantly influenced the perception of self-vulnerability to prostate cancer and being an African-American and Hispanic man was associated with low perception of self -vulnerability towards prostate cancer. Similarly, Odedina et al. (2017) reported a lower perception of susceptibility of prostate cancer among Caribbean-born black men in comparison to those born in the USA. The perception of self- vulnerability has been associated with prostate cancer screening behaviours in various studies. The results of a study among African American men found various barriers to uptake of prostate cancer screening which included low perception of vulnerability to prostate cancer. (Forrester-Anderson, 2005) These findings are corroborated by Blocker et al. (2006),, who found that perception of vulnerability was associated with prostate cancer screening behaviours. Starosta et al. (2015) found that lower risk perception of prostate cancer was correlated with lower screening uptake rates. Similarly, a study conducted in Italy found that slightly less than half of the men had low perception of risk of developing prostate cancer and perceived risk was associated with prostate cancer screening. (Morlando et al., 2017) A study conducted among men aged 50-70 years in Hamadan, Iran found a low level of perceived self-vulnerability among the participants (Khosravi et al., 2018).

A study done in Tanzania found that a third of the respondents did not perceive themselves at risk of prostate cancer (Bugoye et al., 2019). Yeboah-Asiamah et al. (2017) in their study conducted in Ghana found that only 34.4% of the men considered themselves at high risk of developing prostate cancer. A study done in Nairobi County

Kenya had similar findings where 42% of the respondents had poor perception on self - vulnerability towards prostate cancer (Wanyaga, 2014). Similarly, Kinyao et al. (2018) in their study in Makueni County Kenya, found that 36.3% of the respondents did not perceive themselves at risk of prostate cancer. This finding provides a framework for enhancing men's knowledge on prostate cancer to influence their perceived risk, which is envisioned to enhance their participation in risk-based screening. Men should be empowered with adequate information regarding prostate cancer including the risk factors to counteract this belief as their pre-existing perceptions of risk influences the decision making process.

2.7.3.1 Effectiveness of interventions on perception of self-vulnerability towards prostate cancer

The perception of self-vulnerabilty is postulated as a factor-influencing uptake of prostate cancer screening. Several interventions carried out have found a significant increase in self- vulnerability at post intervention. Allen et al. (2009) found a significant increase in perception of risk among African American men after a computer tailored intervention. Capik & Gozum (2012) found a decrease in the perception of susceptibility to prostate cancer that further resulted in reduction of barriers to screening. Starosta et al. (2015) in their Randomized Control Trial in an outpatient department found that print decision aid and web based decision aids significantly influenced men's existing attitudes about the risks of prostate cancer screening. Men randomised to receive a decision aid reported less barriers to prostate cancer screening in comparison to those who did not receive a decision aid. Zare et al. (2016) similarly reported an increment in the perceived susceptibility towards prostate cancer in the intervention arm of the study following an educational intervention. A study conducted among men in Iran based on PRECEDE model found an increase in perception towards self- vulnerability and an improvement in the attitude towards prostate cancer screening (Jeihooni, 2019). Sultan et al. (2014) found a significant improvement in risk perception towards prostate cancer among the men receiving an education intervention.

2.7.3.2 Prostate cancer fatalism

Cancer fatalism is an individual's belief that their health is a result of luck, destiny and devine intervention which results in hopelessness and the feeling that they do not have control over external events related to a cancer occurrence. The individual has pessimistic beliefs that death is the outcome following a cancer diagnosis. It describes a set of beliefs regarding the etiology, prevention and ability to cure cancer, which is accompanies the individual feeling hopeless and powerless (Powe & Finnie, 2003). Fatalism is a paramount belief that recquires to be considered due to its association with avoidance of cancer information and uptake of screening (Kobayashi, et al., 2016). Individuals who hold fatalistic beliefs may attribute the acquiring of health conditions to fate or luck and less to do with their actions, which may deter their participation in health promotive activities. The disparities in health existing among minority populations has been attributed to fatalistic beliefs (Mitchell et al., 2014).

Fatalism construct has gained a lot of interest over time and therefore several tools have been developed over time to assess different attributes of fatalism. This include but are not limited to Powe Fatalism Inventory, Niederdeppe's Fatalism Assessment and Lange's Fatalism Assessment (Powe & Finnie, 2003; Lange & Piette, 2006; Niederdeppe & Levy, 2007). The most commonly used tool for assessment of cancer fatalism is the Powe Fatalism Inventory.The tool comprises of fifteen items that test four attributes of fatalism which include fear, pre-destination, pessimism and death inevitability (Powe & Finnie, 2003).

Several studies have investigated the association of fatalism and adoption of health promoting beahaviours that include uptake of screening. Fatalistic beliefs have been attributed to failure of adoption of health protective behaviours and engagement in self-destructive behaviours. A study conducted among adolescents found that those with fatalistic beliefs ignored warnings about susbstance abuse as they believed any health outcomes were pre-determined (Unger et al., 2002). Similar findings have attributed fatalism to cancer screening behaviours. Similary, Niederdeppe & Levy (2007) reported

that men who held fatalistic beliefs are less likely to engage in cancer prevention. A study conducted in the United Kingdom associated fatalism with underutilization of prostate cancer screening. (Vrinten et al., 2016). A review of several studies showed that there is a significant relationship between fatalism and uptake of cancer screening. The findings of the study indicated that fatalism could be a unique factor that is likely to influence uptake of PC screening (Espinosa de los Monteros & Gallo, 2010). A study done in Makueni County, in Kenya found that men held relatively high fatalist beliefs. Majority (75%) of the men in the study held fatalist beliefs on prostate cancer. Majority of the respondents felt that they had no influence on occurrence of prostate cancer and hence preferred not knowing about it at all (Mutua et al., 2017).

Prostate cancer fatalism is more prevalent among minority and underserved populations and is believed to be a major barrier to prostate cancer screening. Cobran et al. (2017) found a higher degree of fatalism among black Caribbean males born in USA in comparison with those not born in the USA. Odedina, et al. (2011) had similar findings where the USA born Carribean men had lower prostate cancer fatalism compared to those born in Caribbea. Niederdeppe and Levy (2007) similarly reported fatalism among African men, the poor and low level of education. Perception of fatalism has been associated poor knowledge on prostate cancer and low education levels among men. (Powe et al., 2009) Pedersen et al. (2011) found that African and Caribbean black males perceived a diagnosis of prostate cancer as a death sentence. Conde et al. (2010) reported similar results where they found fear of a positive result for prostate cancer and association of a cancer diagnosis to death as barriers to prostate cancer screening. This finding shows the relevance of addressing such beliefs during education of men about prostate cancer to circumvent this barrier to the uptake of screening.

2.7.3.3 Effectiveness of education intervention on prostate cancer fatalism

Fatalism has gained much interest, given the disparities that exist among individuals of different socio-economic backgrounds associated with fatalism. Perception of fatalism has been associated with medically underserved populations and inadequate knowledge

on cancer (Keeley, Wright & Condit, 2009). Lack of cancer knowledge has been associated with fatalistic beliefs and unengagement in cancer screening (Marlow et al., 2018; Costanza et al., 2005). The provision of culturally relevant health messages has been found to change fatalistic beliefs and hence enhance uptake of screening (Magai et al., 2004). A study conducted among elderly citizens in USA which used a video intervention, found a decrease in fatalism and an increase in knowledge at post-test (Powe & Finnie, 2003). Similarly, an education intervention led to a decrease in the degree of fatalism at post-test following the intervention (Tayel et al., 2019). The utilization of a culturally sensitive education intervention led to a derease in fatalism among African Americans (Morgan et al., 2010). Though there is paucity of studies assessing fatalism and interventions to address this barrier to uptake of prostate cancer screening it is evident from existing literature that its mainly associated with inadequate knowledge and hence to overcome it men require to be empowered with adequate information on prostate cancer.

2.8 Summary of Literature review

In summary, the level of prostate cancer screening among African men remains abysmally low while the presentation of men with advanced prostate cancer remains a major public health puzzle. Several studies conducted have identified various factors influencing uptake of prostate cancer screening. Individual factors influencing uptake of prostate cancer screening include socio-demographic and socio-economic factors, level of awareness and knowledge, perception of self-vulnerability, prostate cancer fatalism, stigma associated with the screening processes and prostate cancer disease and male dominance factors among others. Several education interventions carried out across many countries to assess their effectiveness on cancer screening have demonstrated effectiveness in enhancing knowledge and screening uptake.

2.9 Research gaps

Several studies have been carried out across countries on prostate cancer, however there is paucity of studies assessing the barriers and facilitators to screening among men in developing countries. The construct of fatalism reported among men in developed countries requires further investigation among African men in developing countries. There is need for an in-depth understanding of contextual factors influencing uptake of screening among Kenyan men at risk of prostate cancer. Despite several studies conducted to assess the effect of various education interventions on knowledge and uptake of prostate cancer screening, majority of the studies carried out have not assessed the impact of the CHVs on prostate cancer screening. The interventions carried out to assess effectiveness of CBHWs have majorly involved breast, cervical and colorectal cancer. There is paucity of interventions to enhance uptake of prostate cancer screening, particularly the utilisation of CHVs who play a vital role in health promotion in developing countries to circumvent the shortage of health care workers. The effectiveness of CHVs face-to-face health education on prostate cancer screening is a relevant issue that requires investigation as no similar intervention has been carried out despite the late diagnosis and the rising mortality from prostate cancer in Kenya. There is need for more research on the effectiveness of Community Based Health Education on prostate cancer screening.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Research design

A pre-test post-test non-equivalent quasi-experimental study design that adopted an explanatory sequential mixed method approach was used for data collection. The study participants were grouped into intervention and control arms. The participants in the intervention arm of the study received health education delivered by Community Health Volunteers while the participants in the control arm did not receive any intervention.

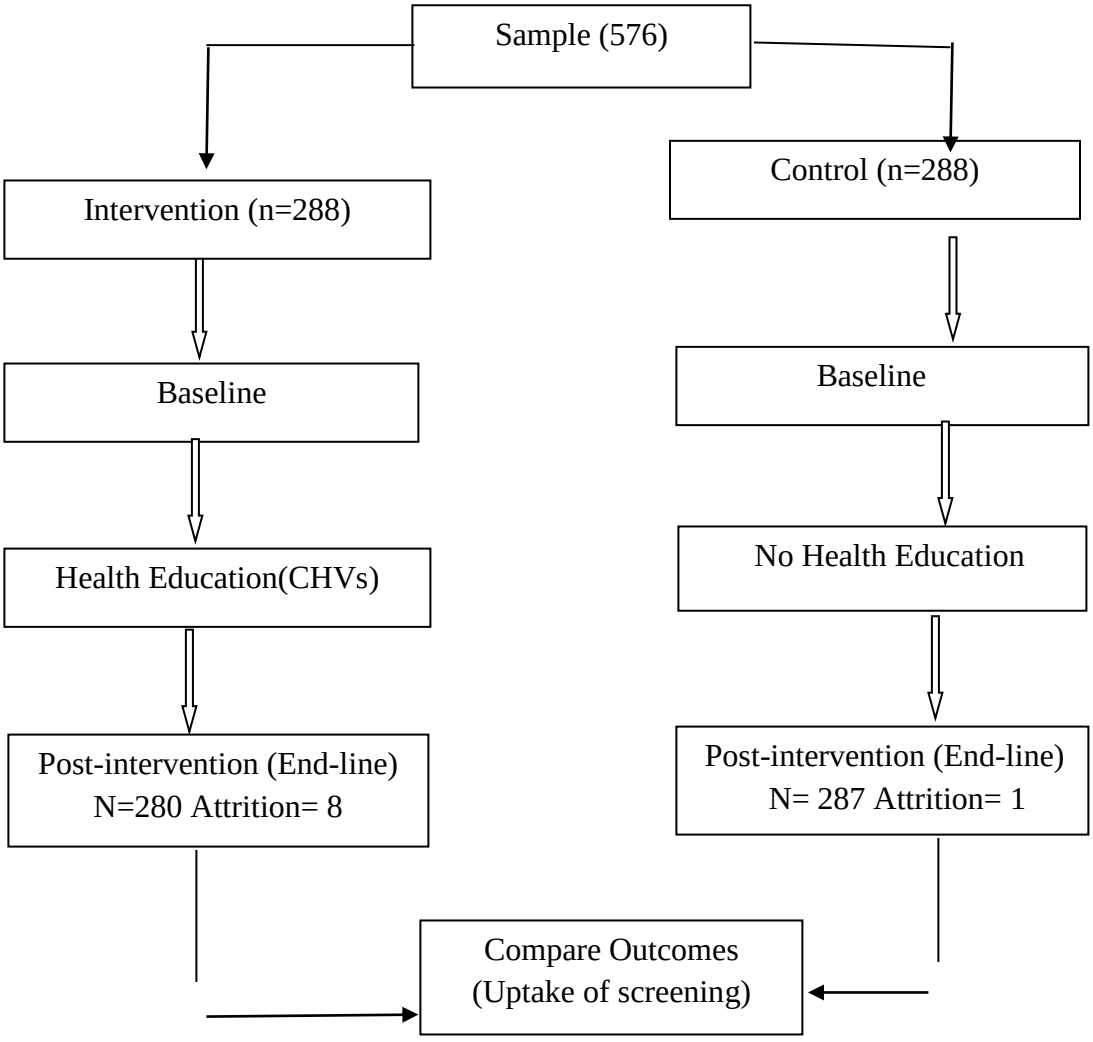


Figure 3.1: Diagrammatic presentation of the study design

The study entailed a pre-test and a post-test for the intervention and control arm as indicated in the flow diagram Figure 3.1. The design was used as it minimizes threats to external validity. The design is also advanced in longitudinal research and in evaluation of impact of health interventions (Mugenda, & Mugenda, 2013; Kothari, 2011).

3.2 Study area

The study was conducted in Gatundu North Sub- County and Kiambu Sub-county in Kiambu County. Kiambu county is located in the central region of Kenya and comprises

of twelve subcounties which include; Kiambu, Gatundu North, Thika, Gatundu South, Kikuyu, Lari, Githunguri, Kiambaa, Kabete, Limuru, Ruiru and Juja. The County has fertile high-level uplands soils, which are ideal for rearing of livestock and growing of both cash crops and food crops. The major economic activity in the county is agriculture. The cash crops grown in the area include coffee and tea with the food crops grown including maize, beans, pineapples and irish potatoes. The rainfall type in the county is bi-modal with the long rains falling in mid-March to May and the short rains in mid- October to November. The average rainfall experienced in the area is approximately 1,200 mm and the mean temperature being 26 ^{o}C with humidity ranging from 54% to 300% (Kiambu County, 2012).

Kiambu County comprises of 505 health facilities which include three Level-five hospitals namely Thika, Gatundu and Kiambu Hospitals and eleven level four hospitals which include Igegania Hospital in Gatundu North Sub-county. There are 24 health centres and 70 government dispensaries. Aditionally, the county has 170 private and FBO health facilities, 9 private nursing homes and 1 private maternity home which are well distributed within the County. The population size projected for 2017 in Gatundu North subcounty is 125,972, while Kiambu Sub-county it's 136, 098 (Kiambu County Government, 2019).

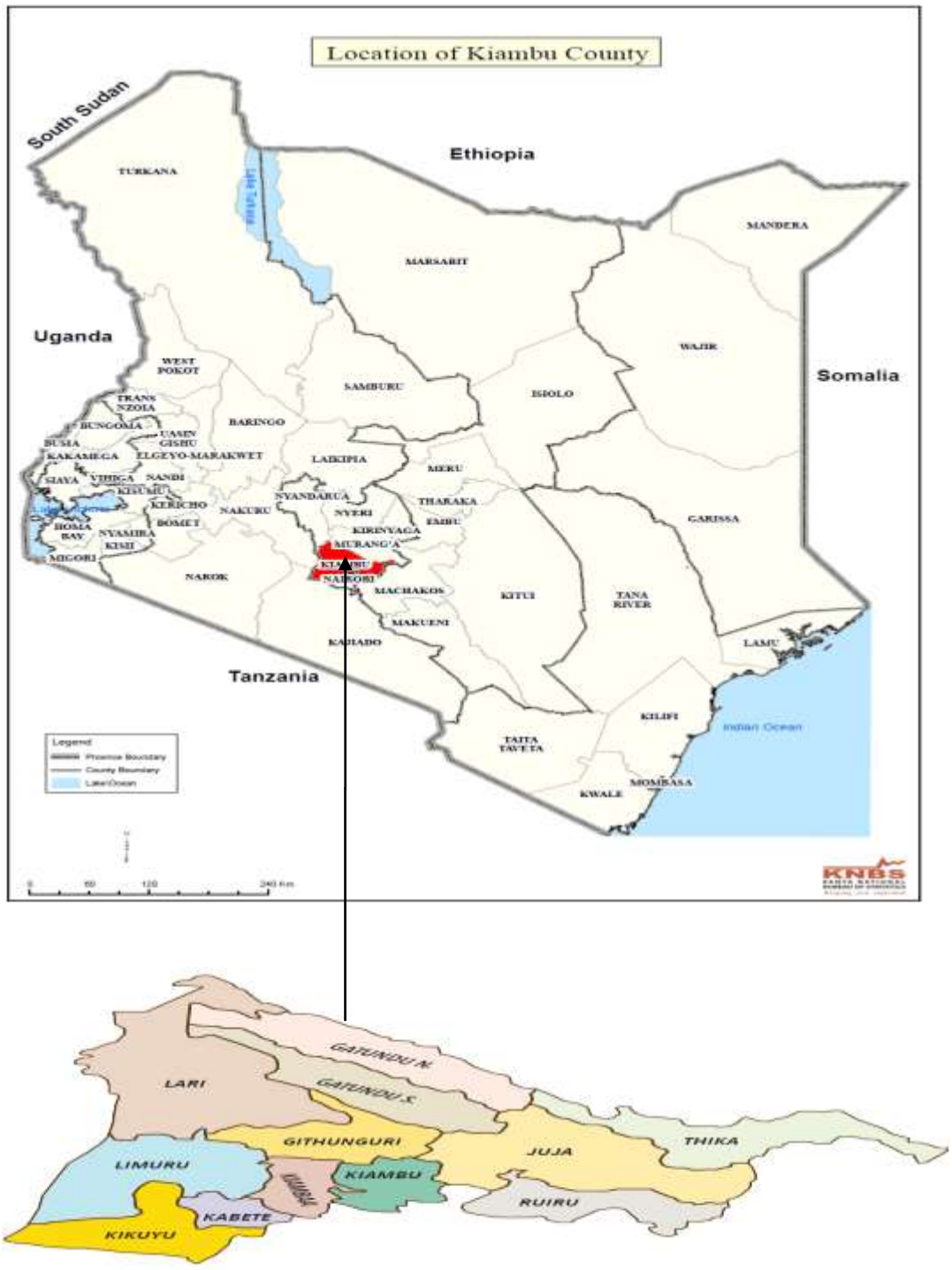


Figure 3.2: Map of Kenya indicating the study area

The study area was randomly selected as it's within Kiambu County which has low rates (3.4%) of prostate cancer screening. The education intervention was carried out in Gatundu North Sub-county and the control was in Kiambu Sub-county. The two subcounties have well established functional CHUs with CHVs. The CHUs in the Gatundu North Sub-county are 11 in number while in Kiambu sub-county they are 6. Screening services for prostate cancer are offered at Igegania level 4 Hospital in Gatundu North Sub-county and Kiambu level 5 Hospital in Kiambu Sub-county.

3.3 Study population

The study population comprised of men aged 40-69 years residing in Gatundu North and Kiambu Sub-counties. The age of 40-69 years was used as it represents the recommended age for screening of men for prostate cancer in Kenya (MOH, 2018). The total population of men aged 40-69 is approximately 10, 437 in Gatundu North Sub-county and 11,427 in Kiambu Sub-county (KNBS, 2017). At pretest, a total of 288 men from Gatundu North Sub-county and 288 men from Kiambu Sub-county were randomly selected to participate in the study. Different sub-counties within Kiambu County were selected to avoid contamination of the study as they are approximately 90 Kilometres apart. However, the two areas have similar geographical, social and economic characteristics and have functional Community Health Units and a link health facility offering prostate cancer screening services.

3.4 Sample size determination

The study sample size was determined based on the formula indicated below for comparing two proportions (Wang & Chow, 2007).

$$\mathrm{n} = \frac{[(Z_{\alpha/2} + \mathrm{Z}_{\beta})^2 \times (p_1(1-p_1) + \mathrm{p}_2(1-\mathrm{p}_2]}{(\mathrm{p}_1 1 - \mathrm{p}_2)^2}$$

Zα/2 = the critical value of the Normal distribution at α/2 (for a confidence level of 95%, α is 0.05) =1.96

Zβ = the critical value of the Normal distribution at β (for a power of 80%, β is 0.2) = 0.84

p1 = the expected sample proportion of men screened for prostate cancer in the control group = 3.4% = 0.034

p2 = the expected sample proportions of men screened for prostate cancer in the intervention group at post test) = 10% = 0.1

$$n = \frac{(1.96 + 0.84)^2 \times (0.034(1 - 0.034) + 0.1(1 - 0.1)}{(0.034 - 0.1)^2}$$

n= 222

Considering the screening rates anticipated in the control group was 3.4% (KDHS, 2014) and 10% (Çapık & Gözüm, 2012) for the intervention group using the above formula the minimum sample size required for each group was 222 men. To cater for attrition 30% was added to the minimum sample size (Gustavson et al., 2012). A total of 576 men were included in the study; 288 men in the intervention arm and 288 in the control arm.

3.5 Sampling procedure

Kiambu County has three sub-counties which have well established functional Community Health Units (CHUs) and a link health facility that offers prostate cancer screening services which include; Gatundu – North, Kiambu and Thika Sub-counties.

Simple random sampling was applied to select Gatundu North Sub-county as the intervention site among the three Sub-counties. The control site, Kiambu Sub-county was purposively selected as it's approximately over 90 kilometres from the intervention site to avoid contamination of the study. Stratified random sampling was applied to select respondents from the CHUs within the study area. All the CHUs in the two arms of the study were listed. The total CHUs were 11 in the intervention arm and 6 in the control arm. Using the CHVs registers, a list of all the households with men aged 40-69 years per CHU were generated. Using a table of random numbers, 288 households from the 11 CHUs in the intervention site and 288 households from the 6 CHUs in the control site were selected to participate in the study (Table 3.1).

Table 3.1: Sampling frame for the study

Intervention			**Control**		
Community Health Unit	**Population**	**Sampled**	**Community Health Unit**	**Population**	**Sampled**
Kairi	544	31	Ting'ang'a	565	48
Nguna	597	34	Kiamumbi	594	50
Karure	354	20	Kanunga	578	49
Kanyoni	458	26	Riabai	532	45
Makwa	541	31	Ndumberi	612	52
Gatukuyu	621	35	Kihingo	524	44
Gituamba	460	26			
Gathaite	324	18			
Mang'u	567	32			
Gacege	256	14			
Gakoe	368	21			
Total	**5090**	**288**	**Total**	**3,405**	**288**

A total of 33 CHVs (3 per CHU) in the intervention site were selected using simple random sampling to deliver health education in the selected households. Each CHV was allocated 8-9 study participant's to deliver the health education. Purposive sampling was applied for the selection of the Focus Group Discussions (FGDs) participants at the community level. This included the representation of men aged 40-69 years residing in the study area with various socio-economic and socio-demographic characteristics to ensure heterogeneity. Purposive sampling was applied in selection of the 7 Key

Informants. This included members of the Sub-county Health Management Committee who are the key people involved in the implementation of the Community Health Strategy in the intervention and control sites. This included the Sub-County Public Health Nurse, Sub-County Public Health Officer, Community Strategy Focal Point Person in the intervention and control sites and the the head of the Non-communicable Diseases in Kiambu County.

3.6 Inclusion/ Exclusion criteria

3.6.1 Criteria for inclusion of study subjects

All men in established CHUs in Gatundu North and Kiambu Sub-counties aged 40 - 69 years who gave voluntary consent to participate in the study.

3.6.2 Criteria of exclusion of study subjects

i. All men already diagnosed with prostate cancer or awaiting histological results were excluded from the study.
ii. Men with major medical illnesses that would preclude them from receiving prostate cancer screening were excluded from the study.
iii. Men who had psychotic conditions were also excluded from the study.

3.7 Study intervention

The intervention tested in this study was the effectiveness of community based health education on enhancing knowledge and awareness, perception of self –vulnerabilty, fatalism and screening following a face-to-face household education by a CHV. A post-test was carried out to determine the differences in outcomes six months after the education intervention in the community. The study was conducted in three phases as follows;

Phase I included a baseline assessment of the level of uptake of prostate cancer screening, socio-demographic and economic factors influencing uptake of prostate cancer screening, facilitators and barriers to screening, knowledge and awareness on prostate cancer, perception on self-vulnerability and prostate cancer fatalism among men aged 40-69 years in Gatundu North and Kiambu Sub-counties. Qualitative data was collected by use of Focus Group Discussions among men aged 40-69 years and Key Informant Interviews to generate more detailed information on the facilitators and barriers to uptake of prostate cancer screening. **Phase II** involved the development of a training guideline for CHVs. A CHVs training guideline based on the Ministry of Health CHVs training Module 13 (Non-Communicable Diseases) was developed by the Principal Investigator (Appendix X). Two content experts reviewed the training guideline's content and methodologies of teaching, and ammendments done accordingly. The training guideline was also subjected to a panel of experts from the Ministry of Health. The suggested ammendments were effected and authorization to use the guideline for training the CHVs in the selected sub-county sought from the Ministry of Health (Appendix VIII). Health care workers in the study area underwent sensitization on the current algorithm of screening for prostate cancer, which entails individualized informed decision- making based on the clear understanding of the risks and benefits of screening. Thirty- three (33) CHVs were recruited to deliver health education to the households. The CHVs were trained for two days on prostate cancer using different modes of delivery including interactive lectures, small and large group discussions, demonstration role-play and return demonstrations (Appendix X). Upon completion of training, every CHV was issued with a CHV tool kit containing key health messages on prostate cancer for reference during the household visits. This was followed by the engagement of the enrolled participants in the intervention arm in face-to-face household visits and provision of an educational intervention by the CHVs. Each CHV was allocated 8-9 households. Initial household visits were done and health education delivered by the CHVs in the participants households. This was followed by monthly household visits to follow up. A household visit checklist (Appendix IX) was developed which was used as a monitoring tool for the initial and follow-up household visits. Upon

completion of the visit the checklist was signed by the CHV, the participant and received by the Community Health Assistant (CHA) of the particular CHU and forwarded to the Sub-County Public Health Officer. All the CHVs were issued with the MOH client referral forms to facilitate the referreal of the participants to the health facility for prostate cancer screening. Supervision of the activities in the households was done by the principal investigator and the CHAs of the particular CHUs. The principal investigator held monthly meetings with the CHVs which entailed giving a detailed report on the activities of the month per house hold by the CHV. A small reimbursement of the transport of Kshs. 1000 was given to CHVs during each monthly meeting. **Phase III** involved the administration of a post-test which was carried out 6 months after the education intervention. The outcomes (knowledge and awareness, perception on self-vulnerability, fatalism and uptake of prostate cancer screening) were assessed for the differences at post-intervention in comparison to baseline in the arms of the study.

3.8 Data collection tools

The study utilized three types of instruments at prestest and post-intervention. This included a questionare, a Focus Group Discussion guide and a Key Informant guide. An interviewer administered structured questionnaire was used for collection of quantitative data from the study participants. The questionnaire was pretested to establish its validity and reliability before the actual field work was done. The questionare was then translated to the Kiswahili version. A Focus Group Discussion guide and a Key Informant Interview guide were developed based on the key themes of the study.

3.9 Validity and reliability of data collection tools

3.9.1 Pre-test

Pre-testing of the research instruments was done to ascertain their appropriateness, suitability and actual fieldwork logistics. The pretesting was used to refine the tools and identify errors. This was conducted at Thika Sub-county. A total of 29 men from Thika

Sub-county which was equivalent to 10% of the intervention arm sample size were randomly selected. The participants were informed that the instruments were being pre-tested and they were allowed to comment on the appropriateness and any ambiguity in the questions. The questionare was revised and corrections done to some questions that were found to be ambiguous and repetitive. The revised questionare was administered where no issues were reported. One FGD was conducted in Thika Sub-county to ascertain the appropriateness of the FGD guide. The Key Informant Interview guide was also tested on the Sub-county Public Health Officer and the Sub-county Public Health Nurse in Thika Sub-county. The data collected was further cleaned, coded and analysed using stata version 13 and Cronbach's alpha computed to test reliability of each study construct scale in the questionnaire. The results showed that the Cronbach's alpha for all the constructs (knowledge, perception of self-vulnerability and prostate cancer fatalism was >0.7 which indicated that all the items were reliable in measuring their respective variables.

3.9.2 Validity

Validity of the tools was ensured by pre-testing of 10% of the questionnaires and conducting one FGD before the actual study. The questions were analysed to ensure clarity, precision and inclusiveness. This consequently enhanced good understanding of the questions by the research assistants. The data collected during the pre-test was also cross -checked and analysed to asses the data quality. The questions were adjusted accordingly to ensure validity of the tools. To ensure validity of the questionnaire and FGDs, the participants were assured of confidentiality and reassured that no victimization would be introduced due to their responses. Validity was also ensured by training all the CHVs using a standard curriculum to ensure harmony in relation to the health education given during face-to-face visits in the households by CHVs. Role-play and community visits were incorporated during training of CHVs to ensure consistency in delivery of the education sessions. Upon completion of training, every CHV was issued with a CHV tool kit containing key health messages on prostate cancer for reference during the household visits. A checklist for household visits indicating

contents covered was filled upon every house-hold visit from the initial visit to the follow up visits. Upon completion of the household visit the checklist was signed by the participant, CHA and verified and recevied by the Sub-county Public Health Officer. All the men referred by the CHVs to the facility for screening had a referral form filled by the CHV to enhance the record keeping which was forwarded to the Sub-County Public Health Officer. Pretest and post-test were done for both the intervention and control groups to ensure that the outcome of the study was associated with the intervention. External validity was maximized by the selection of study subjects randomly. Regarding qualitative data, referential adequacy was ensured by review of the original data and findings by two members of the research team who had vast experience in qualitative data analysis and multiple review of the data by other research team members before generation of codes to ensure credibility of the data. Operationalization was also done through member checking at the end of interviews. The analysis embedded some direct quotations of the participants to reflect their opinions.

3.9.3 Reliability

A structured pre-tested questionnaire was used in order to standardize the reliability of the tools to ensure that when it is used by the same or a different investigator the results will be the same. The Cronbach's alpha results for knowledge (0.73), perception of self-vulnerability (0.71) and prostate cancer fatalism (0.87) were reliable in measuring their respective variables. The research assistants were identified and underwent an intensive training on the use of the questionnaire prior to the research to reduce the interview bias. The principal investigator checked on all the filled questionnaires upon receiving them from the research assistants to ensure that they were filled and when anomalies were detected a call back was performed. To ensure quality assurance, the principal investigator conducted at least 5% of the interviews for the participants in the study sites. Lincoln and Guba criteria was used for enhancing trust- worthiness of the qualitative data. Several debriefing sessions were held by the members of the research team. Multiple coders were used and a consensus ensured from the team members before generation of themes. An audit trail of all the steps undertaken during analysis

was kept to ensure rigor. Researcher and methodologic triangulation were also done (Nowell et al., 2017).

3.10 Data Collection procedures

A structured questionnaire was designed, pre-tested and used to collect quantitative data from the participants in the intervention and control arm of the study at baseline and post-intervention. Research assistants with a medical background and with vast experience in research were selected and trained. The participants from the study population who met the inclusion criteria were interviewed by the trained research assistants using the structured questionnaire (Appendix II and III). The researcher explained the purposes and the benefits of the study after which they sought informed consent from the participants before the administration of the interviewer administered questionare.

A semi-structured guide based on the key themes of the study was used to conduct the FGDs (Appendix V). Focus Group Discussions (FGDs) were conducted among men aged 40-69 years in the study area and Key Informant Interviews conducted among the Sub-county Public Health Nurses, Sub-county Public Health Officers, the Community Strategy Focal Point Persons and the head of the Non-communicable Diseases in Kiambu County. Saturation for the FGD and KII was achieved with a total of 6 FGDs and 7 indepth interviews. The total participants were 66 which constituted of 59 men aged 40-69 years and 7 KIs.The participants were selected purposively through the assistance of the CHVs. The FGD constituted of the principal investigator and two repertoires. The FGDs were conducted in a private set up within the link health facilities in the study site. An FGD constituted of 9-11 participants and lasted for an average duration of 82 minutes. To minimize FGD bias a pre-tested FGD guide was used and the principal investigator acted as the moderator of all the FGD sessions. Each participant was allocated a specified time to avoid dominance bias and all participants were given equal chance to contribute in the discussion. All the FGDs were audio recorded and transcribed verbatim. A semi- structured Key Informant Interview guide was used to

conduct Key Informant Interviews (Appendix IV). The interviews were conducted by the principal investigator and two research assistants who were recording. The participants were informed of the purpose of the interview and informed consent sought. The principal investigator conducted interviews with the various key informants which lasted between 45 minutes to 1 hour.

3.11 Data management

Quantitative data entry, cleaning and coding was done to enhance data quality. The questionares were assessed by the principal investigator upon receipt for completeness and legibility. They were then cross checked for errors, coded and entered into Statistical Package of Social Sciences version 22(SPSS Armonk, NY: IBM Corp) software for data analysis. Both inferential and descriptive statistics were used for data analysis. The study subjects were classified into two groups; the intervention and the control arms. Chi-square test and fishers exact test were utilized to establish the relationship between the independent and dependent variables. The association between the socio-demographic and socio-economic variables and prostate cancer screening was tested. The variables that were significant were then subjected to logistics regression to identify the predictors of uptake of prostate cancer screening at baseline. These regression models were used to predict the odds ratio (ORs) at 95% confidence intervals (CIs). A P-value of < 0.05 was considered significant in the study.

Knowledge was measured using a series of 13 statements based on a five point likert scale ranging from 1(strongly disagree) to 5 (strongly agree) modified from the Integrative Model of Prostate Cancer Disparities a validated survey instrument (Odedina et al., 2011). Perception of self-vulnerability was assessed using 11 statements based on a five-point likert scale anchored on strongly diasagree (1) to strongly agree (5) for positive statements and the reverse for the negative statements. The attributes of perception of self-vulnerability assessed included; absolete vulnerability, conditional vulnerability and cancer worry (Gerrard & Houlihan, 2008). The study utilized a modified Powe Fatalism Inventory to assess the degree of fatalism. Four key attributes

of fatalism were assessed which included; Fear, Predestination, Pessimism and Death Inevitability. The variable was assessed using 11 statements based on a 5-point likert scale anchored on strongly disagree (1) to strongly agree (5) (Powe & Finnie, 2003). The five point likert scale responses were dichotomized by collapsing responses for 1 to 3 from the original scale to Disagree and 4 and 5 to Agree. The rationale of dichotomization between 3 and 4 from the original scale was that the rubric of short answer question regards people who answered higher than or equal to 4 as those who agreed with the statement in an item (Jae Jeong, 2016). The proportion of participants who agreed for the various items of knowledge, perception of self-vulnerability and fatalism were then compared at baseline and post-intervention in both arms of the study using pearson's chi-square test.

Inductive Content analysis was applied for the qualitative data analysis. Inductive analysis was used in the study as it allows flexibility, considers contextual factors and enhances generation of new ideas. The transcripts underwent de-identification of participants with codes. The research team immersed themselves in the data to enhance familiarization and triangulation of the data was done. The data was then coded independently by two researchers using the grounded theory which entailed a constant interplay between data collection and analysis. The final codes were generated based on consensus from the research team which included experienced researchers. The coding entailed the analysis of specific statements and their categorization into themes. This was followed by searching for the themes and researcher triangulation done coupled with the diagrammatic representation of the connection of themes for further interrogation. Then a review of the themes and sub themes was done and comparison with the raw data and the transcripts done multiple times before generation of codes. The main themes were named and defined through consensus of the research team members and consultation of two experts in the subject. This was followed by the final analysis of the data using the established themes. The six steps of data analysis as guided by Braun and Clarke were applied in the study. The analysis also embedded some direct quotations of the participants to reflect their opinions. (Nowell et al., 2017)

3.12 Ethical consideration

This study was conducted in compliance with the principles of the Declaration of Helsinki (World Medical Assembly, 1983). Ethical clearance to carry out the research was sought from the JKUAT Institutional Ethics Review Committee reference number JKU/2/4/896B (Appendix VI) Permission to carry out the study was sought from the National Commission for Science Technology and Innovation reference number NACOSTI P/19/71673/28322. (Appendix VII) Authorization to carry out the study was also sought from the Ministry of Health (Appendix VIII) and Kiambu County Health Research Department. Participant's autonomy and privacy was maintained and any information shared with them was confidential. The participants were explained to the purposes and benefits of the study after which the investigator sought a signed consent (Appendix I). The Participants were not coerced to participate in the study or take up screening. The health care providers in the study area were sensitized on the current prostate cancer screening algorithm which is based on an individual decision making process based on understanding of the risks and benefits and high index of suspicion. The participants who were screened and had elevated PSA levels or urinary symptoms were referred to a clinician for further investigations. The privacy of participants was also considered during the health education sessions by the CHVs in the households. Despite prostate cancer affecting the male reproductive system the health education given was general and hence not sensitive to the men. The audio recordings used during the FGD sessions were only used for transcription purposes after which they were erased.

3.13 Study assumptions

The study's assumption was that there was low level of knowledge on prostate cancer which contributed to low perception of self-vulnerability, fatalistic beliefs and hence low uptake of prostate cancer screening among men in the study area.

3.14 Study Limitations

The study was limited to men in Kiambu County, which is predominantly an area inhabited by men from one major ethnic group and therefore the results may not be generalized to other populations which may have different cultural barriers linked to their ethnicity that may influence uptake of prostate cancer screening. The target population was predominantly rural which may differ from urban populations due to access of information and screening services. The data was collected at the point of contact with the men up to six months and therefore long- term effects of the intervention were not assessed. The maintenance of the recommended screening practices among the participants was not assessed in the study. Randomization which is the gold standard in experimental studies was not done as the study was quasi-experimental, nonetheless different sub-counties were selected as intervention and control arms and a pre-test and post-test done. Additionally, the study participants were randomly selected to minimise bias.

CHAPTER FOUR

RESULTS

4.1 Socio-demographic characteristics of respondents

Five hundred and seventy six (576) men participated in the study at baseline with a response rate of 100%. Majority 100(34.7%) of the respondents in the intervention arm were between the age bracket of 50-59 years while in the control arm majority 152(52.8%) were in the age group btween 40-49 years. Regarding religion, 282(97.9%) of the respondents in the intervention arm and 283(98.3%) of respondents in the control arm were affiliated to the Christian religion. Majority 242(84%) of the respondents in the intervention and 227(78.8%) of the respondents in the control arm were married (Table 4.1).

Table 4.1: Socio-demographic characteristics of respondents

Variable	Category	Control	Intervention	Total N (%)
Age in years	40-49	152(52.8)	97 (33.7)	249 (43.2)
	50-59	97 (33.7)	100(34.7)	197 (34.2)
	60-69	39 (13.5)	95 (31.6)	130 (22.6)
Marital status	Married	227(78.8)	242 (84.0)	469(81.4)
	Single /widowed/separated	61 (21.2)	46(16.0)	107(18.6)
Religion	Christian	283(98.3)	282 (97.9)	565(98.1)
	Traditionalist	2 (0.7)	4(1.4)	6 (1.0)
	Muslim	3 (1.0)	2 (0.7)	5 (0.9)

Key N= Frequency %= Percentage

4.2 Socio-economic characteristics of the study participants

Regarding the level of education majority 151(52.4%) of the respondents in thecontrol arm had acquired secondary level of education while in the intervention arm 149(51.7%)

had the highest level of education acquired being primary. Majority 171(59.4%) in the intervention arm were farmers while majority 101(35.1%) in the control arm were not in any form of employment. The total household monthly income reported by majority of the respondents in the control 171(59.4%) and intervention 203(70.5%) arms was less than Kshs. 10,000. The Tenure of household was mainly owner occupied which represented 203(70.5%) in the control arm and 273(94.8%) in the intervention arm.

Table 4.2: Socio-economic characteristics of the respondents

Variable	Category	Control	Intervention	Total N(%)
Education	None	4(1.4)	2 (0.7)	6 (1)
	Primary	89 (30.9)	149(51.7)	238 (41.3)
	Secondary	151 (52.4)	118 (40.3)	267 (46.4)
	Tertiary	44(15.3)	21(7.3)	65(11.3)
Occupation	None	101(35.1)	67 (23.3)	168(29.2)
	Business	91 (31.6)	39(13.5)	130 (22.6)
	Formal	36 (12.5)	11 (3.8)	47 (8.2)
	Farmer	60(20.0)	171 (59.4)	231(40.1)
HH income	<10,000	171(59.4)	203 (70.5)	374(64.9)
	10000-30000	83 (28.8)	83(28.8)	166 (28.8)
	30000-50000	23 (8)	2 (0.7)	25 (4.3)
	>50000	11 (3.8)	0 (0)	11 (1.9)
Housing type	Permanent	158 (54.9)	129(44.8)	287 (49.8)
	Semi	104 (36.1)	144 (60)	248 (43.1)
	Temporary	26 (9.0)	15 (5.2)	41 (7.1)
Household Tenure	Owner	203(70.5)	273(94.8)	476(82.6)
	Rented	85(29.5)	15(5.2)	100(17.4)
Land ownership	Yes	131(45.5)	206(71.5)	337(58.5)
	No	157(54.5)	82(28.5)	239(41.5)
Land acreage	<1 acre	81(61.8)	108(52.4)	189(56.1)
N=337	1-3 acres	47(35.9)	87(42.2)	134(39.8)
	4-5 acres	1(0.8)	9(4.4)	10(39.8)
	>5 acres	2(1.5)	2(1)	4(1.2)
Source of water	Pubic tap	153 (53.1)	94(32.6)	247 (42.9)
	Private tap	61 (21.2)	107 (37.2)	168(29.2)
	Borehole	49 (17.0)	58 (20.1)	107 (18.6)
	River/dam	25 (8.7)	29(10.1)	54 (9.4)
Cooking fuel	Electricity	6 (2.1)	2(0.7)	8 (1.4)
	Gas	114 (39.6)	21 (7.3)	135(23.4)
	Paraffin	19 (6.6)	4 (1.4)	23 (4.0)
	Charcoal	44 (15.3)	0 (0)	44 (7.6)
	Firewood	105 (36.5)	261(90.6)	366 (63.5)
Main lighting	Electricity	267 (92.7)	232(80.6)	499 (86.6)
	Lamps	16 (5.6)	50 (17.4)	66(11.5)
	Solar	5 (1.7)	6 (2.1)	11 (1.9)

Key N= Frequency %= Percentage

Regarding the type of housing, 158(54.9%) of the respondents in the control arm had permanent houses while 144(60%) in the intervention arm had semi-permanent houses. Regarding land ownership, 131(45.5%) of the respondents in the control arm and 206(71.5%) in the intervention arm owned a piece of land. Majority of the respondents in the intervention and control owned less than 1 acre of land. The main source of water for majority 153(53.1%) in the control arm was public piped while in the intervention arm majority 107(37.2%) used private piped source of water. The main type of cooking fuel used by majority 114(39.6%) of the respondents in the control arm was gas while majority 261(90.6%) in the intervention arm used firewood. Majority of the respondents in the control arm 267(92.7%) and intervention arm 232(80.6%) of the study reported the household's main type of lighting as electricity (Table 4.2).

4.3 Uptake of prostate cancer screening

The proportion of respodents who had undergone prostate cancer screening at baseline was 4.5% (13) in the intervention arm and 5.6% (16) in the control arm. Majority 76.9% (10) in the intervention arm and 43.8% (7) in the control arm had undergone PSA screening. Majority 76.9% (10) and 68.8% (11) in the intervention and control sites respectively were motivated to undergo screening through routine medical check up. Notably, despite the current screening guidelines recommending shared decision-making, none of the men who had undergone screening reported the utlization of shared decision- making process during screening in the intervention and control arms of the study. Majority 75% (12) in the intervention arm and 92.3% (12) in the control arm reported making the decision on their own. Only 46.3% (6) and 68.8% (11) of health care providers explained the risks and benefits before screening the men in the intervention and control arm respectively.Regarding willingness to screen in future, 89.3% (242) and 72.7%(194) men in the intervention and control arm respectively were willing to undergo screening in the future as indicated in table 4.3. Majority 60.3% (166) in the intervention arm and 48.3% (131) in the control arm cited the main reason for lack of willingness to undergo prostate cancer screening as the men's belief that they were well. The other reasons cited included; In ability to afford the test (12.3% and 20.7%),

thinking it's not beneficial (13.7% and 13.8%), Not knowing where to get the test (6.8% and 10.3%) and considering it as being too risky (6.8% and 6.9%) respectively in the intervention and control arms (Table 4.3).

Table 4.3: Prostate cancer screening decision-making process at baseline

Variable	Category	Intervention N(%)	Control N(%)	All N(%)
Ever gone for prostate gland examination	Yes	17(5.9)	21(7.3)	38(6.6)
	No	271(94.1)	267(92.7)	538(93.4)
Screened for prostate cancer	Yes	13(4.5)	16 (5.6)	29 (5.0)
	No	275(95.5)	272(94.4)	547 (95.0)
Method of screening	PSA testing	10 (76.9)	7 (43.8)	17 (58.6)
	DRE	3 (23.1)	6 (37.5)	9 (31.0)
	Biopsy	0	1 (6.3)	1 (3.4)
	Don't know	0	2(12.5)	2 (6.9)
Duration of screening	<1 year	9 (69.2)	6 (37.5)	15 (51.7)
	1-2 years	3 (23.1)	8 (50)	11 (37.9)
	>2 years	1 (7.7)	2 (12.5)	3 (10.3)
Motivation of screening	Routine check-up	10 (76.9)	11 (68.8)	21 (72.4)
	Advise by HCW	1(7.7)	2 (12.5)	3 (10.3)
	Advise by CHV	1(7.7)	2 (12.5)	3 (10.3)
	Advert	1(7.7)	1 (6.3)	2 (6.9)
Decision to screen	HCW	1 (7.7)	4 (25)	5 (17.2)
	Self	12(92.3)	12 (75)	24(82.8)
Benefits and risks of screening explained	Yes	6 (46.3)	11 (68.8)	17 (58.6)
	No	7 (53.8)	5 (31.8)	12 (41.4)
Willingness to screen in future	Yes	242 (89.3)	194 (72.7)	436 (81)
	No	29 (10.7)	73 (27.3)	102 (19)

Key N= Frequency %= Percentage

The proportion of respodents who had undergone prostate cancer screening at baseline was 4.5% (13) in the intervention arm and 5.6% (16) in the control arm. There was no significant difference in the proportion of men who had been screened in the intervention and control arms at baseline (X^2=0.327 df=1 P=0.568). The study assessed the effectiveness of a Community Based Health Education intervention on the uptake of prostate cancer screening. The proportion of participants who had undergone screening for prostate cancer significantly increased from 4.5% (13) at baseline to 57(20.4%) post-

intervention in the intervention arm (X^2=32.809 df=1, P=<0.05). In the control arm the level of uptake of screening increased slightly from 5.6% (16) at baseline to 6.3% (18) at post intervention. There was no significant difference in the uptake of prostate cancer screening in the control arm at post-intervention (X^2=0.133 df=1 P=0.716) as indicated in table 4.4.

Table 4.4: Comparison of uptake of screening at baseline and post-intervention

Group		**Uptake of screening**			**Chi square**	
		Uptake N(%)	**Non uptake N(%)**	**Total N(%)**	**χ2 , df , p value**	
Intervention	Baseline	13 (4.5)	275(95.5)	288	32.809 <0.05	1
	Post-intervention	57 (20.4)	223(79.6)	280		
Control	Baseline	16 (5.6)	272 (94.4)	288	0.133 0.716	1
	Post-intervention	18 (6.3)	269 (93.7)	287		

Key N= Frequency %= Percentage

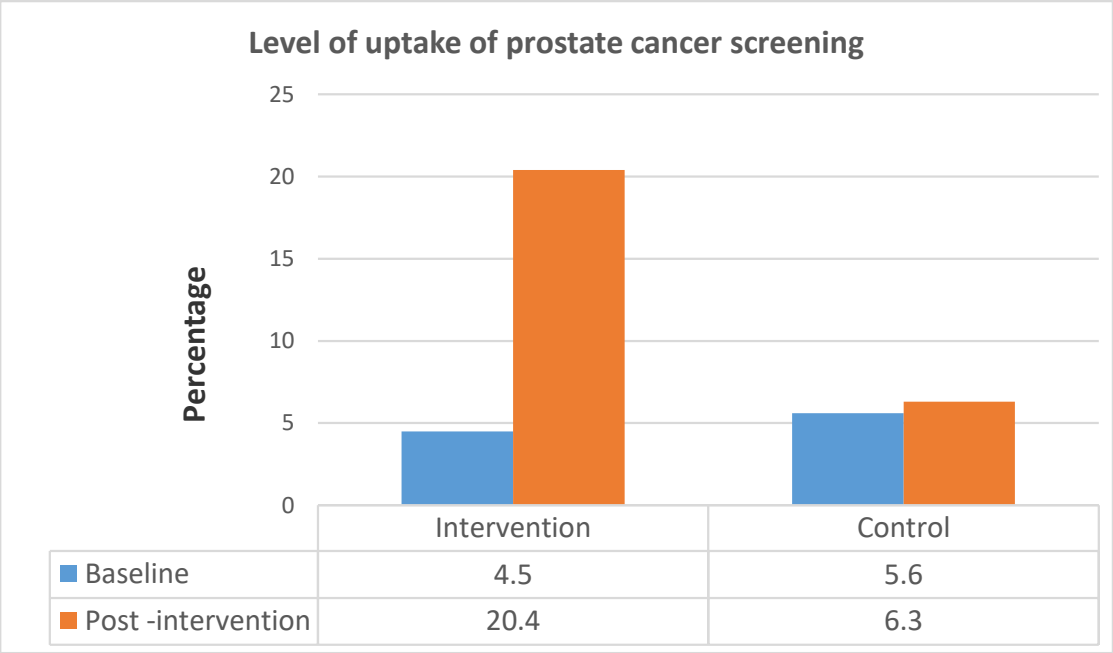


Figure 4.1: Uptake of Prostate cancer screening in the study arms

A comparison of the proportion of study participants who had taken up prostate cancer screening in the arms of the study at baseline indicated that there was no significant difference between the intervention and control arms (X^2=0.327 df=1 P=0.568). An assessment of the proportion of study participants who had taken up prostate cancer screening at post-intervention indicated that there was a significant difference in the intervention arm and control arms (X^2=24.498 df=1 P= <0.05) as indicated in table 4.5.

Table 4.5: Uptake of prostate cancer screening in the study arms

	Group	Uptake of screening			Chi square		
		Uptake N(%)	Non-uptake N(%)	Total N(%)	$\chi 2$	df	P value
Baseline	Control	16 (5.6)	272 (94.4)	288 (50)	0.327	1	0.568
N=576	Intervention	13 (4.5)	275(95.5)	288 (50)			
	Total	38 (6.6)	538 (93.4)	576 (100)			
Post - intervention	Control	18 (6.3)	269 (93.7)	287 (50.6)	24.498	1	<0.05
N=567	Intervention	57 (20.4)	223(79.6)	280 (49.4)			
	Total	75 (13.2)	492 (86.8)	567 (100)			

Key N= Frequency %= Percentage

The findings of the study suggest that community based health education intervention significantly enhanced the uptake of prostate cancer.

4.4 Socio-demographic and economic factors influencing uptake of prostate cancer screening

4.4.1 Socio-demographic characteristics influencing uptake of screening

The findings of the study indicate that socio-demographic factors (age, marital status and religion) were not significantly associated with uptake of prostate cancer screening (P>0.05) as summarized in table 4.6.

Table 4.6: Association between socio-demographic characteristics and prostate cancer screening

Variable	Category	Uptake N(%)	Non uptake N(%)	Total N(%)	Chi square /Fishers Exact
Age in years	40-49	9(3.6)	240 (96.4)	249 (43.2)	$\chi 2$ (2)=2.972, P=0.226
	50-59	10 (5.1)	187(94.9)	197 (34.2)	
	60-69	19(7.7)	120 (92.3)	130 (22.6)	
Marital status	Married	29(6.2)	440(93.8)	469(81.4)	Exact = 0.097
	Single/ widowed/separated	0(0)	107(100)	107(18.6)	
Religion	Christian	37(6.5)	528 (93.5)	565(98.1)	Exact = 0.095
	Traditionalist	0 (0.0)	6(100)	6 (1.0)	
	Muslim	1 (20)	4 (80)	5 (0.9)	

Key N= Frequency %= Percentage

4.4.2 Socio-economic characteristics influencing uptake of prostate cancer screening

In the study, occupation, the acreage of the land owned and the main source of water was significantly associated with the uptake of prostate cancer screening ($P < 0.05$) as indicated in table 4.7.

4.4.3 Association of socio-economic factors and prostate cancer screening.

Inorder to assess the influence of socio-economic factors on prostate cancer screening, the significant variables were entered into multi-variate logistics regression analysis as indicated in table 4.8. The owning of 1-3 acres of land was significantly associated with uptake of prostate cancer screening ($P<0.05$). Participants who owned 1-3 acres of land were 16 times more likely to undergo screening in comparison to those with less than 1 acre of land (OR=15.672 CI (1.256- 195.478) P= 0.033).

Table 4.7: Association between socio-economic factors and screening

Variable	Category	Uptake N(%)	Non uptake N(%)	Total N(%)	Chi square / Fishers exact
Education	**None**	0	6 (100)	6 (1.0)	Exact = 0.406
	Primary	10 (4.2)	228(95.8)	238 (41.3)	
	Secondary	13 (4.9)	254 (95.1)	267 (46.4)	
	Tertiary	6(9.2)	59(90.8)	65(11.3)	
Occupation	None	2 (1.2)	166 (98.8)	168(29.2)	**Exact = 0.008**
	Business	6 (4.6)	124(95.4)	130 (22.6)	
	Formal	5 (10.6)	42 89.4)	47 (8.2)	
	Farmer	16 (6.9)	215 (93.1)	231(40.1)	
HH income	<10,000	17(4.5)	357 (95.5)	374(64.9)	Exact = 0.076
	10000-30000	7(4.2)	159(95.8)	166 (28.8)	
	30001-50000	4 (16.0)	21 (84)	25 (4.3)	
	>50001	1 (9.1)	10 (90.9)	11 (1.9)	
Land ownership (N=337)	<1 acre	10(5.3)	179 (94.7)	189 (56.1)	**Exact = 0.008**
	1-3 acres	6 (4.5)	128(95.5)	134(39.8)	
	4-5 acres	2 (20)	8 (80)	10(3.0)	
	>5 acres	2 (50)	2 (50)	2 (1.2)	
Housing type	Permanent	19(6.6)	268(93.4)	287 (49.8)	Exact = 0.143
	Semi	10 (4.0)	238(96.0)	248 (43.1)	
	Temporary	0	41 (100)	41 (7.1)	
Source of HH water	Pubic tap	5 (2.0)	242(98.0)	247 (42.9)	**Exact = 0.010**
	Private tap	11 (6.5)	157 (93.5)	168(29.2)	
	Borehole	7 (6.5)	100 (93.5)	107 (18.6)	
	River/dam	6 (11.1)	48(88.9)	54 (9.4)	
Main cooking fuel	Electricity	0	8(100)	8 (1.4)	Exact = 0.448
	Gas	8 (5.9)	127 (94.1)	135(23.4)	
	Paraffin	0	23 (100)	23 (4.0)	
	Charcoal	0	44 (100)	44 (7.6)	
	Firewood	21 (5.7)	345(94.3)	366 (63.5)	
Main lighting	Electricity	28 (5.6)	471(94.4)	499 (86.6)	Exact = 0.353
	Lamps	1(1.5)	65 (98.5)	66(11.5)	
	Solar	0	11 (100)	11 (1.9)	

Key N= Frequency %= Percentage

Table 4.8: Association of baseline socio-economic characteristics and screening

Ever had prostate cancer screening	Odds ratio	95% CI	P value
Occupation			
Casual/None	Reference		
Farmer	3.833	(0.476 -30.855)	0.207
Business	2.309	(0.487-10.946)	0.292
Fornal employment	0.49	(0.124 -1.946)	0.311
Land acreage			
<1 Acre	Reference		
1-3 acres	15.672	(1.256- 195.478)	**0.033***
4-5 acres	2.981	(0.190-46.871)	0.437
> 5 acres	11.081	(0.937 -130.991)	0.056
Main source of water			
River/ stream/ dam	Reference		
Public piped	4.017	(0.834 - 19.349)	0.083
Private piped	1.613	(0.353 - 7.378)	0.538
Well/ borehole	1.488	(0.291 -7.613)	0.633

4.5 Barriers and facilators to prostate cancer screening

Qualitative data from Focus Group Discussions and Key Informant Interviews highlighted on the facilitators and barriers to the uptake of prostate cancer screening in the study area.

4.5.1 Facilitators to the uptake of prostate cancer screening

Four themes emerged from the FGDs and KIIs as facilitators to the uptake of prostate cancer screening which included the experience of symptoms, proximity of cancer, accessibility of screening services and community advocacy as summarized in table 4.9.

Experience of Symptoms

The experience of symptoms was reported by the participants as a major facilitator to the uptake of prostate cancer screening as stated by a participant,

"I was visiting the toilet all the time to pass urine so I decided to go to hospital to get checked. The doctor recommended that I get screened for prostate cancer. Most men will be screened when they experience a change in their body." (Respondent 2 FDG 1)

Another participant stated;

"People will go for screening if they get the symptoms since it's not something you can touch or feel". (Respondent 6 FDG 4)

A key informant stated;

"Most men will come to seek care when they experience the urinary symptoms where majority are diagnosed with advanced prostate cancer. Our men here are not very receptive to cancer screening in the absence of symptoms" (Key informant 5)

Proximity of cancer

The experience of negative outcomes from prostate cancer among family members or friends and having a close person diagnosed with prostate cancer was reported by participants as a facilitator to uptake of screening. A participant stated;

"I lost my friend recently who was very close to me from prostate cancer so I decided to take up screening. You know when you see someone you know has the disaease you see how they suffered you just want to get checked early." (Respondent 5, FGD 3)

Another stated;

"My father died from prostate cancer which was diagnosed late. This has prompted me to go for screening to ensure that it doesn't happen to me as well. I believe that had he known earlier he would still be alive…." (Respondent 2, FGD 1)

Accessibility to screening services

The provision of services that were accessible to men in peripheral facilities and at an affordable or free cost and inclusion of screening services in the National Health Insurance Fund was highlighted by majority of the respondents as a facilitator to screening. A participant stated,

"*If the government provides this screening services for free many men including myself might consider taking up screening. If other cancers are screened for free why not this one. Many people in the community are poor so screening will not be a priority….." (Respondent 1 FGD 6)*

Another participant stated;

"if this screening is offered in hospitals near us at an affordable price then probably more men will be screened. The government should consider giving us this service for free since we cannot afford the test." (Respondent 2, FGD 2)

A key informant stated;

"We need to consider the provision of screening services in the peripheral facilities to reach out to more men. I strongly believe if the services are brought closer to the people, it will improve the utilization" (Key Informant 4)

Advocacy on prostate cancer screening

The creating of awareness through various channels of communication in the community was highlighted by the participants as a motivator to uptake of prostate cancer screening.

"I was informed about prostate cancer screening in church and since I had also heard about it in the radio I decided to go for the test. If more men know about the disease they would go to get checked" (Respondent 3, FGD 5)

Another participant stated;

"I have heard about prostate cancer through the local radio, a lot of information I get about health is from the radio. If more men would be educated about this disease through the radio it might help." (Respondent 1, FGD 1)

A key informant stated;

"There is a need to educate men on prostate cancer to empower them to take up screening and other preventive measures as the disease is a public health concern in the sub-county." (Key Informant 2)

Table 4.9: Facilitators to uptake of prostate cancer screening

Themes	Sub-themes
Accessibility of services	Provision of free screening
	Inclusion of screening in national health insurance
	Provision of screening services in the peripheral facilities
	Inclusion in medical camps
Experience of symptoms	Presence of symptoms
Proximity of cancer	Death of family member/ friend/ community member
	Witnessing bad experiences of a relative/ friend/community member affected by prostate cancer
Community advocacy	Awareness created in the community/Medical camps/Mass media
	Health care workers health education/ recommendation

4.5.2 Barriers to the uptake of prostate cancer screening

Five themes emerged as barriers to the uptake of prostate cancer screening which included; lack of knowledge, fatalistic beliefs, low perception of self-vulnerability, stigma and male dominance factors as indicated in table 4.10.

Lack of knowledge

Lack of knowledge on prostate cancer disease, the aetiology and screening were reported by participants as a barrier to the uptake of prostate cancer screening. For instance, one respondent stated,

"I have not been screened since I don't know much about the disease or screening. If I am educated more about it then I might consider going for screening" (Respondent 1, FGD 4)

Another participant stated;

"*Most men in the community have not been screened for prostate cancer as many of us don't understand much about the disease or where to get the test and since we are not sick screening has not been a priority" (Respondent 2, FGD 1)*

There was existence of myths and misconceptions among this rural population regarding the etiology of prostate cancer which deterred uptake of screening with the predominant cause of prostate cancer reported being denial of conjugal rights as illustrated by one participant;

"This disease is caused by lack of sex so men don't want to go for screening because it will indicate their sexual life has a problem." (Respondent 2, FGD 6)

Another FGD participant stated;

"Most of us do not know much about prostate cancer and what causes it. I heard from social media that men with many sexual partners cannot get prostate cancer. In the community, people say that this disease is caused by the denial of conjugal rights. We lack information about this disease and only rely on what is said in the community which we are not sure whether it's true." (Respondent 3, FGD 2)

Other causes of prostate cancer reported included women getting to menopause when men were still sexually active, bacteria, masturbation, having several sexual partners, and punishment from God. Several myths and misconceptions were also reported regarding prevention of prostate cancer which included a man having several sexual partners, being hygienic, showering every day, loving their wives, being faithful to one partner, eating traditional foods that enhance sexual performance, and trusting in God.

One FGD participant stated;

"When a man has the urge to have sex and is denied by the wife the accumulation of sperms which were supposed to be released from the body causes bacteria to enter in the system causing the disease. I totally blame our women for denying men their conjugal rights, which is now causing men to get prostate cancer. The only way men can prevent themselves is getting another sexual partner to meet their needs" (Respondent 2, FGD 4)

The majority of the participants also reported that they were not aware of the methods used for prostate cancer screening. The participants reported that men felt that they are always left out in health education programs which limits their understanding of the diseases as the focus is mainly on women and children as indicated by one participant;

"We hear of prostate cancer but it is still a mystery to many of us. I have not been screened since I don't know what method will be used. I've heard of some men in the community who talk about getting fingers inserted in the anus during screening and I don't know whether this is true or not." (Respondent 3, FGD 1)

Another participant stated;

"We don't know much about this disease as we men have really been left out in the health programmes, all we see are campaigns for women health issues and children. We need to be included as well since we are also dying from many diseases in the

community. Why are cancers affecting women given more priority than those affecting men like prostate cancer?" (Respondent 1, FGD 2)

This was also echoed by the key informants;

"The general knowledge on cancer in the sub-county is high but knowledge on prostate cancer is very low as the health education programmes carried out in the sub-county have focused on breast and cervical cancer and none has focused on prostate cancer…" (Key Informant 2)

Perception of fatalism towards prostate cancer

Fatalistic beliefs were reported as a major barrier to the uptake of prostate cancer screening. The participants seemed to perceive a diagnosis of prostate cancer as a death sentence as expressed by a participant;

"When I think of cancer I think of death and what comes to my mind is trouble in the family. I have lost a close family member and a friend who had cancer and it was very devastating. The money used was soo much but they finally died. I see disaster, suffering and eventually death. I dread testing……" (Respondent 3, FDG 1)

Participants also expressed fear of a cancer diagnosis as a participant stated;

"Cancer is not curable because all the people I know who have been diagnosed with prostate cancer have all died from the disease despite all they have done. It doesn't matter what you do with cancer in the equation the denominator is always death. I fear cancer more than any other disease. You just start writing the eulogy after diagnosis."(Respondent2, FGD 3)

The participants expressed pessimism towards prostate cancer and felt that no matter what was done death was still the outcome as stated by a participant;

"What is the point of knowing I have the prostate cancer it will only bring my death closer. What I don't know will not kill me. If I have to be started on treatment that is too expensive that will lead my family to sell property and eventually I will still die, then I would rather not go for the screening" (Respondent 5, FGD 2)

A key informant stated;

"*In the community people equate cancer to death which has contributed to majority of the men not undertaking screening and resulting to using herbal medication and seeking health care much later when the disease has spread." (Key nformant, 1)*

Low Perception of Self-vulnerability

Low perception of self-vulnerability towards prostate cancer was reported as a barrier to uptake of prostate cancer screening. One participant stated;

"*I have not been screened since I believe that I cannot get this disease after all I take lots of healthy juices and my marriage is okay, you know what I mean. As a man I believe that I am not at risk of getting prostate cancer now or in the future." (Respondent 2, FGD1)*

Another participant stated;

"I donot believe that I am personally at risk of getting this disease, there is no way I can be at risk than other men." (Respondent 4, FGD 3)

A middle -aged participant stated;

"Many men do not go for screening since they do not believe that they can get the disease. May be some sort of denial……".(Respondent 1, FDG 5)

A Key informant stated;

"The medical camps have seen a very low turn-out of men for prostate cancer screening

since majority don't think they are at risk of developing the disease. We need to reach out to men considered at risk of prostate cancer in the community" (Key Informant 2)

Male dominance factors

Male dominance factors emerged as a major barrier to screening which included threatening of masculinity due to poor sexual performance and association of sickness with feminity. As reported by a discussant,

"This disease will mess up your sexual performance no man wants the confirmation that they have it. How will you start discussing your sexual matters with other people? It's very hard for men to share their sensitive issues. After all this disease is caused by denial of conjugal rights" (Respondent 5, FGD 3)

Another FGD participant stated;

"There is a time there was a medical camp offering cancer screening in our community but I did not see men going to be screened most of this things are for women. As a man I only go to hospital when im very sick" (Respodent 2, FGD 2)

Another stated;

"It's impossible to get men to come to hospital when they are not sick. We come to the hospital when we are very sick or to bring the children and our wives. Men cannot come to hospital to line up when they are well." (Respondent 4, FGD 5)

The preference for older male clinicians for the provision of prostate cancer screening services was reported by the participants. The provision of screening services by young females was reported as a barrier to screening as expressed by a participant;

"Many health care providers are young females and its taboo for a young girl to see an old man naked therefore I would rather not go for screening. We need a men for men program for this things…" (Respondent 2, FGD 3)

Table 4.10: Barriers to uptake of prostate cancer screening

Themes	Sub-themes
Lack of knowledge	Lack of knowledge on prostate cancer disease
	Lack of information on screening (where/ methods/cost)
	Confusion of prostate cancer with 'old man's disease'(BPH)
	Myths and misconceptions on etiology of prostate cancer (denial of conjugal rights)
Perception of Fatalism towards PC	Pessimism towards Prostate Cancer
	Perception of death inevitability on diagnosis/ Death sentence
	Fear of a diagnosis of Prostate Cancer
Low Perception of Self-vulnerability	Consider themselves at low risk
	Lack of symptoms
Male dominance factors	Association of sickness with feminity
	Masculinity threatened by low sexual performance
	Secrecy among men
	Preference of older males for screening
Stigma	Social isolation due to shame
	Embarrassing disease associated with sexual changes

Stigma associated with prostate cancer

Stigma associated with the disease was also cited as a barrier due to it's association with sexual behavior. A participant stated;

"…who really wants to go for screening it will be like you are informing other people of your inability to perform sexually it's too shameful for any man." (Respondent 2, FDG 6)

Another participant stated;

"This is a very shameful disease. No man wants others to find out that they have this disease its too embarrassing." (Respondent 5, FGD 1)

A key informant stated;

"There is a lot of stigma associated with prostate cancer in the community due to the myths and misconceptions regarding its cause and this contributes to men not participating in screening" Key Informant 4

4.6 Knowledge and awareness on prostate cancer in the arms of the study

4.6.1 Awareness on prostate cancer in the intervention and control arms

Findings at baseline indicated that 83.3% (284) in the intervention arm and 83.7% (241) of the respondents in the control arm had ever heard about prostate cancer. The main source of the information cited was mass media, which constituted 72.8% (174) in the intervention arm and 68% (164) in the control arm. Regarding treatment, 82.3% (237) in the intervention arm and 58% (167) in the control arm were aware that prostate cancer can be treated. Majority of the respondents, 73(30.8%) in the intervention arm and 79(47.3%) in the control arm cited surgery as a treatment mode. Majority 170(59%) in the intervention and 172(59.7%) in the control arm had never heard about prostate cancer screening. Only 18.4% (53) and 22.6% (63) of the respondents were aware of any method of screening in intervention and control arm respectively. The most commonly cited method of screening in the intervention arm was PSA testing which constituted 77.4% (41) while in the control arm the majority 44.6% (29) reported Digital Rectal Examination. Majority of the respondents 69.4% (200) in the intervention arm and 74.0% (213) in the control arm knew somebody who had undergone PC screening at the time of the study (Table 4.11).

Table 4.11: Awareness on prostate cancer at baseline

Variable	Category	Intervention	Control	All N(%)
Ever heard about prostate cancer	Yes	240(83.3%)	241(83.7%)	481(83.5%)
	No	48(16.3%)	47(16.7%)	95(16.6%)
Source of information	Mass media	174(72.8%)	164(68.0%)	338(70.4%)
	Friend	39(16.3%)	18(7.5%)	57(11.9%)
	Relative	11(4.6%)	18(7.5%)	29(6%)
	HCW	4(1.7%)	14(5.8%)	18(3.8%)
	Church	5(2.1%)	16(6.6%)	21(4.4%)
	CHV	6(2.5%)	11(4.6%)	17(3.5%)
Family history of prostate cancer	Yes	32(11.1%)	24(8.3%)	56(9.7%)
	No	264(91.7%)	256(88.9%)	520(90.3%)
Awareness of symptoms	Yes	73(25.3%)	55(19.1%)	128(22.2%)
	No	215(74.7%)	233(80.9%)	448(77.8%)
Awareness of prostate cancer treatment	Yes	237(82.3%)	167(58%)	404(70.1%)
	No	51(17.7%)	121(42%)	172(29.9%)
Mode of treatment	Drugs	73(30.8%)	50(29.9%)	123(30.4%)
	Surgery	73(30.8%)	79(47.3%)	152(37.6%)
	Radiotherapy	12(5.1%)	8(4.8%)	20(5%)
	Herbal remedies	18(7.6%)	1(0.6%)	19(4.7%)
	Chemotherapy	36(15.2%)	18(10.8%)	54(13.4%)
	Don't know	65(27.4%)	36(21.6%)	101(25%)
Ever heard about screening	Yes	118(41%)	116(40.3%)	234(40.6%)
	No	170(59%)	172(59.7%)	342(59.4%)
Awareness on method for screening	Yes	53(18.4%)	65(22.6%)	118(20.5%)
	No	235(81.6%)	223(77.4%)	458(79.5%)
Methods of screening known	PSA screening	41(77.4%)	23(35.4%)	64(54.2%)
	Digital Rectal Exam	8(15.1%)	29(44.6%)	37(31.4%)
	Biopsy	4(7.5%)	13(20%)	17(14.4%)
Aware of anyone screened	Yes	88(30.6%)	75(26.0%)	163(28.3%)
	No	200(69.4%)	213(74.0%)	413(71.7%)

Key N= Frequency %= Percentage

The proportion of respondents who had heard about prostate cancer at baseline was 83.3% (240) in the intervention arm and 83.7% (241) in the control arm. There was no significant difference in the arms of the study at baseline (X^2 =0.013 df=1 P=0.911). Post-intervention, the proportion in the intervention arm was 99.3% (278) while in the control arm it was 83% (239). There was a significant difference in the intervention and

control arms of the study (X^2=36.607 df=1, P<0.05). Regarding awareness on the signs and symptoms of prostate cancer, only 25.3% (73) and 19.1% (55) of the respondents were aware of the signs and symptoms of prostate cancer at baseline in the intervention and control arms respectively. There was no significant difference in awareness of signs and symptoms at baseline between the two arms of the study (X^2=3.254 df= 1 P= 0.071). At post- intervention, the awareness in the intervention arm was 80% (224) in comparison to 30.6% (88) in the control arm. There was a significant difference between the intervention and control arms of the study post intervention (X^2=133.83 df=2 P<0.05) as indicated in table 4.12.

Table 4.12: Comparison of awareness on prostate cancer in the intervention and control arms of the study

		Baseline			Post-intervention	
Variable	**Group**	**N (%)**	X^2 **,df, P value**	**Group**	**N (%)**	X^2 ,df, P value
Heard of PC	Control	241(83.7)		Control	239(83)	
	Intervention	240(83.3)	X^2 =0.013(1) P=0.911	Intervention	278(99.3)	X^2=36.607(1) P<0.05
Awareness of symptoms	Control	55(19)		Control	88(30.6)	
	Intervention	73(25.3)	X^2=3.254(1) P= 0.071	Intervention	224(80)	X^2=133.83(2) P<0.05
Awareness of screening	Control	65(22.6)		Control	84(29.3)	
	Intervention	53(18.4)	X^2 =1.535(1) P=0.215	Intervention	252(90)	X^2 =58.049(1) P<0.05

Key N= Frequency %= Percentage PC= Prostate cancer

The proportion of respondents aware of prostate cancer screening methods at baseline was 18.4% (53) in the intervention arm and 22.6% (65) in the control arm. There was no significant difference between the arms of the study (X^2 =1.535 df=1 P=0.215). Post-intervention the awareness on prostate cancer screening methods in the control arm was 29.3% (84) compared to 90% (252) in the intervention arm. There was a significant difference between the intervention and control arms (X^2 =58.049 df=1 P<0.05). The

findings of this study suggest that community based health education significantly increased awareness on prostate cancer among the respondents.

4.6.2 Knowledge on prostate cancer in the intervention and control arms of the study

Knowledge was assessed at baseline and post-intervention to compare the differences in the intervention and control arms of the study. There was a significant increase in knowledge on the signs and symptoms of prostate cancer in the intervention arm of the study at post-intervention. The proportion of respondents who were knowledgeable to 'I will be able to know I have prostate cancer immediately through the symptoms I experience' increased significantly from 40.6% to 62.5% (X^2=27.196 df=1 P=<0.05) while in the control arm there was no significant change (X^2=0.427 df=1 P=0.513) as indicated in table 4.13.

Table 4.13: Knowledge of symptoms in the arms of the study

Variable	Intervention N(%)			Control N(%)		
Knowledge	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
I will know I have PC through the symptoms I experience*	117 (40.6)	175(62.5)	27.196 (1) P=< 0.05	114(39.6)	106(36.9)	0.0427 (1) P=0.513

Key N= Frequency %= Percentage *Reverse coded

Knowledge on the risk factors of prostate cancer increased in the intervention arm post-intervention in comparison to the control arm. For instance, the proportion of respondents who were knowledgeable on the fact that younger men are less likely to get prostate cancer than older men increased significantly from 62.5% to 73.2% in the intervention arm (X^2 =6.188 df=1 P= 0.013) while in the control arm there was no significant change (X^2 =1.949 df=1 P=0.163). The proportion of respondents who agreed that eating vegetables decreases the risk of men developing prostate cancer significantly

increased in the intervention arm from 86.5% to 94.3% (X^2 =9.423 df=1 P=0.002) while in the control arm there was no significant difference (X^2 =2.891 df=1 P=0.089) as indicated in table 4.14.

Table 4.14: Comparison of knowledge on prostate cancer risk factors in the arms of the study

Variable	**Intervention N(%)**			**Control N(%)**		
Knowledge; risk factors	**Baseline**	**Post-intervention**	***X²*, df, P**	**Baseline**	**Post-intervention**	***X²*, df, P**
Younger men are more likely to get prostate cancer than older men*	180(62.5)	205(73.2)	6.188 (1) P=0.013	229(79.5)	242(84.3)	1.949 (1) P=0.163
Eating vegetables increases the risk of a man developing prostate cancer*	249(86.5)	264(94.3)	9.423 (1) P=0.002	240(83.3)	255(88.9)	2.891 (1) P=0.089

Key N= Frequency %= Percentage *Reverse coded

Knowledge on management of prostate cancer also increased significantly in the intervention arm at post-intervention in comparison to baseline. The proportion of respondents who were knowledgeable on 'Prostate cancer can cause death if it is left untreated' increased from 40.6% to 52.1% (X^2=7.575 df=1 P=0.006) in the intervention arm while in the control arm there was no significant change (X^2=0.417 df=1 P=0.518). Similarly, the proportion of respondents who were knowledgeable on 'Prostate cancer disease is curable' significantly increased from 20.1% to 30% (X^2=7.134 df=1 P=0.008) while in the control arm there was no significant change (X^2=2.180 df=1 P=0.140) as it decreased from 29.9% to 20.2% as indicated in table 4.16.

Table 4.15: Comparison of Knowledge in the study arms at baseline and post-intervention

Knowledge	Intervention N(%) Pre-intervention		Post-intervention		Control N(%) Pre-intervention		Post-intervention	
Variable	**Agree**	**Disagree**	**Agree**	**Disagree**	**Agree**	**Disagree**	**Agree**	**Disagree**
I will be able to know I have PC through the symptoms I experience*	117(40.6)	171(59)	175(62.5)	105(37.5)	114(39.6)	174(60.4)	106(36.9)	181(63.1)
Younger men are more likely to get prostate cancer than older men*	180(62.5)	86(37.5)	205(73.2)	75(26.8)	229(79.5)	59(20.5)	242(84.3)	45(15.7)
Having somebody in your family having PC increases the chance of getting PC.	172(59.7)	116(40.3)	171(61.1)	109(38.9)	143(49.7)	145(50.3)	133(46.3)	154(53.7)
Eating red meat increases the risk of a men developing prostate cancer	53(18.4)	235(81.6)	82(29.8)	198(70.7)	168(58.3)	120(41.7)	139(48.4)	148(51.6)
Eatingvegetables increases the risk of PC*	249(86.5)	39(13.5)	264(94.3)	16(5.7)	240(83.3)	48(16.7)	255(88.9)	32(11.1)
A man with many sexual partners is more likely to develop prostate cancer*	120(41.7)	168(58.3)	123(43.9)	157(56.1)	177(61.5)	110(38.5)	212(73.9)	75(26.1)
A man can prevent himself from getting PC by not smoking cigarettes/ tobacco.	72(25)	216(75)	219(78.2)	61(21.8)	66(22.9)	222(77.1)	147(51.2)	140(48.8)
Prostate cancer disease is curable	58(20.1)	230(79.9	84(30.0)	196(70.0)	94(32.6)	194(67.4)	111(38.7)	176(61.3)

Prostate cancer can cause death if it is left untreated	117(40.6)	171(59.4)	146(52.1)	134(47.9)	120(41.7)	168(58.3)	112(39.0)	175(61)
Early testing for PC cannot tell if one has PC*	77(26.7)	211(73.3)	148(52.9)	132(47.1)	74(25.7)	214(74.3)	98(34.1)	189(65.9)
PC diagnosed early through testing has better clinical outcomes	120(41.7)	168(58.3)	148(52.9)	132(47.1)	102(35.4)	186(64.6)	98(34.1)	189(65.9)
All adult men should undergo PC screening*	57(19.8)	231(80.2)	235(83.9)	45(16.1)	210(72.9)	78(27.1)	103(35.9)	184(64.1)
Men should undergo PC screening once*	124(43.1)	164(56.9)	127(45.4)	153(54.6)	134(46.5)	154(53.5)	50(17.4)	237(82.6)

Key N= Frequency %= Percentage *Reverse coded PC= Prostate Cancer

Table 4.16: Knowledge on management of prostate cancer in the arms of the study

Variable	Intervention N(%)			Control N(%)		
Knowledge; management of prostate cancer	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
Prostate cancer can cause death if it is left untreated	117(40.6)	146(52.1)	7.575 (1) P=0.006	120(41.7)	112(39.0)	0.417 (1) P=0.518
Prostate cancer disease is curable	58(20.1)	86(30.0)	2.180 (1) P=0.008	94(32.6)	111(38.7)	7.134 (1) P=0.140

Key N= Frequency %= Percentage *Reverse coded

Knowledge on benefits and eligibility criteria for prostate cancer screening similarly increased in the intervention arm in comparison to the control arm as indicated in table 4.17. For instance, the proportion who agreed to 'Prostate cancer diagnosed early through testing has better clinical outcomes' significantly increased from 41.7% to 52.9% (X^2=7.134 df=1 P=0.008) in the intervention arm while in the control arm there was no significant difference (X^2=0.102 df=1 P=0.749). Similarly, the proportion of respondents who were knowledgeable on 'Early testing for prostate cancer can tell if one has prostate cancer' increased from 26.7% to 52.9% (X^2=40.495 df=1 P=<0.05) in the intervention arm while in the control arm it slightly increased from 25.7% to 34.1% (X^2=4.898 df=1 P=0.027). The proportion of men who were knowledgeable on 'Not All adult men should undergo prostate cancer screening increased from 19.8% to 83.9% (X^2=233.788 df=1 P=<0.05) while in the control arm there was a significant decrease from 72.9% to 35.5% (X^2=79.462 df=1 P=<0.05).

Table 4.17: Knowledge on prostate cancer screening in the intervention and control arms of the study

Variable	Intervention N(%)			Control N(%)		
Knowledge on prostate cancer screening	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
Prostate cancer diagnosed early through testing has better clinical outcomes	120(41.7)	148(52.9)	7.134 (1) P=0.008	102(35.4)	98(34.1)	0.102 (1) P=0.749
All adult men should undergo prostate cancer screening*	57(19.8)	235(83.9)	233.788 (1) P=<0.05	210(72.9)	103(35.9)	79.462 (1) P=<0.05
Early testing for prostate cancer cannot tell if one has prostate cancer*	77(26.7)	148(52.9)	40.495 (1) P=<0.05	74(25.7)	98(34.1)	4.898 (1) P=0.027

Key N= Frequency %= Percentage *Reverse coded

The study findings indicate that knowledge on prostate cancer significantly increased following the intervention in comparison to baseline. These findings indicate that Community Based Health Education significantly increased the level of knowledge on prostate cancer.

4.7 Perception of Self-vulnerability towards prostate cancer in the intervention and control arms of the study

The perception of self-vulnerability towards prostate cancer was assessed based on four sub-scales of perceived vulnerability, which included; absolute perceived vulnerability, conditional perceived vulnerability and prostate cancer related worry as summarized in Table 4.18.

Table 4.18: Perception of self-vulnerability at baseline and post-intervention in the intervention and control arms of the study

	Intervention N(%)				Control N(%)			
	Pre-intervention		Post intervention		Pre-intervention		Post-intervention	
Variable	**Agree**	**Disagree**	**Agree**	**Disagree**	**Agree**	**Disagree**	**Agree**	**Disagree**
In my opinion prostate cancer is not a common disease among men*	147(51)	141(49)	159(56.8)	121(43.2)	126(43.8)	162(56.3)	139(48.4)	148(51.6)
I believe that at my age, I don't need to get screened for PC*	97(33.7)	191(66.3)	119(42.5)	161(57.5)	107(37.2)	181(62.8)	78(27.3)	208(72.7)
Compared with other diseases, having a PC test is not important*	113(39.2)	175(60.8)	261(93.2)	19(6.8)	111(38.5)	177(61.5)	120(41.8)	167(58.2)
I believe that getting a PC test would take too much of my time at the hospital.*	65(22.6)	223(77.4)	100(35.7)	180(64.3)	83(28.8)	205(71.2)	60(20.9)	227(79.1)
I believe having a PC test would cost me too much money unnecessarily*	114(39.6)	174(60.4)	201(71.8)	79(28.2)	93(32.3)	195(67.7)	111(38.7)	176(61.3)
I am too busy to undertake PC screening*	104(36.1)	184(63.9)	133(47.5)	147(52.5)	100(34.7)	188(65.3)	105(36.6)	182(63.4)
I believe that I am at risk of getting PC.	113(39.2)	175(60.8)	156(55.7)	124(44.3)	92(31.9)	196(68.1)	74(25.8)	213(74.2)
I am at a higher risk of getting prostate cancer than other men of my age.	125(43.4)	163(56.6)	117(41.8)	163(58.2)	87(30.2)	201(69.8)	89(31)	198(69)
Compared to other men my age, It is likely that I will get PC in future	131(45.5)	157(54.5)	104(37.1)	176(62.9)	96(33.3)	192(66.7)	63(22)	224(78)
I worry about getting PC	165(57.3)	123(42.7)	136(48.6)	144(51.4)	119(41.3)	169(58.7)	71(24.7)	216(75.3)
I worry about taking a PC test	91(31.6)	197(68.4)	103(36.8)	177(63.2)	101(35.1)	187(64.9)	57(19.9)	230(80.1)

Key N= Frequency %= Percentage PC= Prostate Cancer *Reverse coded

A comparison of the absolute perceived self-vulnerability in the intervention and control arm indicated that there was a significant increase in the intervention arm while there was essentially no change in the control arm. The proportion of respondents who agreed to 'I believe that I am at risk of getting prostate cancer' increased from 39.2% to 60.8% (X^2=5.463 df=1 P= <0.05) in the intervention arm compared to the control arm where there was no significant change (X^2=2.657 df=1 P=0.103) as indicated in table 4.19.

Table 4.19: Comparison of absolute vulnerability in the study arms

Variable	Intervention N(%)			Control N(%)		
Absolute vulnerability	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
I believe that I am at risk of getting prostate cancer	113(39.2)	156(55.7)	15.463 (1) P<0.05	92(31.9)	74(25.8)	2.657 (1) P=0.103

Key N= Frequency %= Percentage

Concerning conditional perceived vulnerability, there was a significant increase in the intervention arm with no significant change in the control arm of the study (Table 4.20). The proportion of respondents who believed that 'Compared with other diseases, having prostate cancer screening is important' increased from 39.2% to 93.2% (X^2=183.934 df=1 P=0.05) in the intervention arm compared to the control arm where there was no significant change (X^2=0.409 df=1 P=0.523). The proportion who agreed to 'At my age, I need to get screened for prostate cancer' increased from 33.7% to 42.5% (X^2=4.686 df=1 P=0.030) in the intervention arm while in the control arm there was a significant decrease from 37.2% to 27.3%. (X^2=6.413 df=1 P=0.011). The proportion of respondents with the belief that having a prostate cancer test would cost too much money unnecessarily, increased from 39.6% to 71.8% (X^2=60.845 df=1 P=<0.05) in the intervention arm while in the control arm there was no significant change (X^2=2.560 df=1 P=0.110). There was a significant increase in the proportion who agreed to 'I believe that getting a prostate cancer test would take too long at the hospital' in the

intervention arm at post-intervention. This increased from 22.6% to 35.7% (X^2=11.902 df=1 P=0.001) while in the control arm there was a significant decrease (X^2=4.818 df=1 P=0.028). The proportion who agreed to 'I am not too busy to undertake prostate cancer screening' increased from 36.1% to 47.5% (X^2=7.573 df=1 P=0.006) in the intervention arm while in the control arm there was no significant change (X^2=0.218 df=1 P=0.641).

Table 4.20: Comparison of perception of conditional vulnerability in the arms of the study

Variable	Intervention N(%)			Control N(%)		
Conditional vulnerability	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
At my age, I do not need to get screened for prostate cancer*	97(33.7)	119(42.5)	4.686 (1) P=0.030	107(37.2)	78(27.3)	6.413 (1) P=0.011
Compared with other diseases, having prostate cancer screening is not important*	113(39.2)	261(93.2)	183.934 (1) P=0.05	111(38.5)	120(41.8)	0.409 (1) P=0.523
I believe that getting a prostate cancer test would take too much of my time at the hospital*	65(22.6)	100(35.7)	11.902 (1) P=0.001	83(28.8)	60(20.9)	4.818 (1) P=0.028
Having a prostate cancer test would cost me too much money unnecessarily*	114(39.6)	201(71.8)	60.845 (1) P=<0.05	93(32.3)	111(38.7)	2.560 (1) P=0.110
I am too busy to undertake prostate cancer screening*	104(36.1)	133(47.5)	7.573 (1) P=0.006	100(34.7)	105(36.6)	0.218(1) P=0.641

Key N= Frequency %= Percentage *Reverse coded

A comparison of the perception of self-vulnerability scores at baseline and post-intervention revealed that there was a significant increase in absolete and conditioned vulnerability towards prostate cancer in the intervention arm while there was no change in the control arm. However, the scores for prostate cancer worry did not improve following the intervention for both arms of the study. The findings of the study suggest

that Community Based Health Education signicantly increased perception of self-vulnerability towards prostate cancer.

4.8 Prostate cancer fatalism in the intervention and control arms of the study

Prostate cancer fatalism between the intervention and control arms of the study was assessed using 11 items derived from Powes fatalism inventory. The scale was composed of four attributes of fatalism, which included; fear, predestination, pessimism and death inevitability (Table 4.21).

Table 4.21: Prostate cancer fatalism in the groups at baseline and post-intervention

Fatalism	Intervention N(%)				Control N(%)			
	Pre-intervention		Post-intervention		Pre-intervention		Post-intervention	
Variable	Agree	Disagree	Agree	Disagree	Agree	Disagree	Agree	Disagree
Of all diseases I am most afraid of cancer	149(52.3)	139(49.3)	136(47.7)	143(50.7)	150(55.8)	138(45.1)	119(44.2)	168(54.9)
I believe that most people don't want to know they have PC due to the fear of dying	107(44.0)	181(55.7)	136(56.0)	144(44.3)	91(36.0)	197(61.4)	162(64.0)	124(38.6)
I believe if someone gets PC it's already too late to get treated for it.	192(83.8)	96(28.4)	37(16.2)	242(71.6)	176(66.4)	112(36.2)	89(33.6)	197(63.8)
A PC test will not decrease my chances of dying from prostate cancer.	84(65.1)	204(46.5)	45(34.9)	235(53.5)	81(42.0)	207(54.3)	112(58.0)	174(45.7)
I believe if somebody gets PC it doesn't matter when they find out they will still die.	115(69.3)	173(43.0)	51(30.7)	229(57.0)	89(49.7)	199(50.4)	90(50.3)	196(49.6)
I think PC will kill you no matter when it's found and how it's treated.	108(63.9)	180(45.1)	61(36.1)	219(54.9)	73(39.7)	215(55.0)	111(60.3)	176(45.0)
I believe if someone was meant to get PC, they will get it as it is Gods will.	107(67.3)	181(44.3)	52(32.7)	228(55.7)	100(47.8)	188(51.4)	109(52.2)	178(48.6)
I believe if someone gets cancer that's how they were meant to die.	102(67.1)	186(44.7)	50(32.9)	230(55.3)	91(44.4)	197(53.2)	114(55.6)	173(46.8)
I believe if someone gets PC their time to die is near	95(85.6)	193(42.2)	16(14.4)	264(57.8)	106(59.2)	182(46.2)	73(40.8)	212(53.8)
I believe PC kills most people who get it.	116(69.5)	172(42.9)	51(30.5)	229(57.1)	115(49.6)	173(50.4)	117(50.4)	170(49.6)
If I was diagnosed with PC, I would not live for more than five years.	88(72.1)	200(44.8)	34(27.9)	246(55.2)	86(38.9)	202(57.1)	135(61.1)	152(42.9)

Key N= Frequency %= Percentage PC= Prostate Cancer

There was a significant decrease in the belief that prostate cancer is a predetermined occurrence in the intervention arm at post-intervention in comparison to the baseline (Table 4.22). For instance, the proportion of respondents who agreed to 'I believe if someone was meant to get prostate cancer they will get it as it is Gods will' decreased significantly from 37.2% to 18.6% at post-intervention (X^2=24.318 df=1 P= <0.05) while in the control arm there was no significant change (X^2=0.659 df=1 P=0.417). The proportion of respondents who agreed to 'I believe if someone gets cancer that's how they were meant to die' significantly decreased in the intervention arm from 35.4% to 17.9 (X^2=22.335 df=1 P=<0.05) while in the control arm there was a significant increase from 31.6% to 39.7% (X^2=4.136 df=1 P=0.042).

Table 4.22: Prostate cancer fatalism (pre-destination) in the intervention and control arms of the study

Variable	**Intervention N(%)**			**Control N(%)**		
Pre-destination	**Baseline**	**Post-intervention**	**X^2, df, P**	**Baseline**	**Post-intervention**	**X^2, df, P**
I believe if someone was meant to get prostate cancer they will get it as it is Gods will.	107(37.2)	52(18.6)	24.318 (1) P=<0.05	100(34.7)	109(38)	0.659 (1) P=0.417
I believe if someone gets cancer that's how they were meant to die.	102(35.4)	50(17.9)	22.335 (1) P= <0.05	91(31.6)	114(39.7)	4.136 (1) P=0.042

Key N= Frequency %= Percentage

Post-intervention, there was a decrease in pessimistic beliefs in the intervention arm in comparison to baseline (Table 4.23). The proportion who agreed to 'I believe if somebody gets prostate cancer it doesn't matter when they find out they will still die' significantly decreased from 39.9% at baseline to 18.2% (X^2=32.369 df=1 P=<0.05) at post-intervention in the intervention arm while in the control arm there was no significant change (X^2=0.021 df=1 P= 0.884). There was a significant decrease in the proportion of respondents who agreed to, 'A prostate cancer test will not decrease my

chances of dying from prostate cancer' from 29.2% to 16.1% in the intervention arm (X^2= 13.870 df=1 P=< 0.05) while in the control arm the proportion increased significantly from 28.1% to 39.2% (X^2= 7.831 df=1 P=0.005). Similarly, the proportion of respondents who agreed to 'I think prostate cancer will kill you no matter when it's found and how it's treated' decreased significantly from 37.5% to 21.8 % in the intervention arm (X^2= 28.539 df=1 P=0.005) while in the control arm it increased significantly from 25.3% to 38.7% (X^2= 11.736 df=1 P=<0.05).

Table 4.23: Pessimism towards prostate cancer at baseline and post-intervention in the arms of the study

Variable	**InterventionN(%)**			**Control N(%)**		
Pessimism	**Baseline**	**Post-intervention**	***X²*, df, P**	**Baseline**	**Post-intervention**	***X²*, df, P**
I believe if somebody gets prostate cancer it doesn't matter when they find out they will still die.	115(39.9)	51(18.2)	32.369 (1) P=<0.05	89(30.9)	90(31.7)	0.021 (1) P= 0.884
A prostate cancer test will not decrease my chances of dying from prostate cancer	84(29.2)	45(16.1)	13.870 (1) P=< 0.05	81(28.1)	112(39.2)	7.831 (1) P=0.005
I think prostate cancer will kill you no matter when it's found and how it's treated'	108(37.5)	61(21.8)	28.539 (1) P=0.005	73(25.3)	111(38.7)	11.736 (1) P=<0.05

Key N= Frequency %= Percentage

There was a significant decrease in the belief of death inevitability in the intervention arm at post-intervention (Table 4.24). The proportion of respondents who agreed to 'I believe prostate cancer kills most people who get it' significantly decreased from 40.3% to 18.2% (X^2= 33.296 df=1 P=< 0.05) in the intervention arm while in the control arm there was no significant change (X^2=0.042 df=1 P= 0.838). Similarly, the proportion who agreed to 'If I was diagnosed with prostate cancer, I would not live for more than five years' decreased from 30.6% to 12.1% (X^2=28.539 df=1 P=<0.05) in the

intervention arm while in the control arm there was a significant increase from 29.9% to 47.0% (X^2= 17.925 df=1 P=<0.05).

Table 4.24: Perception of death inevitability towards prostate cancer

Variable	Intervention N(%)			Control N(%)		
eath Inevitability	**aseline**	**Post-tervention**	**², df, P**	**aseline**	**ost-tervention**	**², df, P**
believe prostate cancer lls most people who get	6(40.3)	l(18.2)	3.296 (1) P=< 05	l5(39.9)	l7(40.8)	042 (1) P=0.838
i was diagnosed with ostate cancer, i would ot live for more than ve years	3(30.6)	4(12.1)	3.539 (1) P=<0.05	5(29.9)	35(47)	7.925(1) =<0.05

Key N= Frequency %= Percentage

There was a significant decrease in prostate cancer fatalism scores for the attributes of pessimism, pre-determination and death inevitability in the intervention arm post-intervention while in the control arm there was generally no significant decrease in the fatalism scores. Notably, fear towards prostate cancer increased in both arms of the study. The findings of this study suggest that community based health education delivered by CHVs significantly decreased prostate cancer fatalism.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Discussion

This chapter discusses the study findings in accordance with the study objectives, appropriate postulates, and comparison with previous studies. The themes include uptake of prostate cancer screening, socio-demographic and economic factors, knowledge and awareness, perception of self-vulnerability, and fatalism. Conclusions and recommendations based on the study findings are also included in this chapter.

5.2 Uptake of prostate cancer screening

The level of uptake of prostate cancer screening was abysmally low in the intervention and control arms of the study at baseline. The proportion of men aged 40-69 years who had taken up prostate cancer screening at baseline in the intervention arm was 4.5% while in the control arm it was 5.6%. The findings are incongruent with a population-based study in Australia, which reported prostate cancer screening rates of 51.8% (Nair-Shalliker, 2018). A study conducted in Brazil similarly reported screening rates of 51.9% (Paiva et al., 2018). In the USA, similar high rates of screening were reported from a national survey conducted among men (Drazer et al., 2015). The finding is congruent with a study conducted among Kenyan men in a rural community in Makueni County, which reported a prostate cancer-screening rate of 2.6% (Mutua et al., 2017). Wachira et al. (2018) found that only 1% of men in Mathare slums in Nairobi County, Kenya had ever undergone prostate cancer screening. A similar study conducted in Tanzania reported a screening rate of 7.7% among men aged above 40 years (Bugoye et al., 2019). Ugochukwu et al. (2019) reported a screening rate of 21% among men in an urban area in Nigeria. The study findings indicate a low rate of prostate cancer screening among Kenyan men. Generally, developed countries have reported higher rates of prostate cancer screening which is attributed to higher levels of knowledge and

awareness (WHO, 2018). The low uptake of screening is an indication of existence of barriers among Kenyan men. There is need for the concerted effort among policy makers and all health care workers to overcome the existing barriers to screening.

5.2.1 Socio-demographic and economic factors influencing the uptake of prostate cancer screening

Socio-demographic and economic factors have been postulated to influence uptake of prostate cancer screening. The findings of the study indicate that there was no significant association between socio-demographic factors (age, marital status and religion) and uptake of prostate cancer screening ($P>0.05$). The findings of the study were corroborated in a study in Ghana which found no association between age, religion and marital status (Yeboah-Asiamah et al., 2017). A study conducted among men aged 30 years and above in Nairobi County, Kenya reported similar findings where socio-demographic factors were not associated with prostate cancer scre ening (Wanyaga, 2014). Similarly, in their study in a rural community in Makueni County in Kenya, Mutua et al. (2017) reported no association between socio-demographic characteristics and prostate cancer screening. Erena et al. (2020) reported similar findings among Kenyan men.

The findings of this study however differ with what has been postulated previously in regard to determinants of prostate cancer screening among black men where several individual factors which include older age, and being married have been reported to influence prostate cancer screening (Blocker et al., 2006; Parker et al., 2006; Winterich et al., 2009; Nair-Shalliker et al., 2018). The findings of this study are also incongruent with a study conducted in Brazil which found that older married men were more likely to take up prostate cancer screening (Lima et al., 2018). Similarly, Moses et al. (2017) in their study in USA found that marital status increased the likelihood of men taking up prostate cancer screening. Eren et al. (2020) in their study in Eldoret, Kenya found that the likelihood of screening increased with age.

The study findings indicate that socio-economic factors (land acreage) were associated with uptake of prostate cancer screening ($P<0.05$). This finding is also congruent with a populationbased study conducted among men in Poland which found that socio-economic factors (better education, occupation and personal income) influenced prostate cancer screening (Prajsner et al., 2016). Tabuchi et al. (2015) reported that socio-economic factors influenced uptake of screening, the occupation of men significantly influenced their uptake of prostate cancer screening. Similarly, a study conducted in Iran found a significant association between screening behaviours and the occupation of the participants (Jeihooni et al., 2015). The occupation of a man may influence the likelihood of him taking up screening as higher income has been positively associated with screening. In the study, the acreage of land owned was significantly associated with prostate cancer screening and the likelihood of screening increased as the acreage of land increased. The study population in the current study was predominantly rural hence; the acreage of land owned was likely to inform the socio-economic status of the participants hence the influence on uptake of screening. This study finding were corroborated by Dean et al. (2014) in their study in U.S.A which found that being of low socio-economic status reduced the likelihood of taking up prostate cancer screening. Bugoye et al. (2019) reported similar findings in their study in Tanzania. Bello et al. (2019) in their study among urban Nigerian men found that men with higher income were more likely to screen. The findings are similar to the Kenya Demographic Health Survey, which found that the likelihood of prostate cancer screening increased with increase in wealth of the participants (KDHS, 2014). Erena et al. (2020) reported similar findings in a population based study where Kenyan men in high wealth index category were more likely to undergo prostate cancer screening. The findings of this study indicate that the socio-economic status of men may influence the participation of men in prostate cancer screening. Based on these findings, it is paramount that designing of prostate cancer screening programmes considers provision of free or affordable screening services especially among men of low socio-economic status.

5.2.2 Barriers and facilitators to the uptake of prostate cancer screening

5.2.2.1 Facilitators to the uptake of prostate cancer screening

The study findings indicate that the facilitators to prostate cancer screening among this rural population included the experience of symptoms. The presentation of symptoms was similarly reported among Fillipino men (Conde et al, 2011). The findings were corroborated in a study conducted among chiness men (So et al., 2014). Similar findings were reported by Enaworu et al. (2016) in their study among Nigerian men. Prostate cancer is mainly asymptomatic in the initial stages hence the need to educate men considered at risk on the benefits of early screening. Clinicians should engage at-risk men presenting with urinary symptoms in health facilities in shared decision-making in line with the screening guidelines (MOH, 2018).

Proximity of prostate cancer was reported as a barrier to uptake of screening. This study finding was corroborated by Ocho et al. (2013) in their study among men in Trinidad and Tobago. Similar findings were reported by Fyffe et al. (2008) who found that participant who had exeperienced devastating effects of prostate cancer among their family and friends were more likely to undergo screening. Mutua et al. (2017) reported similar fndings among Kenyan men. The experience of the effects of cancer by a close family member or friend enhances risk perception which may contribute to the men taking up preventive measures which include screening. This can be explored by use of narration by survivors of prostate cancer in the community during advocacy and raising awareness among community members to enhance family suport.

The accessibility of screening services was highlighted as a facilitator to the uptake of screening. Similar findings were reported among African American men (Cobran et al., 2017; Patel et al., 2010). Ugochukwu et al. (2019) in their study among Nigerian men found that financial constraints was a major barrier to screening among men. Similarly, a study conducted in Namibia reported the lack of insurance cover and inacessibilty of services as a major barrier to prostate cancer screening (Kangmennaang et al., 2016). A

population -based study in Kenya reported that men with medical insurance coverage were more likely to undergo prostate cancer screening (Erena et al., 2020). The provision of affordable or free screening services, inclusion of screening services in the National Health Insurance Fund and the provision of services in the peripheral facilities can be explored to circumvent the barriers to accessibility of the services.

Participants cited increase in advocacy on prostate cancer as a facilitator to screening. Ferrante et al. (2011) reported similar findings. A study conducted among rural african American men reported sharing of more information regarding prostate cancer by the clinicians as a facilitator to screening (Hooper et al., 2017). Ojewola et al. (2017) similarly, reported an increase in awareness and recommendation by a health care worker as a major facilitator to uptake of prostate cancer screening. The study participants cited their main source of information as the radio, friends, family or church. Several studies conducted have reported the main source of information as mass media (Mutua et al. 2018, Wachira et al., 2018, Bugoye et al., 2019). Health care worker recommendation is fundamental in prostate cancer decision-making process. Evidence shows that low prostate cancer screening is associated with weak physician recommendation (Lee et al., 2011). Targeted programs involving health care workers to reach at risk men, incorporation of awareness in routine care and reinforcement in the community through a collaboration of health care workers and community-based health workers should be considered.

5.2.2.1 Barriers to the uptake of prostate cancer screening

The study findings indicate that the barriers to prostate cancer screening among this rural population included the low perception of self-vulnerability. Low perception of risk towards prostate cancer has been reported among black men (Ogunsanya et al., 2017). Morlando et al. (2017) reported similar findings where the most commonly cited reasons for respondents not taking up prostate cancer screening were the men feeling well and not perceiving themselves at risk. Arafa et al. (2012) similarly found that the main reason deterring men from prostate cancer screening was the lack of signs and

symptoms. Ferrante et al. (2011) similarly reported that men avoided screening since they considered themselves not at risk and were not experiencing signs and symptoms. Similar findings have been reported among men in Tanzania, Ghana and Kenya (Bugoye et al., 2019; Yeboah-Asiamah et al., 2017; Kinyao et al., 2018). This is an indication of lack of adequate knowledge on prostate cancer signs and symptoms, risk factors and screening eligibility which is likely to deter the utilization of screening services and hence the presentation of men with advanced stages of prostate cancer.

Lack of knowledge on prostate cancer disease, the aetiology and screening were reported by the participants as a major barrier to the uptake of prostate cancer screening. James et al. (2017) reported similar findings in their systematic review where participants cited lack of awareness on the etiology, signs and symptoms and the screening procedure for prostate cancer as a barrier to the uptake of screening. Baratedi et al. (2019) in their study reported lack of knowledge as a major barrier to prostate cancer screening among men in sub-saharan Africa. Cobran et al. (2017) reported similar findings in their study. The most commonly cited barrier to uptake of screening among black men of African and Carribean origin was limited knowledge and misinformation. In the study myths and misconceptions that associated prostate cancer with sexual practices detered men from taking up screening. Similar findings were reported in a study in Nigeria (Ojewola et al., 2017). The association of prostate cancer with multiple sexual partners has been reported previously (Nakandi et al., 2013). The cited myths and misconceptions which result from lack of information are likely to hinder men from screening due to the stigma associated with the disease. Participation of men in screening is highly dependent on their knowledge about prostate cancer and the benefits of early detection. The current screening guidelines require shared informed decision making between the clinician and client (MOH, 2018). This requires a well-coordinated public health awareness programme coupled with sensitization of all clinicians and development of decision aids.

Fatalistic beliefs reported as barriers to screening in our study have been reported previously (Moreno et al., 2019). Conde et al. (2011) reported the interpretation of prostate cancer as a death sentence as a major barrier to the uptake of screening among

men. Wachira et al. (2018) reported fatalistic beliefs as a barrier to uptake of screening among men in Kenya. A study conducted in Makueni county reported similar findings (Mutua et al., 2017). Fatalism is mainly attributed to a lack of knowledge and negative outcomes of prostate cancer experienced mainly due to diagnosis of advanced disease (Kobayashi et al., 2015). Fatalism has been associated with delayed health care seeking which forms a vicious cyle of late diagnosis and death (Beeken et al., 2011). The witnessing of the negative outcomes increases fatalistic beliefs towards cancer in the community. These fatalistic beliefs can be overcome through education of at-risk men, timely diagnosis and navigation of patients which will contribute towards improvement in prostate cancer treatment outcomes (Moreno et al., 2019; Tayel et al., 2019).

In the study, male dominance factors were highlighted as barriers to uptake of prostate cancer screening. The male dominance factors reported in the study have been documented in previous studies (James et al., 2017; Fish et al., 2015; Friedman et al., 2012). The association of prostate cancer with sexual performance and the fear of diagnosis due to anticipated negative effects on masculinity reported in the study have similarly, been reported in other studies (Ogusanya et al., 2016; Friedman et al., 2012; Fyffe et al., 2008). The preference of a-men for men program for prostate cancer and provision of screening services by older male health care workers was reported in the study. Capacity building of male clinicians and inclusion of other cadres like male nurses for the provision of culturally acceptable prostate cancer screening services can be explored. Baker et al. (2014) recommended the consideration of gender when developing prevention and control programs and policies. The engaging in health seeking in the absence of symptoms is not considered a norm among black men as it goes against the social expectations of being a man (Ng et al., 2013; Sanchez et al., 2007). It’s therefore paramount for the prostate cancer prevention and control programmes to utilize a gendered approach that considers masculinity dominance to enhance utilization of such services especially in a culturally endowed African society like Kenya.

Stigma associated with prostate cancer screening was reported as a barrier to screening. The stigma associated with prostate cancer is mainly due to misinformation regarding the disease. A study conducted among black men in Texas reported stigma as a barrier to screening as undergoing a test was equated to the lose of a mans credibility and most men were embarrassed of screening (Ogunsanya et al., 2017). A study conducted in Ghana found that diagnosis of prostate cancer was surrounded with a lot of stigma emanating from the loss of social status and association of the disease with being promiscous (Salifu et al., 2019). The participants in the study cited the perception of prostate cancer as a shameful disease in their community. The embarrassment of diagnosis with the disease was mainly attributed to the myths which associated the disease with denial of conjugal rights, impotence and promiscuity. It is vital for the scaling up of public health education through utilization of culturally tailored information to overcome such beliefs and reduce stigma towards prostate cancer. The utilization of community based health workers to increase knowledge and awareness on prostate cancer can be explored.

5.2.3 Effectiveness of Community Based Health Education on uptake of prostate cancer screening.

The reduction in disparities in regard to mortality of men from prostate cancer is highly dependent on early diagnosis of the disease through the uptake of screening before metastasis (Bray et al., 2018). The study assessed the effect of community-based health education on uptake of prostate cancer screening. The proportion of the respondents screened for prostate cancer significantly increased from 4.5% to 20.4% in the intervention arm while there was no significant change in the control arm. A study which assessed the impact of a web- based education intervention among men in Turkey, found an increment of screening rates from 6.7% to 31.4% in the intervention group (Capık & Gozum, 2012). Similarly, Ukoli et al. (2013) in their study among low-income African Americans found that the uptake of prostate cancer screening significantly increased from 22.1% to 62.8% following the use of a brochure and a tailored interaction education intervention. In their study Drake et al. (2010) concluded

that a church-based education intervention is an effective strategy for enhancing decision making in regard to prostate cancer screening among African American men. A similar study done in Iran found that the utilization of a health belief model-based education intervention increased the uptake of screening for prostate cancer from 7.5% to 43.3% in the intervention group (Zare et al., 2016). Similar findings were reported in a study conducted in Shiraz community in Iran reported an increase in prostate cancer screening in the intervention group from 6.12% to 36.4% three months after an education intervention (Molazem et al., 2017). The study findings are corroborated by a culturally tailored education intervention among African americans which found an incresae in screening at post intervention (Dougherty et al., 2021).

The role of CHWs as culturally competent 'health brokers' has been recognized globally and their effectiveness in the enhancing prevention of diseases and follow up of care in various aspects of health (CDC, 2015). The study findings indicated that the utilization of Community Based Health Education delivered by CHVs was an effective strategy in enhancing uptake of prostate cancer screening. The findings of the study are congruent with a study conducted among black men which foud that a Community Health Worker led education intervention significantly decreased decisional conflict in regards to prostate cancer screening (Martinez-Lopez et al., 2020). Similarly, a study that utilized home visits by local health outreach workers in an underserved population in Jordan led to improvements in knowledge and preventive behaviours (Taha et al, 2014). The findings of this study are however, incongruent with Capik (2014) who found no significant increase in prostate cancer screening rates following an education intervention delivered face to face during home visits among men aged above 50 years in Turkey.

Community Based Health Worker (CBHW) interventions have been rendered as cost effective strategies to enhance cancer screening behaviours especially in underserved populations (Kim et al., 2016; Nguyen et al., 2015). The uptake of prostate cancer screening is a complex medical decision that requires men to have adequate knowledge on prostate cancer for informed decision-making (James et al., 2017; Fraenkel, 2013). It

is therefore imperative for the consideration of provision of culturally acceptable education to men to enhance their decision- making. Utilization of CHWs to enhance uptake of prostate cancer screening is a cost-effective strategy which can be explored as CHWs are already familiar with the community. This would also aid in circumventing the shortage of health care workers especially in developing countries and medically underserved populations.

5.2.4 Knowledge and awareness in the intervention and control arms

Majority of the respondents in both arms of the study had heard about prostate cancer at baseline with mass media being the main source of information. These findings are corroborated by other studies conducted among African men (Mofolo et al, 2015; Nakandi et al., 2014; Oladimeji et al., 2010). Similarly, population-based studies among men in Kenya have reported high levels of awareness (KDHS, 2014; Erena et al., 2020). This is incongruent with studies conducted in more developed countries where majority of men reported getting the information from health care providers (Morlando et al., 2017; Arafa et al., 2012). The recommendation by a health care provider has been reported as a strong predictor to uptake of screening among men (Conde, et al., 2011; Cobran et al., 2013). This finding indicates the need for the sensitization of all health care providers on the need for sharing adequate information with men at risk to facilitate informed shared decision-making. This finding also indicates the need for utilization of a multi-faceted approach which includes the use of mass media to complement other community based strategies used to increase awareness on prostate cancer.

Studies conducted across coutries have reported low levels of knowledge on prostate cancer. A study conducted in Turkey among men aged 40 years and above found that the level of knowledge on prostate cancer was low (Karadag et al., 2018). A study conducted among Jamaican men similarly, found that the participants had moderate level of knowledge and several knowledge deficiencies regarding prostate cancer (Morrison et al., 2017). Several studies conducted among black men in USA, Uganda, Caribbea, Burkina Faso and Kenya have also consistently reported low levels of

knowledge on prostate cancer (Ogunsanya et al., 2017; Ajape et al., 2010; Pedersen et al., 2011; Kabore et al., 2013; Wachira et al., 2018). This is despite African men having a higher risk of dying from the disease (Wilson et al., 2012; Mahal et al., 2017). Studies comparing the level of knowledge among black and Caucasian men have found black men to have lower levels of knowledge on prostate cancer (Cobran et al., 2013; Odedina et al., 2011). Enhancement of knowledge about prostate cancer among Kenyan men is therefore imperative as it has been associated with enhanced uptake of screening (Ukoli et al., 2013; Koitsalu et al., 2018).

Knowledge and awareness on prostate cancer significantly increased in the intervention arm following the education intervention. The study findings are corroborated by other studies that have utilized a variety of education interventions. For instance, a study done in the USA which assessed the impact of a web-based education intervention on prostate cancer knowledge and decision making, found that the knowledge scores of more than half (54%) of men in the intervention sites had improved knowledge scores versus 39% of men in comparison sites (Allen et al., 2010). Another study conducted among African American men found a significant increase in knowledge following a barbershop-based education intervention (Luque et al., 2011). Similarly, a significant increment in the knowledge on prostate cancer among the intervention group was reported after an education intervention delivered face to face to men (Capik, 2014). Similarly, a study conducted among Jamaican men found that there was improvement of knowledge among men following an education intervention based on the Transtheoretical Model and Health Belief Model. The percentage of men who knew the types of screening, the risk factors and symptoms increased significantly (Capanna et al., 2015). A study conducted among African American men from rural Alabama reported a significant increase in knowledge and awareness on prostate cancer following an education intervention (Carter et al., 2010).

The findings of this study suggest that community based health education delivered by CHVs through face to face household visits can lead to an increase in knowledge and awareness on prostate cancer. Other studies which have assessed the impact of

Community based interventions, have reported similar improvements in the various domains of knowledge on cancer (Taha et al, 2014; Kim et al., 2016; Dickey et al., 2017). Martinez-Lopez et al. (2020) reported a significant increase in prostate cancer knowledge following a Community Health Worker-led intervention among black men. This indicates that culturally relevant health education delivered by the CHVs residing within the community can enhance knowledge on prostate cancer. The improvement of knowledge among men has been anticipated to enhance the transition of men in the decision making process in regards to the uptake of prostate cancer screening (Ogunsanya et al., 2017). The findings of the study among the rural population represents important learning moments that can be utilized to empower men for later decision-making process regarding prostate cancer prevention and screening behaviours. There is need to scale up the CHV led health education to increase the awareness and knowledge on prostate cancer among men in the community to enhance the uptake of prostate cancer screening.

5.2.5 Perception of self –vulnerability towards prostate cancer in the study arms.

Studies conducted in developing countries have reported low perception on self-vulnerability among men (Kinyao & Kishoyian, 2018; Khosravi et al., 2018; Wanyaga, 2014; Nakandi et al., 2013; Oladimeji et al., 2010). Notably, men in developing countries have generally reported higher levels of perceived vulnerability, which is attributed to higher levels of education and knowledge on prostate cancer (Odedina et al., 2011; Talcott et al., 2007). The study findings showed a significant increase in the perception of self- vulnerability among the respondents in the intervention arm in comparison with the control arm. Several studies have similarly reported improvements in risk perception following an education intervention. A study conducted in Iran, which assessed the influence of a health belief model based education reported a significanct increase in risk perception following the education intervention (Zare et al., 2016). Similarly, a study conducted in USA that utilized a brief video education intervention reported a significant increase in the risk perception of men and improved screening rates for prostate cancer (Sheehan, 2009).

Similarly, a study that assessed the effectiveness of a web-based education intervention in Turkey, reported an increase in the perception of susceptibility towards prostate cancer at post-test in the intervention group (Capik & Gozum, 2012). Similarly, Jeihooni et al. (2019) found an increase in perception of self-vulnerability among men in Iran following an education intervention. Allen et al. (2009) in their computer tailored education intervention found a significant increase in the perception of risk in the intervention arm that enhanced the decision making towards prostate cancer screening. A study conducted among African Americans aged 40-70 Years which evaluated the effectiveness of a church based culturally tailored education intervention reported significant increase in perceived risk, knowledge and screening for prostate cancer at post test (Husaini & Reece, 2008).

The perception of self-susceptibility influences the perceived threat of an individual to a condition and the greater the perception of threat, the more likely an individual will engage in adoption of preventive behaviours. The uptake of preventive measures is highly dependent on the men's transition from the stage of lack of awareness to the recognition that they are at risk of developing the disease and hence take precautions to prevent themselves (Weinstein et al., 2008). The perception of risk has been associated with uptake of prostate cancer screening in several studies (Koitsalu et al., 2018; Wanyaga, 2014; Kinyao & Kishoyian, 2018). Perception of self-vulnerability towards prostate cancer has been associated with knowledge levels among men (Yeboah-Asiamah et al., 2017; Wanyaga, 2014). The more aware men are regarding prostate cancer, the higher the likelihood to perceive themselves at risk and hence take up screening. The study findings suggest that community-based health education delivered by CHVs can significantly increase the perception of self-vulnerability among men. The perception of unrealistic optimism where one has a false belief that they are less vulnerable to a condition in comparison to other people is a significant deterrent to uptake of cancer screening. It's therefore imperative to scale-up Community Based Health Education delivered by CHVs in the community to overcome this barrier which is envisioned to enhance uptake of prostate cancer screening.

5.2.6 Prostate cancer fatalism in the intervention and control arms of the study

The construct of fatalism remains a poorly defined complex phenomenon thus making it difficult to develop behavioral interventions for cancer prevention and control. Powe & Finnie (2003) posited fatalistic beliefs are higher in underserved populations and result in decreased participation in cancer-preventive behaviors. Fatalism has been found to influence the uptake of prostate cancer screening (Moreno et al., 2019, Phillip et al., 2010). Fatalism has been reported to develop over time in a cyclic pattern whereby men continue observing poor outcomes and deaths from men related to diagnosis with advanced prostate cancer (Powe & Finne, 2003). This contributes further to fatalistic beliefs as with time they develop pessimism towards prostate cancer, perceive helplessness, lose hope and perceive death as inevitable with a cancer diagnosis. This is anticipated to occur due to inadequate knowledge on cancer hence it's anticipated that an increase in knowledge may reduce fatalism. The decrease in fatalism has been predicted to facilitate the participation of men in cancer preventive activities, which include screening for early diagnosis (Niederdeppe & Levy, 2007).

The study findings indicate that there was a significant decrease in fatalism in the intervention arm in comparison to the control arm at post-intervention. The study findings suggest that community-based health education decreased prostate cancer fatalism specifically the attributes of pre-destination, pessimism and death inevitability. These findings are corroborated in a study where participants in the intervention group who viewed an education video had a greater decrease in colorectal cancer fatalism scores than those in the control group (Powe et al., 2006). Similar findings were reported in a study conducted among black men in New York City which assessed the effectiveness of a culturally targeted health education leaflet on reduction of fatalism. There was significant reduction in fatalism following the education intervention (Philip et al., 2010). Similarly, Morgan et al. (2010) in a study that utilized a culturally acceptable intervention among African American men, found a significant decrease in fatalism in the intervention group. Tayel et al. (2019) in their study similarly found a significant decrease in fatalism following an education intervention.

Study findings indicate that the constructs of fear towards prostate cancer did not improve following the intervention but seemed to increase in both arms of the study. These findings suggest that there is need to explore further the contextual parameters that activate fear towards prostate cancer and approporiate interventions developed to address this factor as it may be a deterrent to early diagnosis. An interesting finding in the study was an increase in fatalism in the control arm post-intervention in some of the constructs, this could have been attributed to the increase in awareness and lack of adequate information regarding prostate cancer. There is need to urgently address fatalistic beliefs towards prostate cancer in the community as they may have far reaching implications which may further worsen the outcomes of prostate cancer treatment and contribute further to more deaths as a result of increase in pessimistic beliefs towards prostate cancer.

Fatalism is a complex barrier to prostate cancer screening that requires critical consideration. Cancer fatalism is prevalent among African men especially amongst the underserved populations of low socio-economic status.There is need to address the existing fatalistic beliefs in the community to enhance the uptake of prostate cancer preventive measures (Niederdeppe & Levy, 2007; Cobran et al., 2013; Keeley et al., 2009). The findings of this study support the ascertion that men with low levels of knowledge are more likely to hold fatalistic beliefs. This is evidenced by the significant reduction in fatalism following the education intervention delivered face to face by CHVs. Fatalism is a vital factor in the decision-making process that requires consideration (Lange & Piette, 2006; Phillip et al., 2010). Powe (2006) postulated that designing of programs to enhance uptake of cancer screening should address fatalistic beliefs to increase their success. There is a need to tailor the education of men on prostate cancer to decrease their perception of fatalism towards prostate cancer and hence promote the adoption of health-promoting behaviors and uptake of prostate cancer screening.

5.3 Conclusions

Based on the stated objectives, this study makes the following conclusions as elucidated below;

1. Community Based Health Education significantly increased the uptake of prostate cancer screening in the study. The proportion of respondents who had undergone prostate cancer screening increased significantly from 4.5% to 20.4% ($P<0.05$) in the intervention arm while in the control arm there was no significant increase [5.6% to 6.3% ($P>0.05$)]

   This study therefore rejects the null hypothesis that states; Community based health education is not effective in enhancing uptake of prostate cancer screening.

2. In the study, socio-demographic characteristics [age, marital status and religion] were not significantly associated with prostate cancer screening ($P >0.05$). Socio-economic factors (land acreage) of the respondents were significantly associated with uptake of prostate cancer screening ($P<0.05$).
3. Study findings indicated that the facilitators to prostate cancer screening included the experience of symptoms, proximity of cancer, accessibility of screening services and community advocacy. The barriers to prostate cancer screening included lack of knowledge, fatalistic beliefs, low perception of self-vulnerability, stigma and male dominance factors.
4. Community Based Health Education significantly increased the knowledge and awareness on prostate cancer in the intervention arm. The level of awareness and knowledge on signs and symptom, risk factors, management and screening on prostate cancer significantly increased at post-intervention in the intervention arm in comparison to the baseline while in the control arm there were no significant changes.

This study, therefore, rejects the null hypothesis that states; Community Based Health Education is not effective in increasing knowledge and awareness on prostate cancer.

5. The perception of self-vulnerability increased significantly in the subscales of absolute risk and conditional vulnerability in the intervention arm at post-intervention in comparison to baseline while in the control arm there was generally no change. Community Based Health Education significantly increased the perception of self- vulnerability towards prostate cancer.

   This study therefore rejects the null hypothesis that states; Community Based Health Education is not effective in increasing perception on self-vulnerability towards prostate cancer.

6. Community Based Health Education significantly decreased prostate cancer fatalism. There was a significant decrease in the fatalism scores for the attributes of pessimism, death inevitability and pre-destination in the intervention arm at post-intervention in comparison to the baseline while in the control arm there was generally no significant decrease.

   This study therefore rejects the null hypothesis that states; Community Based Health Education is not effective in decreasing prostate cancer fatalism in Kiambu County.

5.4 Recommendations of the study

The study proposes the following recommendations for policy and practice to the National and County Governments and other stakeholders to enhance uptake of prostate cancer screening services;

1. There is a need for establishment of targeted programs involving health care workers to reach at risk men to enhance public awareness on prostate cancer

through integration of culturally sensitive education to routine care in the health facilities and reinforcement in the community through a collaboration of health care workers and community-based health workers.

2. The planning and designing of prevention and control programmes and policies for prostate cancer should consider capacity building of clinicians, task shifting and provision of well-coordinated affordable culturally relevant screening services in the peripheral facilities.
3. There is need for the national government and county governments to scale up community-based prostate cancer prevention and control programmes through training of all Community Health Workers to enhance uptake of prostate cancer preventive measures in the community.

The study recommends the following for further research;

1. Further research to explore the construct of fear towards prostate cancer, the contextual factors activating it and strategies to overcome it in the community requires consideration.
2. The study noted that the success of a prostate cancer screening programme may be influenced by gender related cultural issues and hence recommends further research to ascertain the influence of gender, male dominance and cultural factors on prostate cancer prevention and control programmes.

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APPENDICES

Appendix I: Informed Consent Explanation for participants

This was read to the respondents before the interview to seek their consent.

Title of the study

Effectiveness of community -based health education intervention on uptake of prostate cancer screening in Gatundu North Sub-County.

Introduction

My name is Ruth Gathoni Mbugua. I am a student at Jomo Kenyatta University of Agriculture and Technology conducting a research at Gatundu North Sub-county which aims at exploring the effectiveness of Community based health education on knowledge & awareness, self-vulnerability, fatalism and uptake of prostate cancer screening.

Purpose of the study

The study will in among other things assist the Ministry of Health to develop a policy in terms of enhancing the prevention and control of prostate cancer through health education by Community Health Volunteers while endeavoring to enhance uptake of screening among men perceived to be at risk of prostate cancer.

Procedure to be followed:

You have been selected to participate in the study because you are aged between 40-69 years. If you agree to participate in this study you will be asked a few questions regarding your knowledge, perception on self-vulnerability, fatalism and practices towards prevention of prostate cancer for a period of approximately 20 minutes. A CHW will give you some health education regarding prostate cancer which may occur after you answer the questions or after 6 months after you answer the same questions to enable us asses the differences.

Risks:

Any information gathered from you will be confidential and no mention of names will be done in the report to ensure that the risks of disclosing the information you have given us will be fully minimized. All the data will be stored in computers with passwords and hard copies will be kept in lockable cabinets that have authorized access to the investigators only.

Benefits:

There will be a benefit to you for your participation in the study. You will receive education on prostate cancer from a CHV this will occur before or after the study depending on which arm of the study you shall fall.

Assurance of confidentiality:

The information you have provided us will be handled confidentially. Your name will not be mentioned in the reports or publications.

Storage of data:

All the records containing your information collected in the study will be stored safely and will only be accessible to the investigators.

Right to refuse or withdraw:

Your participation in the study is voluntary. You are free to stop answering questions at any point if you don't feel like without any penalty. You will still receive some education on prostate cancer from a Community health volunteers.

Subject:

If during the course of this study you have any questions concerning this research you should contact Ruth Mbugua, P.O. Box 347-01000, Thika. Telephone Number: 0722 297 188

If in case you have a question concerning your rights of participation, you should contact;

The Secretary, JKUAT Institutional Ethics Review Committee, P.O. Box 62000-00200, Nairobi.

Telephone Number:

I _____ have read/been read to the information shown above and had the opportunity to ask questions and all were answered satisfactorily. I hereby give consent for my participation as explained to me.

Study participant's name: _____

Sign: _____

Date: _____

Respondent's signature…….Date ……..

Interviewer's signature……..Date……

Appendix II: Questionare (English)

INTERVIEW INFORMATION			
Date:			
Interviewers name:	Interviewers code :		
Community Unit:	House hold number :		
General Guidelines 1. Identify a man in the age bracket (40-69 Years) residing in the selected Community Unit. 2. Introduce yourself and ask if you can ask him a few questions which will not take more than 25 Minutes. 3. Explain that the questions are not personal and are anonymous.			
CONSENT AND SCREENING			
	Do you agree to be part of the study	Yes…….1 No…….0	0- Ineligible
IF CONSENT NOT GIVEN: THANK RESPONDENT FOR THEIR TIME. END INTERVIEW.			
	Are you aged between 40-69 years	Yes…….1 No…….0	0- Ineligible
	Have you been diagnosed with prostate cancer	Yes…….1 No…….0	1- Ineligible
If eligible: Share study information and gain informed consent. Proceed with interview. **If ineligible: Thank respondent for their time and explain that respondent is not eligible for the study.**			
QX3	Interview result	Complete……..1 Ineligible……...…2 Incomplete……3 Refused…….4	**1** **2** **3** **4**

SOCIO-DEMOGRAPHIC FACTORS (applicable to everyone) ***Read to respondent: "i would like to ask you some questions about your background. I realize some of these questions seem unrelated to prostate cancer, but all of these questions help us to understand and plan services provided to men for prevention of prostate cancer.***			
1.	What is your current age?	1. 40-49 Years 2. 50-59 Years 3. 60- 69 Years	1 2 3
2.	What is your current marital status?	1. Married 2. Single 3. Widowed 4. Separated/Divorced	1 2 3 4
3.	What is your current religion?	1. Christian 2. Traditionalist 3. Muslim 4. No religion 5. Others specify ……	1 2 3 4 5
SOCIO- ECONOMIC STATUS			
4.	What is the highest educational level you attained?	1. None 2. Primary- not completed 3. Primary Completed 4. Secondary-not completed 5. Secondary completed 6. Tertiary (college/university)	1 2 3 4 5 6
5.	What is your current occupation?	1. None 2. Business 3. Formal employment 4. Farmer (small scale) 5. Farmer (large scale) 6. Casual worker 7. Other specify ……..	1 2 3 4 5 6 7
6.	What is your total average household income per month?	1. <10,000 2. 10-30,000 3. 31-50,000 4. 51-80,000 5. 81-100,000 6. >100,000	1 2 3 4 5 6
7.	What is the tenure status	1. Owner occupied 2. Rented/donated/provided	1 2

	of your household	3. Others specify ……..	3
8.	What is the type of housing? ***Observe and record***	1. Permanent 2. Semi-permanent 3. Temporary	1 2 3
9.	Do you own a piece of land?	1. Yes 2. No	1. Go Q10 2. Go Q11
10.	If Yes how many acres of land?	1. <1 Acre 2. 1-3 acres 3. 4-5 acres 4. > 5 acres	1 2 3 4
11.	What is the main source of water in the household?	1. Public piped 2. Private piped 3. Well/ borehole 4. River/ stream/ dam 5. Others specify ……	1 2 3 4 5
12.	What is the main type of cooking fuel used in the house hold?	1. Electricity 2. Gas 3. Paraffin 4. charcoal 5. Firewood	1 2 3 4 5
13.	What is the main type of lighting in the household?	1. Electricity 2. Lamps 3. Solar 4. Others specify …… ……..	1 2 3 4
KNOWLEDGE AND AWARENESS OF PROSTATE CANCER; READ TO RESPONDENT: *"I will ask you some questions about prostate cancer. These questions are used to understand how much you know about prostate cancer and will inform planning for health education." (Read questions to respondent. Do not read out answers unless stated. Allow for unprompted responses and tick what corresponds to the respondent's answer.)*			
14.	Have you ever heard of prostate cancer?	1. Yes 2. No	1. Go Q15 2. Go Q16
15.	If Yes to Q14, what was the source of the information? ***DO NOT READ***	1. Newspaper /Radio/ TV 2. Friend 3. Relative 4. Hospital 5. Church 6. CHW house hold visit 7. Others specify	1 2 3 4 5 6 7

		……	
16.	Has anybody in your family been diagnosed with prostate cancer?	1. Yes 2. No	1 2
17.	Do you know the symptoms of prostate cancer?	1. Yes 2. No	1. Go Q18 2. Go Q19
18.	If yes, to Q 17 what are the symptoms? ***DO NOT READ*** ***If respondent gives more than one record all of them.***	1. Frequent/ Painful/ Difficulty in urination 2. Blood in urine 3. Bone pain 4. Erectile dysfunction 5. Weight loss 6. Others specify …….	1 2 3 4 5 6
19.	Can prostate cancer be treated?	1. Yes 2. No	1. Go Q20 2. Go Q21
20.	If yes to Q19, what methods of treatment of prostate cancer do you know? ***DO NOT READ*** ***If respondent gives more than one record all of them.***	1. Drugs 2. Surgery 3. Radiotherapy 4. Herbal remedies 5. Chemotherapy 6. I don't know 7. Others specify ……	1 2 3 4 5 6 7
21.	Have you ever heard about prostate cancer	1. Yes 2. No	1 2

	screening?		
22.	If Yes to Q21 what was the source of the information? ***DO NOT READ***	1. Newspaper /Radio/ TV 2. Friend 3. Relative 4. Hospital 5. Church 6. CHW house hold visit 7. Others specify ……	1 2 3 4 5 6 7
23.	Do you know any methods used for screening of prostate cancer?	1. Yes 2. No	1 2
24.	If yes to Q23 which method do you know?	1. PSA testing 2. Digital Rectal Examination 3. Biopsy 4. Any other specify ……	1 2 3 4
25.	Do you know anyone who has undergone a prostate cancer screening test?	1. Yes 2. No	1 2
26.	If Yes to Q25 who are they to you?	1. Relative 2. Friend 3. Community member 4. Others specify ……	1 2 3 4

27.	**KNOWLEDGE ON PROSTATE CANCER** **"Now I would like you to please indicate**	1	2	3	4	5

	how much you agree or disagree with the following statements Score your response as strongly Agree = 5; Agree = 4; Neutral = 3; Disagree = 2; Strongly disagree = 1."					
a.	I will be able to know I have prostate cancer immediately through the symptoms I experience.					
b.	Younger men are more likely to get prostate cancer than older men					
c.	Having somebody in your family having prostate cancer increases the chance of getting prostate cancer.					
d.	Eating red meat increases the risk of a men developing prostate cancer					
e.	Eating vegetables increases the risk of a men developing prostate cancer					
f.	A man with many sexual partners is more likely to develop prostate cancer					
g.	A man can prevent themselves from getting prostate cancer by not smoking cigarettes/ using tobacco.					
h.	Prostate cancer disease is curable					
i.	Prostate cancer can cause death if it is left untreated					
j.	Early testing for prostate cancer cannot tell if one has prostate cancer					
k.	Prostate cancer diagnosed early through testing increases survival					
o.	All adult men should undergo prostate cancer screening					
p.	Men should undergo prostate cancer screening once in their lifetime					

PERCEPTIONS TOWARDS PROSTATE CANCER; ***"Now I would like you to rate the following statements. Score your most appropriate response as strongly agree = 5; agree = 4; Neutral= 3; disagree = 2; strongly disagree = 1.***

28.	**PERCEIVED SELF - VULNERABILITY TOWARDS PROSTATE CANCER**	1	2	3	4	5
a.	In my opinion prostate cancer is not a common disease					
b.	At my age, I do not need to get screened for prostate cancer					
c.	I believe that I am at risk of getting prostate cancer.					

d.	I believe that I am at a higher risk of getting prostate cancer than other men					
e.	Compared with other diseases, having prostate cancer screening is not important					
f.	It is likely that I will get prostate cancer in future					
g.	I am worried about having prostate cancer					
h.	I am worried about having a prostate cancer test because i don't understand what will be done.					
i.	I believe having a prostate cancer test would cost too much money					
j.	I believe that getting a prostate cancer test would take too long at the hospital.					
k.	I am too busy to undertake prostate cancer screening					
29.	**PROSTATE CANCER FATALISM**	1	2	3	4	5
a.	Of all diseases I am most afraid of cancer					
b.	I believe if someone was meant to get prostate cancer they will get it as it is Gods will.					
c.	I believe if someone gets prostate cancer it's already too late to get treated for it.					
d.	I believe if someone gets cancer that's how they were meant to die.					
e.	I believe that most people don't want to know they have prostate cancer due to the fear of dying					
f.	I believe if somebody gets prostate cancer it doesn't matter when they find out they will still die.					
g.	I believe if someone gets prostate cancer their time to die is near					
h.	I believe prostate cancer kills most people who get it.					
i.	A prostate cancer test will not decrease my chances of dying from prostate cancer.					

j.	If I was diagnosed with prostate cancer, I would not live for more than five years.					
k.	I think prostate cancer will kill you no matter when it's found and how it's treated.					

UPTAKE OF PROSTATE CANCER SCREENING			
30.	Have you ever thought seriously about get screened for prostate cancer?	1. Yes 2. No	1 2
31.	Have you ever gone to hospital to have your prostate gland checked?	1. Yes 2. No	1. Go Q32 2. Go Q 38
32.	If yes to Q31 were you tested for prostate cancer?	1. Yes 2. No	1. Go to Q33,34,35, 36,37 2. Go to Q38
33.	If yes to Q32 what method of screening was used?	1. PSA testing 2. Digital Rectal Examination 3. Biopsy 4. Don't Know	1 2 3 4
34.	If Yes to Q32 how long ago were you screened?	1. <1 Year 2. 1-2 Years 3. > 2 years	1 2 3
35.	If Yes to Q32, What motivated you to get screened?	1. Routine check-up 2. Recommendation by doctor/nurse 3. Advise by CHV 4. Having symptoms 5. Any other specify …….	1 2 3 4 5
36.	If Yes to Q32 did the health care provider explain the benefits and	1. Yes 2. No	1. 2.

	risks of screening to you before screening?		
37.	If Yes to Q32 who made the decision for you to get screened?	1. Health care provider 2. Self 3. Both 4. Any other specify ……..	1. 2. 3. 4.
38.	If No to Q31; Are you willing to seek prostate cancer screening services in the future?	1. Yes 2. No	1. Go to Q39 2. Go to Q40
39.	If Yes to Q38**,** indicate how soon you are likely to seek the screening services?	1. Within a month 2. Within 3 months 3. Within 6months and above 4. Not decided 5. Others specify ……...	1 2 3 4 5
40.	If No to Q38, what are the reasons that will make you not to seek screening services for prostate cancer?	1. I'm well I don't need the test 2. I don't know where to get the test 3. I cannot afford the test 4. I don't think It's beneficial 5. It is too risky 6. Any other specify ……	1 2 3 4 5 6
THANK RESPONDENT FOR THEIR TIME			

Appendix III: Questionare (Kiswahili)

<table>
<tr><td colspan="4">HABARI YA MAHOJIANO</td></tr>
<tr><td colspan="2">Tarehe:</td><td colspan="2"></td></tr>
<tr><td colspan="2">Jina la mutafiti :</td><td colspan="2">Nambari ya mtafiti:</td></tr>
<tr><td colspan="2">Kitengo cha jumuiya:</td><td colspan="2">Nambari ya nyumba:</td></tr>
<tr><td colspan="4">Miongozo ya jumla
1. Mchague mwanaume wa umri wa miaka kati ya arobaine na sitini na tisa anayeishi katika Community Unit iliyochaguliwa kwa utafiti.
2. Jitambulishe na umuomba ruhusa ya kummuliza msawali kadha wa kadha kwa muda wa dakika ishirini na tano.
3. Mwelezee kwamba maswali hayo hayamlengi yeye na ujumbe wowote atakao peana hautajulikana na wengine.</td></tr>
<tr><td colspan="4">RUHUSA NA KUCHAGUA WANAOFAA</td></tr>
<tr><td></td><td>Je unakubali kuulizwa maswali?</td><td>Ndio…….1
La…….0</td><td>1- Hataendelea</td></tr>
<tr><td colspan="4">KAMA HAJAKUBALI: MSHUKURU KWA WAKATI WAKE. NA UKATIZE KIPINDI CHA KUULIZA MASWALI.</td></tr>
<tr><td></td><td>Umri wako ni kati ya miaka arobaini na sitini na tisa?</td><td>Ndio…….1
La…….0</td><td>0-Hataendelea</td></tr>
<tr><td></td><td>Ushawahi kuugua ugonjwa wa saratani</td><td>Ndio…….1
La…….0</td><td>1-Hataendelea</td></tr>
</table>

	ya korodani ?		
KAMA ANAFAA: Mwelezee zaidi kuhusu utafiti na uendelee na maswali. **KAMA HAFAI: Mshukuru kwa wakati wake naumueleze hafai kuwa kwa utafiti wa leo.**			
QX3	Majibu ya maswali	Ilikamilika ……..…..……....1 Haikuendelea…….....….. 2 Haikukamilika……..…… 3 Alikataa ……..……..4	**1** **2** **3** **4**
DARAJA NA HALI YA MAISHA (YA KILA MTU) ***Msomee: "Ningependa kukuuliza maswali kuhusu hali yako ya maisha. Nafahamu kuwa haya maswali hayana uhusiano wowote na saratani ya korodani lakini yatasaidia katika kuelewa zaidi huu ugionjwa na pia yatasaidia katika kupanga shuguli za kuwaelimisha wanaume kuhusu saratani ya korodani.***			
1.	Umri wako hivi sasa ni?	1. Miaka arobaini-arobaini na tisa 2. Miaka hamsisni-hamsini na tisa 3. Miaka sitini hadi sabini	1 2 3
2.	Hali yako ya ndoa wakati huu ni?	1. Nimeoa 2. Sijaoa 3. Nimefiwa 4. Hatuishi pamoja/	1 2 3

		Nipo talakani	4
3.	Je dini yako hivi sasa ni gani?	1. Mkristiano 2. Dini ya kienyeji 3. Kiislamu 4. Siamini dini yoyote 5. Zinginezo ……	1 2 3 4 5
HALI YA KIJAMII NA KIUCHUMI			
4.	Kiwango chako cha elimu ulichohitimitu kinalenga wapi?	1. Sijasoma 2. Msingi - sikumaliza 3. Msingi- Nilimaliza 4. Sekondari- sikumaliza 5. Sekondari- Nilimaliza 6. Diploma/ Chuo kikuu	1 2 3 4 5 6
5.	Unafanya kazi gani kujikimi kimaisha?	1. Sina kazi 2. Biashara 3. Kazi ya ofisi 4. Mkulima(kiwango kidogo) 5. Mkulima (kiwango kikubwa) 6. Kazi za kibarua 7. Zingine	1 2 3 4 5 6 7
6.	Marupurupu ya nyumba yako ya kila mwezi ipo wapi kati ya hizi?	1. <10,000 2. 10-30,000 3. 31-50,000 4. 51-80,000 5. 81-100,000 6. >100,000	1 2 3 4 5 6
7.	Haki ya umiliki wa nyumba unayoishi ni?	1. Yangu 2. Kukodesha/kupewa/ Msaada 3. Zingine	1 2 3
8.	Aina ya nyumba ?	1. Ya Kudumu	1

	Kuchunguza na kurekodi	(permanent) 2. Nusu ya kudumu 3. Ya Muda (temporary)	2 3
9.	Je unamiliki kipande cha ardhi?	1. Ndio 2. La	1. Enda Q10 2. Enda Q11
10.	Kama ndio, kipande chako cha ardhi ni cha ekari ngapi ?	1. <1 2. 1-3 3. 4-5 4. > 5	1 2 3 4
11.	Maji mnayotumia kwa boma lako haswa yanatoka wapi?	1. Mfereji wa jumuiya 2. Mfereji wangu binafsi 3. Kisimani 4. Mtoni 5. Zinginezo ……	1 2 3 4 5
12.	Mnatumia haswa nini kupika chakula katika boma lako?	1. Stima 2. Gesi 3. Mafuta ya taa 4. Makaa 5. Kuni	1 2 3 4 5
13.	Mnatumia nini kwa mwangaza usiku katika boma lako?	1. Stima 2. Taa 3. Mtambo wa Sola 4. Zingine	1 2 3 4

UJUZI NA UFAHAMU WA SARATANI YA KORODANI; MSOMEE MSHIRIKI: ***"Ninge penda kukuliza maswali kuhusu saratani ya korodani. Haya maswali yatasaidia kuelewa zaidi kuhusu ufahamu wako wa saratani ya korodani na hivyo kusaidia katika kupanga elimu ya afya." (msomee mshiriki maswali. Usisome majibu isipokuwa umeelezewa hivyo. Mruhusu mshiriki akupe majibu bila haraka halafu utie alama kwa jawabu sahihi.)***

14.	Je ushawahi kusikia kuhusu saratani ya korodani/ kansa ya prostate?	3. Ndio 4. La	1. Enda Q15 2. Enda Q16
15.	Kama ndio kwa Q14, ulipata habari za saratani ya korodani/ kansa ya prostate wapi? ***Usisome majibu***	1. Magazeti /Redio/ Televisheni 2. Rafiki 3. Mtu wa familia yako 4. Hospitali 5. Kanisa 6. Mfanyi kazi wa afya ya jamii (CHW) 7. Zinginezo	1 2 3 4 5 6 7
16.	Je! kuna mtu yeyote katika familia yako aliyeugua saratani ya korodani/ kansa ya prostate?	1. Ndio 2. La	1 2
17.	Je wafahamu dalili za saratani ya korodani/kansa ya prostate?	1. Ndio 2. La	1. Enda Q18 2. Enda Q19
18.	Kama ndio, kwa Q17 dalili za saratni ya korodani/ Kansa ya prostate ni? ***Usisome majibu. Majibu yakiwa zaidi ya moja jaza***	1. Kukojoa mara kwa mara/ uchungu ukikijoa/ ugumu kukojoa 2. Damu kwa mkojo 3. Uchungu wa mifupa 4. Kupoteza nguvu za kiume 5. Kupunguza uzito wa mwili 6. Zinginezo	1 2 3 4

	yote		5 6
19.	Je ugonjwa wa saratani ya korodani /kansa ya prostate unaweza kutibiwa?	1. Ndio 2. La	1. Enda Q20 2. Enda Q21
20.	Kama ndio kwa Q19, ni njia zipii za kutibu saratani ya korodani ambazo unazifahamu? ***Usisome majibu. Majibu yakiwa zaidi ya moja jaza yote***	1. Dawa 2. Upasuaji 3. Radiotherapi 4. Madawa ya mitishamba 5. Kemotherapi 6. Sijui 7. Zinginezo	1 2 3 4 5 6 7
21.	Je unafahamu kuhusu uchunguzi au kupimwa kwa saratani ya korodani/ kansa ya prostate?	1. Ndio 2. La	1. Enda Q21, 22, 23 2. Enda Q24
22.	Kama ndio kwa Q21 ulipata habari za uchunguzi /kupimwa kwa korodani wapi? ***Usisome majibu***	1. Gazeti /Redio/ Televisheni 2. Rafiki 3. Mtu wa familia 4. Hospitali 5. Kanisa 6. Mfanyi kazi wa afya ya jamii (CHV) 7. Zinginezo	1 2 3 4 5 6 7

23.	Kama ndio kwa Q21, Je wajua taratibu zozote zinazotumika kuchunguza au kupima saratani ya korodani?	1. Ndio 2. La	1. Enda Q24 2. Enda Q25				
24.	Kama ndio kwa Q23 ni taratibu gani ambazo unazifahamu za kuchunguza au kupima saratani ya korodani?	1. PSA testing 2. Digital Rectal Examination 3. Biopsy 4. Zinginezo	1 2 3 4				
25.	Je wamfahamu yeyote aliyechunguzwa au kupimwa saratani ya korodani?	1. Ndio 2. La	1. Enda Q26 2. Enda Q27				
26.	Kama ndio kwa Q25 aliyechunguzwa ana uhusiano gani na wewe?	1. Wa familia yangu 2. Rafiki 3. Wa kijiji changu 4. Zinginezo	1 2 3 4				
27.	**UFAHAMU KUHUSU SARATANI YA KORODANI** ***"Ningependa unieleze jinsi unavyo kubaliana au kutokubaliana na maneneo yafuatayo. Majibu yako yatanukuliwa kama ifwatavyo;***		1	2	3	4	5

	Nakubali mno = 5; Nakubali = 4; kati kati = 3; Sikubali = 2; Sikubali kabisa = 1."					
a.	Mwanaume ana uwezo wa kujua kwamba ana saratani ya korodani kupitia dalili ambazo atapata.					
b.	Wanaume waumri mdogo wako hatarini ya kupata saratani ya korodani kuliko wanaume wazee					
c.	Mwanaume ambaye akona uhiasiano wa kifamilia na mtu aliye na ugonjwa wa saratani ya korodani ako hatarini zaidi kupata ugonjwa kuliko wanaume wengine.					
d.	Kula nyama ya ngombe, nguruwe au mbuzi inaongeza hatari ya mwanaume kupata saratani ya korodani.					
e.	Kula mboga inaongeza hatari ya mwanaume kupata saratani ya korodani.					
f.	Mwanaume aliye jihusisha ngono na wapenzi wengi ako hatarini ya kupata saratani ya korodani.					
g.	Mwanaume anaweza kujizuia kupata saratani ya korodani kwa kutovuta sigara/ kutumia tumbaku.					
h.	Mwanaume aliye na Saratani ya korodani anaweza kupona.					
i.	Saratani ya korodani inaweza kuua aliyeadhiriwa isipotibiwa					
j.	Kuchunguzwa mapema kwa saratani ya korodani hakuna manufaa yoyote					
k.	Saratani ya korodani iliyo julikana mapema kwa kuchunguzwa au kupimwa ina matokeo bora kwa matibabu					
l.	Wanaume wote walio na umri zaidi ya miaka kumi na nane wanafaa kuchunguzwa au kupimwa saratani ya korodani					
m.	Mwanaume anafaa kupimwa saratani ya korodani mara moja kwa maisha yake					
MTAZAMO KUELEKEA SARATANI YA KORODANI; ***"Ningependa unieleze jinsi unavyo kubaliana au kutokubaliana na maneneo yafuatayo. Majibu yako yatanukuliwa kama ifwatavyo; Nakubali mno = 5; Nakubali = 4; kati kati = 3; Sikubali = 2; Sikubali kabisa = 1."***						

28.	**MTAZAMO KUHUSU HATARI BINAFSI YA SARATANI YA KORODANI**	1	2	3	4	5
a.	Kwa maoni yangu saratani ya korodani si ugonjwa ambao unaathiri watu wengi					
b.	Kwa umri wangu, mimi si hitaji kupimwa saratani ya korodani					
c.	Naamini kuwa niko hatarini ya kupata saratani ya korodani.					
d.	Naamini kuwa niko hatarini zaidi kuliko wanaume wengine kupata saratani ya korodani.					
e.	Nikilinganisha na magonjwa mengine, kuchunguzwa saratani ya korodani si muhimu.					
f.	Kunauwezekano kuwa nitapata saratani ya korodani siku zijazo.					
g.	Ninahofia kupata saratani ya korodani.					
h.	Naogopa kuchunguzwa saratani ya korodani kwa sababu sielewi jinsi uchunguzi utafanywa.					
i.	Ninaamini kuwa kuchunguzwa kama nina ugonjwa wa saratani ya korodani kutanigharimu pesa nyingi.					
j.	Naamini kuchunguzwa kama nina ugonjwa wa saratani ya korodani kutanichukua muda mrefu hospitalini.					
k.	Sina wakati wa kwenda kuchunguzwa kama nina ugonjwa wa saratani ya korodani.					
29.	**KUFIKIRI HASI KUHUSU SARATANI YA KORODANI** ***"Ningependa unieleze jinsi unavyo kubaliana au kutokubaliana na maneneo yafuatayo. Majibu yako yatanukuliwa kama ifwatavyo; Nakubali mno = 5; Nakubali = 4; kati kati = 3; Sikubali = 2; Sikubali kabisa = 1."***	1	2	3	4	5
a.	Kwa magonjwa mengine yote, naogopa					

	saratani zaidi					
b.	Naamini kuwa kama mtu alifaa kupata saratani ya korodani ataipata kwani ni mapenzi ya mungu.					
c.	Naamini kuwa mtu akipatikana na ugonjwa wa saratani ya korodani kupata matibabu hakutabadilisha chochote.					
d.	Naamini kuwa mtu akipata ugonjwa wa saratani hivo ndivo kifo chake kilifaa kuwa.					
e.	Naamini kuwa wanaume wengi hawataki kujua wako na saratani ya korodani kwa sababu wanaogopa kufa na ugonjwa huo.					
f.	Saratani ya korodani itakuangamiza isijalishe ni lini ilipo zinduliwa.					
g.	Naamini kuwa mtu akiwa na saratani ya korodani wakati wake wa kufa uko karibu.					
h.	Naamini kuwa watu wengi ambao wanapata saratani ya korodani wanakufa.					
i.	Kuchunguzwa kwa saratani ya korodani hakupunguzi uwezekano wa mtu kufariki kutokana na saratani ya korodani.					
j.	Naamini kuwa nikipatikana na saratani ya korodani sitaishi kwa muda zaidi ya miaka tano.					
k.	Kwa maoni yangu, saratani ya korodani itakuua haijalishi wakati ambapo itapatikana au kutibiwa.					

UCHUNGUZI WA SARATANI YA KORODANI			
30.	Je, umefikiri kwa makini kuhusu kuchunguzwa kwa saratani ya korodani?	1. Ndio 2. La	1. 2.

31.	Je, umewahi kwenda hospitalini kuchunguza korodani/prostate yako?	1. Ndio 2. La	1. Enda Q32 2. Enda Q38
32.	Kama ndio kwa 31Je! Ulipimwa saratani ya korodani/ kansa ya prostate?	1. Ndio 2. La	1. Enda Q33,34,35,36, 37 2.
33.	Kama ndio kwa Q32 Ulitumia taratibu gani ya kuchunguza saratani ya korodani?	1. PSA testing 2. Digital Rectal Examination 3. Biopsy 4. Sijui	1 2 3 4
34.	Kama ndio kwa Q32, ulikuwa umechunguzwa muda wa kiasi gani?	1. Chini ya mwaka mmoja 2. Mwaka mmoja- miwili 3. Zaidi ya Miaka miwili	1 2 3
35.	Kama ndio kwa Q32, Nini kilikuchochea wewe kwenda kuchunguzwa?	1. Uchunguzi wa matibabu 2. Mapendekezo ya daktari 3. Ushauri wa Mfanyi kazi wa afya ya jamii (CHW) 4. Kuwa na dalili 5. Zinginezo	1 2 3 4 5
36.	Je, mtoa huduma ya afya alielezea faida na hatari za uchunguzi kwako kabla ya uchunguzi?	1. Ndio 2. La	1 2

37.	Je, nani alifanya uamuzi kuwa utapokea uchunguzi?	1. Mtoa huduma ya afya 2. Mimi binafsi 3. Mimi pamoja na mhudumu wa afya 4. Zinginezo	1 2 3 4
38.	Kama La kwa Q32; Je! Uko tayari kushiriki katika uchunguzi wa saratani ya korodani katika siku zijazo?	1. Ndio 2. La	3. Enda Q39 4. Enda Q40
39.	Kama ndio kwa Q38 Kwa maoni yako utapitia uchunguza baada ya muda gani?	1. Katika mwezi mmoja 2. Katika miezi mitatu 3. Miezi sita na zaidi 4. Sijaamua 5. Zinginezo	1 2 3 4 5
40.	Kama la kwa Q38, Je! ni sababu gani zitakufanya kutoshiriki katika uchunguzi wa saratani ya korodani?	1. Mimi simgonjwa sihitaji kuchunguzwa 2. Sijui wapi nitapata uchunguzi 3. Sina pesa za kutumia katika uchunguzi 4. Sidhani ni muhimu 5. Ni hatari kuchunguzwa	1 2 3 4 5
WASHUKURU WAHUSIKA KWA MUDA WAO			

Appendix IV: Focus Group Discussion Guide

Facilitators welcome and instructions to the participants

Welcome

I would like to take this opportunity to thank you for volunteering to participate in this Focus Group Discussion. Your participation is appreciated very much as your point of view is considered very important. The time taken away from your busy schedule is much appreciated.

Introduction

The Focus Group Discussion has been set up to find out more on your current thoughts and perceptions towards prostate cancer and barriers to uptake of preventive measures. The discussion will take approximately one hour. Can I use a tape recorder to facilitate recollection of what we discuss? (If yes proceed to record)

Anonymity

I would like to assure you that despite us recording the discussion will be anonymous. The recorded information will be kept under safe custody and shall not be accessed by other people and will only be transcribed word for word and then destroyed. The note taken will not have any information to link anybody to specific statements. Kindly lets all refrain from discussing the contribution of others in the group to other members in the community who were not participants. If you feel not comfortable to answer some of the questions kindly note you do not have to so, however I recommend that you participate as much as possible in the discussion.

Rules for FGD

- The first rule is that only one person speaks at a time. Kindly do not speak when another person is speaking but wait until they are done.
- You do not have to speak in a particular order
- When you have something to add to the discussion kindly speak as I would like to hear everyone's view.
- Your views do not have to be the same as others in the group.
- Please note that there is no correct or wrong response
- Is there any question?
- Ockey lets begin the discussion

Warm Up

I would like everyone to introduce themselves

Introductory question

I am going to give you a few minutes to think about cancer; is anyone willing to share their experience and feelings towards the disease?

Guiding questions

Knowledge and awareness on prostate cancer

1. Are you aware of prostate cancer? Probe source of information.
2. In your opinion is prostate cancer a common disease?
3. Probe on age group is mostly affected, causes, signs & symptoms and prevention

Uptake of screening

- Have you ever been screened for prostate cancer screening?

Facilitators to uptake of screening

- If screened probe for what prompted them to get screened.
- Probe for perceived facilitators to uptake of prostate cancer screening among men in the community.

Barriers to uptake of screening

- If not screened probe the reasons why.
- Probe for the factors hindering men from taking up screening in the comunity

Concluding question

- What strategies do you think can be put in place to improve the prevention of prostate cancer in your community?

Conclusion

- Thank you so much for your contributions in this study, this has been a very successful discussion.
- I hope you found the discussion interesting
- If there is anything that you are unhappy with regarding the discussion kindly feel free to share with me after the discussion.
- Just to remind you that anything you shared will remain anonymous.

Appendix V: Key Informant Interview Guide

Introduction

I would like to take this opportunity to thank you for participating in the study. Your contribution in the interview will be very vital as your contribution will inform the researcher's on very pertinent issues related to prostate cancer. The interview will take approximately 45 Minutes.

Is it ockey for me to proceed with the interview?

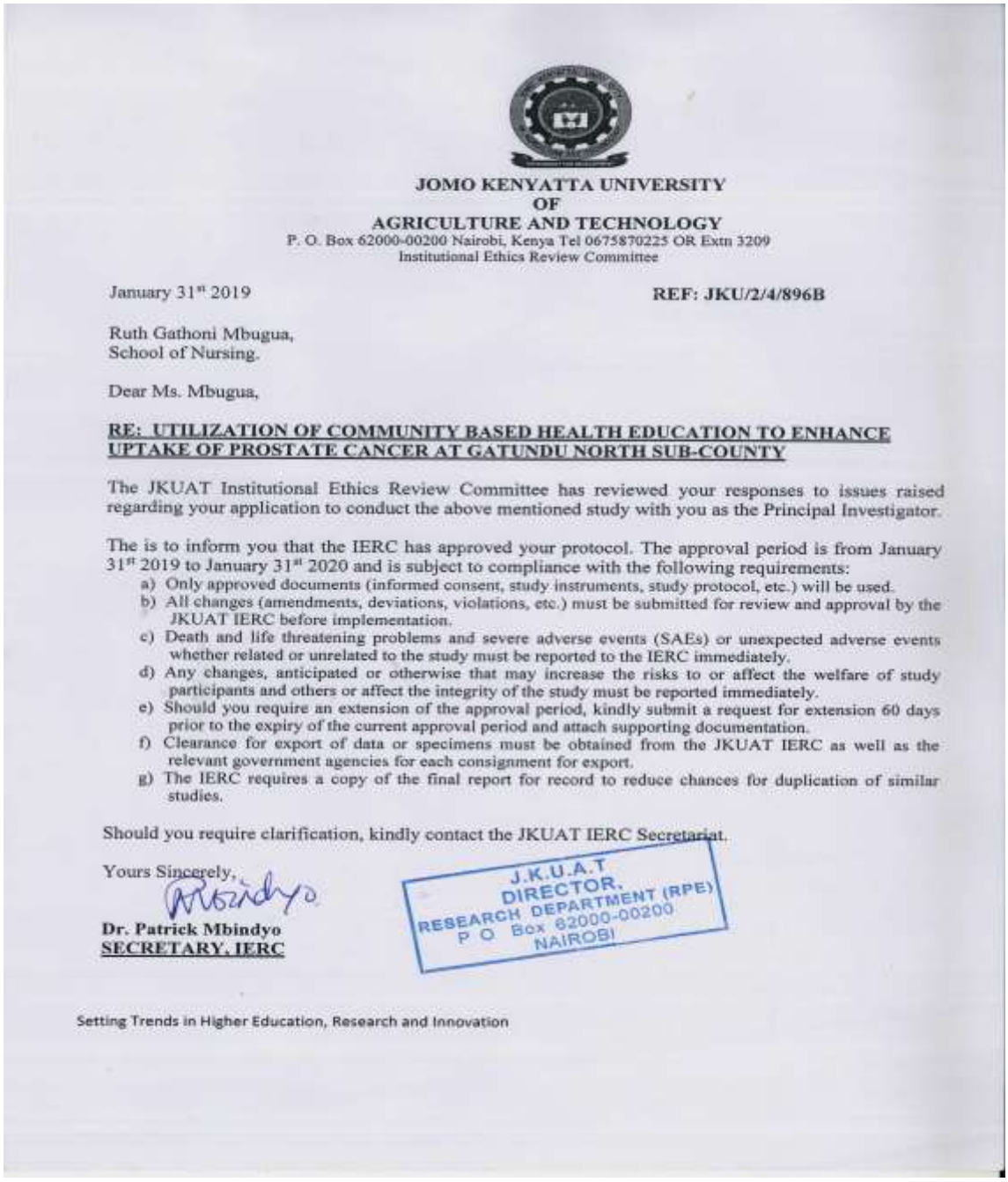
Guiding questions

- How would you rate the level of awareness of prostate cancer in the community?
- Do you think people in the community have adequate knowledge on prostate cancer?
- What is the current level of uptake of prostate cancer screening in the sub-county?
- What are some of the facilitators to the uptake of prostate cancer screening among men in the community?
- What barriers do you think limit the uptake of prostate cancer screening in the community?

Conclusion

- What are your recommendations in relation to raising awareness, empowering men for early diagnosis and prevention of prostate cancer?

Appendix VI: Ethical Approval



JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

P. O. Box 62000-00200 Nairobi, Kenya Tel 0675870225 OR Extn 3209
Institutional Ethics Review Committee

January 31st 2019 **REF: JKU/2/4/896B**

Ruth Gathoni Mbugua,
School of Nursing.

Dear Ms. Mbugua,

RE: UTILIZATION OF COMMUNITY BASED HEALTH EDUCATION TO ENHANCE UPTAKE OF PROSTATE CANCER AT GATUNDU NORTH SUB-COUNTY

The JKUAT Institutional Ethics Review Committee has reviewed your responses to issues raised regarding your application to conduct the above mentioned study with you as the Principal Investigator.

The is to inform you that the IERC has approved your protocol. The approval period is from January 31st 2019 to January 31st 2020 and is subject to compliance with the following requirements:

a) Only approved documents (informed consent, study instruments, study protocol, etc.) will be used.
b) All changes (amendments, deviations, violations, etc.) must be submitted for review and approval by the JKUAT IERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the IERC immediately.
d) Any changes, anticipated or otherwise that may increase the risks to or affect the welfare of study participants and others or affect the integrity of the study must be reported immediately.
e) Should you require an extension of the approval period, kindly submit a request for extension 60 days prior to the expiry of the current approval period and attach supporting documentation.
f) Clearance for export of data or specimens must be obtained from the JKUAT IERC as well as the relevant government agencies for each consignment for export.
g) The IERC requires a copy of the final report for record to reduce chances for duplication of similar studies.

Should you require clarification, kindly contact the JKUAT IERC Secretariat.

Yours Sincerely,

Dr. Patrick Mbindyo
SECRETARY, IERC

J.K.U.A.T
DIRECTOR,
RESEARCH DEPARTMENT (RPE)
P O Box 62000-00200
NAIROBI

Setting Trends in Higher Education, Research and Innovation

Appendix VII: NACOSTI approval

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/19/71673/28322**

Date: **27th February, 2019**

Ruth Gathoni Mbugua
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Utilization of community based health education intervention to enhance uptake of prostate cancer screening in Gatundu North Sub County, Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for the period ending **27th February, 2020.**

You are advised to report to **the County Commissioner, the County Director of Education and the County Director of Health Services, Kiambu County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Kiambu County.

Appendix VIII: Ministry of Health Authorization

MINISTRY OF HEALTH
OFFICE OF THE DIRECTOR MEDICAL SERVICES

Telephone: Nairobi 254-020-2717077
Email: dms@health.go.ke

When replying please quote:

Ref: MOH/F/HRD/01/VOL. II

Afya House
Cathedral Road
P.O. Box 30016-00100
NAIROBI

5th April, 2019

Ruth Mbugua
Jomo Kenyatta University of Agriculture
P.O. Box 62000-00200
NAIROBI.

RE: APPROVAL TO CARRY OUT RESEARCH IN GATUNDU NORTH SUB-COUNTY, KENYA FOR PHD COURSE IN PHILOSOPHY NURSING

Your request letter dated 22nd March, 2019 refers.

Your request to carry out research for your Project entitled, **"Utilization of Community Based Health Education Intervention to enhance uptake of Prostate Cancer Screening in Gatundu North Sub-County, Kenya"** has been approved.

This approval is restricted only to aggregate Gatundu North Sub-County only.

Kindly note that you will be required to share the final report of the study with this office.

Dr. Kioko Jackson K., OGW, MBS.
DIRECTOR OF MEDICAL SERVICES

ISO 9001:2015
Certified

Appendix IX: House Hold Visit Checklist

HOUSEHOLD VISIT CHECKLIST

NAME OF CHW……DATE……

COMMUNITY UNIT ……HOUSEHOLD NUMBER……..…

SESSION NUMBER……

SESSION START TIME……SESSION END TIME……

COVERED CONTENT

Kindly indicate the content covered during the current house hold visit by ticking against the covered area.

Area covered	**Tick**
Introduction; cancer burden word-wide and locally	
Definition of prostate cancer	
Signs and symptoms of prostate cancer	
Risk factors of prostate cancer	
Screening tests for prostate cancer	
Treatment of prostate cancer	
Prevention and control of prostate cancer	

If session not completed as planned give reasons……

……
……
……
……

Date agreed for next visit……..

Signature (CHW)……

Signature (participant)……

Signature of CHEW……

Appendix X: Community Health Volunteer Training Guideline

1.0 Introduction to the course

The Ministry of Health developed the community strategy as a policy guide for the delivery of the Kenya Essential Package of Health as part of the implementation of the second National Health Sector Strategic Plan (NHSSP II).

The Community strategy's main aim is to strengthen the capacity of communities in the management of health-related development initiatives. The overall goal is to enhance the access to health care in the community. This goal can only be achieved through empowering the communities to be actively involved in the improvement of their health. This will be accomplished by establishing sustainable community level services. The empowering of the communities shall require continuous health education to the community through Community Health Workers. The Community Health Volunteers are the key workforce involved in the implementation of the community strategy.

Since Community Health Volunteers are involved in promotion of health in the households through conducting home visits it's imperative that they have the necessary capacity to educate the community regarding various aspects of prostate cancer which will in return contribute to enhanced uptake of early screening hence reducing the late diagnosis and mortality from prostate cancer.

The manual intends to impart knowledge on prostate cancer to Community Health Volunteers who will in return conduct health education sessions in the house holds that they serve. The men will be empowered on various aspects prostate cancer including the signs and symptoms, screening and prevention of the disease.

1.2 Course objectives

The objective of the training is to enhance the capacity of CHVs to conduct community based education on prostate cancer in the community. It's envisioned that at the end of the training the CHVs will acquire the necessary skills and knowledge on prostate cancer to enable them conduct health education to the men at the households.

By the end of this training the CHVs are expected to;

- Define and classify cancer
- Define prostate cancer
- State the signs and symptoms of prostate cancer
- Describe the risk factors of prostate cancer
- Describe the screening tests for diagnosis of prostate cancer
- Describe the management of prostate cancer
- Describe the prevention and control of prostate cancer
- To carryout health education sessions to households on prostate cancer

1.3 Target group

This course is designed to train Community Health Volunteers. Community Health Volunteers play a vital role of delivery of services at level I of the health care delivery system in the community. This training will empower the CHVs with knowledge on prostate cancer. The CHVs will then share this information with the men in the households they serve in the community to facilitate informed decision making in the uptake of prostate cancer screening.

1.3 Organization of the course

The course is intended to run for two (2) days.

1.4 Course content

- Session I: Introduction
- Session II: Prostate Cancer
- Session III Etiology & risk factors of prostate cancer
- Session IV: Principles of Prevention and control of prostate cancer
- Session V: Screening for Prostate Cancer
- Session VI: Practicing health education sessions

1.5 Mode of delivery and instructional materials

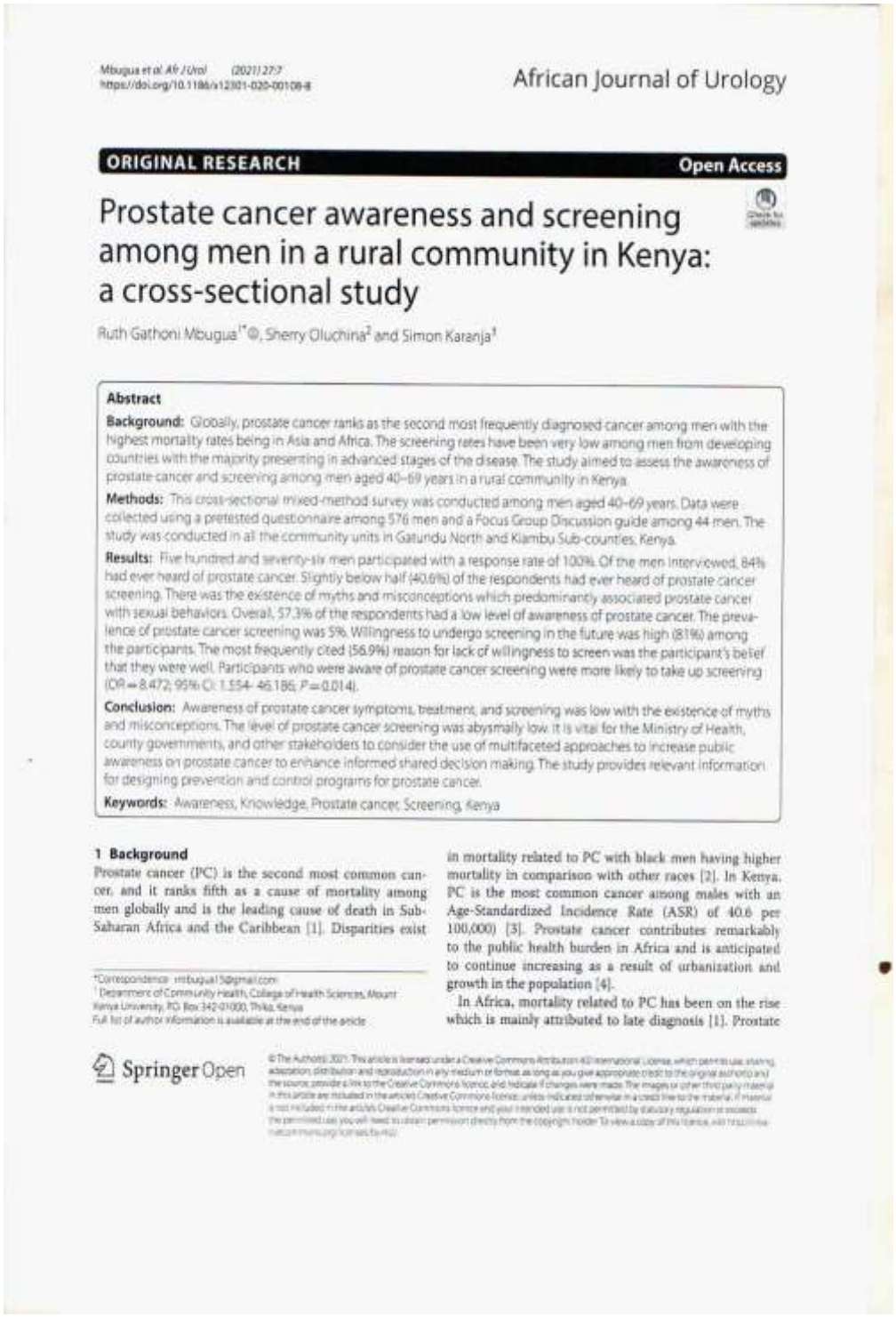
Various techniques shall be used in the training of the CHVs to ensure an interactive session which will be ideal for the adult learners. The methods for teaching shall include; Interactive lectures, small group discussions and large group discussions, demonstrations and return demonstrations and role plays.

The instructional Materials and/or Equipment shall include; a Computer, Overhead projector (OHP); Handouts; White board and Flip charts.

Appendix XI: Community Health Volunteers Training Schedule

Time	Topic	Activities
DAY 1		
30 Minutes	Introduction	Small group discussions, group dicussions, Mini-lecture, plenary
30 Minutes	Prostate cancer	Small group discussions, group dicussions, Mini-lecture, plenary
30 Minutes	Signs and symptoms	Small group discussions, group dicussions, Mini-lecture, Plenary
30 Minutes	Aetiology & risk factors	Small group discussions, group dicussions, Mini-lecture, Plenary
1 hour 15 minutes	Prevention and control of prostate cancer	Small group discussions, group dicussions, Mini-lecture, Plenary
30 Minutes	Screening	Small group discussions, group dicussions, Mini-lecture, Plenary
30 minutes	Household visit	Mini-lecture, Role play, small group discussions
15 minutes	Summary	Highlight key points
10 minutes	Evaluation	Questions and answers
DAY 2		
2 Hours	House hold visit	Field demonstrations in small groups

Appendix XII: Publications



Mbugua et al. Afr J Urol (2021) 27:7
https://doi.org/10.1186/s12301-020-00108-8

African Journal of Urology

ORIGINAL RESEARCH Open Access

Prostate cancer awareness and screening among men in a rural community in Kenya: a cross-sectional study

Ruth Gathoni Mbugua[1*], Sherry Oluchina[2] and Simon Karanja[1]

Abstract

Background: Globally, prostate cancer ranks as the second most frequently diagnosed cancer among men with the highest mortality rates being in Asia and Africa. The screening rates have been very low among men from developing countries with the majority presenting in advanced stages of the disease. The study aimed to assess the awareness of prostate cancer and screening among men aged 40–69 years in a rural community in Kenya.

Methods: This cross-sectional mixed-method survey was conducted among men aged 40–69 years. Data were collected using a pretested questionnaire among 576 men and a Focus Group Discussion guide among 44 men. The study was conducted in all the community units in Gatundu North and Kiambu Sub-counties, Kenya.

Results: Five hundred and seventy-six men participated with a response rate of 100%. Of the men interviewed, 84% had ever heard of prostate cancer. Slightly below half (40.6%) of the respondents had ever heard of prostate cancer screening. There was the existence of myths and misconceptions which predominantly associated prostate cancer with sexual behaviors. Overall, 57.3% of the respondents had a low level of awareness of prostate cancer. The prevalence of prostate cancer screening was 5%. Willingness to undergo screening in the future was high (81%) among the participants. The most frequently cited (56.9%) reason for lack of willingness to screen was the participant's belief that they were well. Participants who were aware of prostate cancer screening were more likely to take up screening (OR = 8.472, 95% CI: 1.554- 46.186; $P = 0.014$).

Conclusion: Awareness of prostate cancer symptoms, treatment, and screening was low with the existence of myths and misconceptions. The level of prostate cancer screening was abysmally low. It is vital for the Ministry of Health, county governments, and other stakeholders to consider the use of multifaceted approaches to increase public awareness on prostate cancer to enhance informed shared decision making. The study provides relevant information for designing prevention and control programs for prostate cancer.

Keywords: Awareness, Knowledge, Prostate cancer, Screening, Kenya

1 Background

Prostate cancer (PC) is the second most common cancer, and it ranks fifth as a cause of mortality among men globally and is the leading cause of death in Sub-Saharan Africa and the Caribbean [1]. Disparities exist in mortality related to PC with black men having higher mortality in comparison with other races [2]. In Kenya, PC is the most common cancer among males with an Age-Standardized Incidence Rate (ASR) of 40.6 per 100,000) [3]. Prostate cancer contributes remarkably to the public health burden in Africa and is anticipated to continue increasing as a result of urbanization and growth in the population [4].

In Africa, mortality related to PC has been on the rise which is mainly attributed to late diagnosis [1]. Prostate

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cancer is mostly asymptomatic in the early stages. It is diagnosed in the majority of the cases after progression to an advanced stage when the prognosis is poor. The major challenge experienced in developing countries is the late presentation of PC patients in the health facilities [4, 5]. In Kenya, 80% of PC patients are diagnosed with advanced disease and more aggressive tumors. This results in poor clinical outcomes as very little can be done to enhance the survival of the patients [6, 7].

Globally, PC screening remains a much-debated issue with various discrepancies regarding recommendations for the uptake of screening. Nevertheless, screening remains the key strategy for the reduction of mortality through early detection of PC among men considered at risk [2]. The cancer screening guidelines in Kenya recommend informed shared decision making among men aged 40–69 years [7]. However, despite high mortality occurring in developing countries like Kenya due to PC, the screening rates are still very low. This has been associated with various barriers including low knowledge and awareness level and negative beliefs [8–11].

Early detection is a key pillar to the achievement of the goal of the cancer control strategy 2017–2022 in Kenya [6]. Unfortunately, the rate of uptake of screening remains very low among Kenyan men. According to the Kenya Demographic Health Survey, the screening rate for PC is 3%, 4.3% and 2.6% among men aged 15–49 years, 40–44 years and 45–49 years, respectively. Men residing in rural areas were reported to have low levels of PC awareness and screening in comparison with those residing in the urban regions [12]. Other studies conducted among Kenyan men of varying ages and residence have reported PC screening rates between 1.3% and 2.6% [13, 14]. Assessment of PC awareness and screening among at-risk men in the community is a critical step toward enhancing early detection. There is a paucity of studies on PC awareness and screening among Kenyan men. There exists no study to our knowledge that has included men considered eligible for PC screening from a rural community. Qualitative studies on PC awareness are important for further exploration of the utilization of screening services. The study, therefore, used a mixed-method approach to assess the level of PC awareness and screening among men aged 40–69 years in a rural community.

2 Methods

2.1 Study design

This descriptive cross-sectional survey assessed the level of awareness and uptake of PC screening among men aged 40–69 years in a rural community. The study was conducted as a baseline survey for a pretest–posttest non-equivalent quasi-experimental study. The aim of the study was to assess the effectiveness of community-based health education on enhancing uptake of PC screening. The intervention arm of the study was in Gatundu North Sub-county. The intervention arm received a structured health education which was delivered face to face by community health workers (CHW). The control arm of the study was in Kiambu Sub-county. The primary outcome of the study was uptake of PC screening, while the secondary outcomes included knowledge, perception of self-vulnerability and fatalism. The variables were assessed at baseline and 6 months post-intervention in both arms of the study to assess the effectiveness of the intervention.

2.2 Study participants

The target population included men aged 40–69 years residing in the study area. The age was selected as it is the recommended age for screening according to the cancer screening guidelines in Kenya [7].

2.3 Study setting

The study was conducted in April 2019 in Gatundu North and Kiambu Sub-counties in Kiambu County which is located in the central region of Kenya. The main socioeconomic activity in the area is agricultural. The study area is composed of 17 community units (CUs) for implementation of community health strategy at the level I of health delivery system in Kenya. Each CU serves a population of approximately 5000 people which are headed by a Community Health Extension Worker and Community Health Volunteers who serve approximately 20 households each. All the CUs in the study area were included in the study. Kiambu county comprises 505 health facilities which include three level five hospitals, eleven level four hospitals, four health centers and 70 government dispensaries which are well distributed within the county. Prostate cancer screening services are provided in the study area in Kiambu Hospital and Igegania Hospitals in Kiambu and Gatundu North Sub-counties, respectively.

2.4 Sample size

The sample size was determined based on the formula indicated below [15]:

$$n = \frac{\left[\left(Z_{\alpha/2} + Z_{\beta}\right)^2 \times \left(p_1(1-p_1) + p_2(1-p_2)\right)\right]}{\left(p_1 - p_2\right)^2}$$

α (the probability of a type I error) was 0.05, and Zα/2 (the critical value of the normal distribution of participants at α/2) was 1.96 at a confidence interval of 95%. β (the probability of a type II error) was 0.2, and the Zβ (the critical value of the Normal distribution at β) was 0.84 for a power of 80%. The p1(the expected sample proportion who have participated in PC screening at baseline) was

3.4% based on previous reported screening rates in the study area [12]. The p2 (the expected sample proportions who have participated in PC screening post-intervention) was 10% estimated from screening rates reported in a similar study that assessed the effectiveness of education intervention on prostate examination [16]. An addition of 30% was done to cater for attrition at follow-up. The calculated sample size for the study was 576 which represented 288 participants in each arm of the study. The sample size for the Focus Group Discussion (FGD) reached saturation with 44 participants.

2.5 Sampling

The study area is demarcated into 17 community units (CUs). All the CUs were included in the study. A list of all households in each CU with men aged 40–69 years was then generated, and using a table of random numbers, simple random sampling was used to select the study participants from all the CUs. Purposive sampling was used to select the FGD participants to ensure heterogeneity with the representation of various socio-demographic and economic characteristics in all the CUs.

2.6 Data collection

Quantitative data were collected by the researchers and research assistants through face-to-face interviews in the participant's households. The research assistants underwent training before data collection to minimize bias. A pretested structured interviewer-administered questionnaire was utilized to collect the data. The structured questionnaire was pretested among 58 men in Thika Sub-county. The questions were assessed for their appropriateness and clarity. The questionnaire was then revised and corrections done to some questions that were found to be ambiguous to ensure they tested what was intended for the study. The tool was further reviewed by two experts before data collection. The response rate was 100% among 576 participants. The questionnaire consisted of three sections: Section I: socio-demographic characteristics which included the respondents age, marital status, religion, education level, and household income. Section II: assessment of the level of awareness of PC which included questions on whether or not they had ever heard about PC and were aware of PC symptoms, treatment, modes of treatment, screening and the screening methods. Section III: history of screening and its related determinants which included asking the respondents whether or not they had ever gone for prostate examination, they were screened, the duration since they screened, the method used, the clinician explained the risk and benefits, the clinician involved them in decision making, their intention to screening in future and the reasons for their lack of willingness to screen.

The qualitative data were collected through Focus Group Discussions (FGDs) using a pretested semi-structured guide. The FGD guide was pretested through one FGD session conducted among 11 men in the Thika sub-county. The tool was further refined before the actual study through review by a team of experts in the subject. The key themes in the guide included awareness of PC, symptoms, etiology, treatment, and screening. The participants were assembled in a private area in the link health facilities in the study area and sessions conducted by a moderator and two repertoires. The interviews were audio-recorded and transcribed verbatim.

2.7 Data analysis

Quantitative data were analyzed using the Statistical Package of Social Sciences Version 22 (SPSS Armonk, NY: IBM Corp). Data cleaning and coding were done before analysis. Our finding was that none of the variables had been excluded. Awareness of PC was categorized into low (values below mean) and high (values ≥ mean). Pearson's Chi-square test was used to assess for the association of the variables and a P value of < 0.05 was considered statistically significant at 95% confidence interval. The dependent variable assessed was uptake of PC screening. The variables that were found to be significant ($P < 0.05$) were then subjected to further analysis using logistics regression. The qualitative data from FGDs were analyzed using inductive content analysis based on grounded theory following the six steps as guided by Braun and Clarke based on the key themes of the study [17].

3 Results

3.1 Demographic characteristics

A total of 576 men participated in the study with a response rate of 100%. Demographic and socioeconomic data are presented in Table 1.

3.2 Awareness of prostate cancer

Among all the participants, 84% had heard about PC. Among these participants, the most frequently cited sources of information were mass media and friends at 70.4% and 11.9%, respectively. Only 3.8% reported healthcare providers as the source of information.

Only 22.2% of the respondents were aware of the symptoms of PC. Six point three percent (6.3%) of the respondents reported experiencing urinary symptoms at the time of the study. Seventy point one percent (70.1%) of the respondents were aware that PC can be treated. Among these respondents, 25% were not aware of any modes of treatment of PC and 4.7% reported the use of herbal medicine as a mode of PC treatment. Slightly below half (40.6%) of the respondents had heard of PC screening. Among these respondents, only 20.5%

Table 1 Socio-demographic characteristics of respondents

Socio-demographic Characteristic	Frequency (N = 576)	Percentage (%)
Age		
40 to < 50 years	249	43.2
50 to < 60 years	197	34.2
60 to < 70 years	130	22.6
Religion		
Christian	565	98.1
Traditionalist	6	1
Muslim	5	0.9
Marital status		
Married	469	81.4
Single	34	5.9
Separated/divorced	40	6.9
Widowed	33	5.7
Occupation		
None	25	4.3
Business	130	22.6
Formal employment	47	8.2
Farmer (small scale)	231	40.1
Casual worker	143	24.8
Income		
< 10,000	374	64.9
10,000 to < 30,000	166	28.8
30,000 to < 50,000	25	4.3
> 50,000	11	1.9
Education level		
None	6	1%
Primary	238	41.3
Secondary	267	46.4
Tertiary	65	11.3

Data are presented in frequency (n) and percentage (%)

reported awareness of any PC screening methods. Seventy-one point seven percent (71.7%) of the respondents were not aware of anyone who had undergone PC screening. Overall, 57.3% of the respondents had a low level of awareness of PC, while 42.7% had a high level of awareness on PC (Table 2).

3.3 Prostate cancer screening

Regarding PC screening, only 5% (29) of the respondents had undergone PC screening at the time of our study. The most frequently reported method of screening was Prostate Specific Antigen (58.6%). The main motivator reported for screening was routine medical examination (72.4%). Only 10.3% of the respondents reported the recommendation by a healthcare provider as a motivator for screening. None of the participants reported the utilization of shared decision making by the clinician during screening. Slightly above half of the respondents (58.6%) reported the healthcare providers had explained the risks and benefits to them before the screening. Intention to undergo screening was high as 81% of the respondents who had never been screened reported willingness to undergo screening in the future. The main reasons reported for the lack of willingness to undergo screening in the future were; the men's belief that they were well (56.9%), inability to afford the test (14.7%) and thinking it is not beneficial (13.7%) (Table 3).

3.4 Association of prostate cancer awareness on uptake of screening

Prostate cancer awareness was significantly associated with screening. Respondents who were aware of the symptoms of PC were more likely to take up screening ($X^2 = 19.183$, $P = <0.001$). Respondents who were aware of PC treatment were more likely to screen ($X^2 = 7.689$, $P = 0.002$). Similarly, respondents who were aware of PC screening ($X^2 = 26.304$, $P = <0.001$) and those aware of PC screening methods ($X^2 = 50.55$, $P = <0.001$) were more likely to undergo screening (Table 4).

The significant variables were subjected to further analysis using multivariate logistics regression. Participants who were aware of PC screening were eight times more likely to screen than those who were not aware [OR = 8.472(1.554, 46.186) $P = 0.014$]. The awareness of PC screening methods was significantly associated with PC screening. Participants who were aware of PC screening methods were seven times more likely to take up screening in comparison with those who were not aware [OR = 7.012(1.219, 40.350) $P = 0.029$] (Table 5).

3.5 Qualitative results

3.5.1 Prostate cancer awareness

The findings from the FGDs indicated the majority of the participants had ever heard about PC. The main source of information reported was mass media. The awareness of the etiology of PC among the participants was low. The themes which emerged regarding the etiology of PC indicated the existence of myths and misconceptions in this rural population. The predominant cause of PC highlighted by the participants was the denial of conjugal rights as was illustrated by one FGD participant:

> *"Most of us do not know much about this cancer and what causes it. I heard from social media that men with many sexual partners cannot get prostate cancer. In the community, people say that this disease is caused by the denial of conjugal rights....."*

Other causes of PC reported included women getting to menopause when men were still sexually active, bacteria, masturbation, having several sexual partners and

Table 2 Knowledge and awareness of prostate cancer

Variable	Category (N = 576)	Frequency (%)
Ever heard about prostate cancer	Yes	481 (83.5%)
	No	95 (16.5%)
Source of information	Mass media	338 (70.4%)
	Friend	57 (11.9%)
	Relative	29 (6%)
	Hospital/healthcare workers	18 (3.8%)
	Church	21 (4.4%)
	Community Health Volunteer	17 (3.5%)
Family history of PC	Yes	56 (9.7%)
	No	520 (90.3%)
Aware of symptoms of PC	Yes	128 (22.2%)
	No	448 (77.8%)
Symptoms of PC	Frequent/painful/difficulty in urination	114 (88.1%)
	Erectile dysfunction	33 (25.8%)
	Weight loss	14 (10.9%)
	Blood in urine	13 (10.2%)
	Bone pain	10 (7.8%)
Prostate cancer can be treated	Yes	404 (70.1%)
	No	172 (29.9%)
Mode of treatment	Drugs	123 (30.4%)
	Surgery	152 (37.6%)
	Radiotherapy	20 (5%)
	Herbal remedies	19 (4.7%)
	Chemotherapy	54 (13.4%)
	Don't know	101 (25%)
Ever heard about prostate cancer screening	Yes	234 (40.6%)
	No	342 (59.4%)
Aware of PC screening methods	Yes	118 (20.5%)
	No	458 (79.5%)
Methods of PC screening	PSA screening	84 (54.2%)
	Digital rectal exam	37 (31.4%)
	Biopsy	17 (14.4%)
Aware of anyone who has undergone screening	Yes	163 (28.3%)
	No	413 (71.7%)

punishment from God. The majority of the participants were not aware of the symptoms and treatment of PC. Regarding the prevention of PC, several myths and misconceptions were reported. This included; a man having several sexual partners, being hygienic, showering every day, loving their wives, being faithful to one partner, eating traditional foods that enhance sexual performance and trusting in God.

One FGD participant stated:

"When a man has the urge to have sex and is denied by the wife the accumulation of sperms causes bacteria to enter the system causing the disease. I totally blame our women for denying men their conjugal rights which is now causing men to get prostate cancer. The only way men can prevent themselves is getting another sexual partner to meet their needs"

The majority of the participants reported they were not aware of the methods utilized for PC screening. The participants reported that men felt that they are always left out in health education programs which limits their understanding of the diseases as the focus is predominantly on women and children as indicated by one participant:

"We hear of prostate cancer but it is still a mystery to many of us. I have not been screened since I don't

Table 3 Prostate cancer screening behaviors

Variable	Category	Frequency (%) $N = 576$
Ever gone for prostate gland examination	Yes	38 (6.6)
	No	538 (93.4)
Screened for prostate cancer*	Yes	29 (76.3)
	No	9 (23.7)
Method of screening used**	PSA testing	17 (58.6)
	Digital Rectal Examination	9 (31.0)
	Biopsy	1 (3.4)
	Don't know	2 (6.9)
When were you screened**	< 1 year	13 (51.7)
	1–2 years	11 (37.9)
	> 2 years	3 (10.3)
Motivation of screening**	Routine checkup	21 (72.4)
	Recommendation by doctor/nurse	3 (10.3)
	Advice by CHV	3 (10.3)
	Advert	2 (6.9)
Who made the decision to screen**	Healthcare provider	5 (17.2)
	Self	24 (82.8)
Did the provider explain the benefits and risks of screening**	Yes	17 (58.6)
	No	12 (41.4)
Willingness to screen in future***	Yes	436 (81)
	No	102 (19)
Reasons for not willing to screen****	Belief they are well	58 (56.9)
	Inability to afford	15 (14.7)
	Thinking it is not beneficial	14 (13.7)
	Lack of information	8 (7.8)
	Consider screening too risky	7 (6.9)

Data are presented in frequency (n) and percentages (%)

*Only those who had the prostate examined

**Only those screened for PC

***Only those who had never gone for prostate examination

****Only those not willing to be screened

know what method will be used. I've heard of some men in the community who talk about getting fingers inserted in the anus during screening and I don't know whether this is true or not."

3.6 Prostate cancer screening

When participants were probed on their personal history of PC screening and other men in their community, only two reported ever having been screened for PC. The majority of participants stated they had never been screened for PC and neither were they aware of anyone who had been screened in the community. The main source of information reported was mass media as described by a participant:

"I have never been screened for prostate cancer though I have heard about it in many forums including the radio and newspaper. I am not aware of any man who has been screened for the disease. I think many men in my community have not been screened including myself."

The majority of the participants cited willingness to undergo screening in the future. The reasons reported for lack of willingness to undergo screening by the participants included; lack of information about the disease, not finding it necessary, not knowing where to get the test, being too costly, association of cancer with death, avoidance of a Digital Rectal Examination (DRE), masculinity, lack of time, cultural beliefs, and stigma and discrimination associated with the disease.

Table 4 Association of knowledge and awareness on uptake of prostate cancer screening

Variable	Category	Ever been screened		X^2	Df	P value
		No	Yes			
Aware of PC symptoms	Yes	112	16	19.183	1	< 0.001
	No	435	13			
Aware of PC treatment	Yes	377	27	7.689	1	0.002
	No	170	2			
Ever heard of PC screening	Yes	209	25	26.304	1	< 0.001
	No	338	4			
Source of information	Mass media	134	11	12.296	1	0.004
	Friend	23	1			
	Relative	6	1			
	Hospital	20	8			
	Church	12	2			
	CHV	12	2			
Aware of PC screening methods	Yes	97	21	50.551	1	< 0.001
	No	450	8			
Family/friend history of PC	Yes	54	2	2.573	1	0.109
	No	493	27			

PC Prostate cancer; CHV Community Health Volunteer

Table 5 Logistics regression analysis of awareness and prostate cancer screening

Variable	Category	P value	Odds ratio	95% CI
Aware of PC treatment	Yes	0.378	2.509	(0.360, 14.820)
	No	Ref		
Aware of PC symptoms	Yes	0.323	0.625	(0.246, 1.589)
	No	Ref		
Aware of PC screening	Yes	**0.014**	8.472	(1.534, 46.786)
	No	Ref		
Source of PC screening information	Newspaper/radio/TV	0.24	2.773	(0.505, 15.213)
	Friend	0.212	5.124	(0.395, 66.500)
	Relative	0.973	0.952	(0.043, 20.077)
	Hospital	0.647	0.653	(0.106, 4.042)
	Church	0.811	1.312	(0.142, 12.110)
	CHW	Ref		
Aware of PC screening methods	Yes	**0.029**	7.012	(1.219, 40.350)
	No	Ref		

Ref reference; CI confidence interval

4 Discussion

The purpose of our study was to assess the level of awareness of prostate cancer and screening among Kenyan men in a rural community. The majority of the respondents in the study had ever heard about prostate cancer with the mass media being the main source of information reported. A similar study conducted among Kenyan men in an urban population of low socioeconomic status reported similar findings [13]. Similarly, the Kenya Demographic Health Survey, reported that two-thirds of men in Kenya had heard about PC [12]. A similar study conducted in Nigeria reported a lower level of awareness, and the main source of information was mass media [9]. The recommendation by a healthcare provider has been reported as a strong predictor to the uptake of PC screening in previous studies [18, 19]. Only 3.8% of the respondents in the study reported a healthcare provider as the source of information. Ugochukwu et al. reported similar findings in a study conducted in Lagos, Nigeria [20]. There is a need for the healthcare providers to

participate in the increase in awareness of PC among men at risk to enhance the decision-making process for screening. This also denotes the effectiveness of mass media as a strategy to enhance awareness on PC.

Despite a majority of the respondents having heard about PC, overall, 57.3% of the respondents had a low level of awareness of PC. Our study findings are congruent with Mutua & Kishoyian in their study among men in a rural community in Kenya where low levels of awareness of PC were reported [21]. A similar study conducted in Tanzania reported low levels of awareness on PC. [11] Similarly, a study conducted in South Africa reported low levels of awareness on PC and screening [22]. These findings are also congruent with other studies conducted among men of African origin across countries. [23–26] Studies comparing the level of knowledge and awareness among black and Caucasian men have found black men to have lower levels of knowledge and awareness on PC. [19, 27] This is despite black men having a higher risk of dying from the disease. [2, 28] Increase in awareness on PC among African men is therefore imperative as it has been associated with participation in PC risk-based screening. [29, 30]

The study findings indicate the existence of myths and misconceptions which associated PC with sexual behavior. The predominant cause of PC cited during the discussions by the participants was the denial of conjugal rights. This finding is not unique to Kenyan men as other studies conducted in Uganda, Nigeria and Burkina Faso reported similar findings. [10, 31, 32] Such misconceptions are likely to deter men from taking up screening due to the stigma associated with the disease in the community. The misconception of the prevention of PC through having multiple sexual partners is equally likely to predispose men to sexually transmitted diseases. These knowledge deficiencies noted among the respondents can be used as a framework to enlighten men and hence reduce the knowledge gaps through the dissemination of relevant information. This is envisioned to enhance informed decision making regarding uptake of PC screening among at-risk men.

In our study, the screening for PC was low as only 5% of the participants had undergone screening. This is despite a significant number having urinary symptoms at the time of the study. A similar low screening rate was reported in a study conducted in the Eastern region of Kenya among men aged above 25 years where the screening rate was 2.6% [21]. Our findings are congruent with a study conducted in Tanzania which reported a screening rate of 7.7% among men aged above 40 years [11]. Similar studies conducted among African men have reported low levels of screening [9, 10]. Intention to undergo screening can serve as a bridge to the transition of men from the level of decision making to taking action. The finding of high intention to screen and low levels of screening have been reported in other studies conducted among Nigerian men and Kenyan men [13, 20]. However, a study conducted in a rural community in Makueni County, Kenya, found a moderately lower level of intention than our current study [14]. Men citing a willingness to screen for PC in the future have been associated with a lack of adequate knowledge on PC which limits their ability for decision making [33]. These findings could be an indication of the existence of barriers to the transition in the decision-making process for screening which require to be addressed. Our study recommends further research to explore the barriers to uptake of PC screening.

In the study, none of the respondents who were screened for PC reported utilization of shared decision making during screening. Only slightly above half reported an explanation of the risks and benefits of screening before the screening. Similar findings were reported by the American Cancer Society [2] where the majority of men reported a lack of utilization of shared decision making among clinicians. Similarly, Farhat and Arafa reported that only 54% of the physicians were practicing shared decision making during PC screening in Saudi Arabia [34]. This finding could be attributed partly to a proportion of the men being screened before the implementation of the current guidelines of screening in the country, failure of sensitization of clinicians on the recent guidelines, or other facility-related factors like demanding workload. This indicates the urgent need for sensitization of all clinicians in the country on the current PC screening guidelines. The study, therefore, recommends the investigation of the implementation of the decision-making process for risk-based PC screening and the development of decision aids.

In out current study, awareness of PC screening was associated with increased likelihood of uptake of PC screening. Other studies have corroborated similar findings. [35] This finding may be an indication that men require to have adequate knowledge as the decision-making process for PC screening is a complex phenomenon that requires a well-informed man. An interesting finding in our study was men reporting being left out in cancer prevention programs with much focus being on women for breast and cervical cancer. There is need for men to be considered when planning for cancer prevention and control programs in the community. The survival of PC patients is highly dependent on timely diagnosis and uptake of preventive measures. Currently, the only available tool for early detection is screening. Effective implementation of the current screening guidelines in Kenya which recommends informed shared decision making requires

men to have adequate knowledge on PC. There is a need for the development of educational interventions to empower men with more information on PC. This study recommends the increase in public awareness on PC using multifaceted approaches to enhance uptake of screening. The study further recommends the development of decision aids to enhance implementation of shared decision making among clinicians.

This study had limitations as it was cross-sectional; therefore, the association of dependent and independent variables could not be clearly explained. The study was conducted in a rural community, and hence, further research should be done among men in urban communities. Nonetheless, the key strength of the study was the use of a mixed-method approach which aided in further exploration of the findings. The study provides relevant information for designing and implementation of prevention and control programs for prostate cancer in Kenya with adequate consideration of the context of the study.

5 Conclusion

The level of awareness on prostate cancer was low despite the majority of the men hearing about PC. There was existence of myths and misconceptions regarding the etiology of PC with denial of conjugal rights being predominant. The level of uptake of prostate cancer screening was abysmally low. There is a need to address the deficiencies noted in knowledge to overcome myths and misconceptions that may deter men from the uptake of prostate cancer screening through well-tailored multifaceted approaches. There is a need for an increase in public health awareness on PC to enhance early detection.

Abbreviations

PC: Prostate cancer; ASR: Age-standardized rate; CHV: Community Health Volunteer; FGD: Focus Group Discussion; PSA: Prostate-specific antigen; DRE: Digital Rectal Examination

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Authors' contribution

RMG, SO and SK developed the concept and designed the study. RMG collected the data, SK assisted in data analysis, and RMG and SO developed the manuscript. SK revised the draft manuscript. All the authors read and approved the final manuscript.

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Availability of data and material

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

Ethical approval and permission to conduct the study were sought from Jomo Kenyatta University of Agriculture & Technology Institutional Ethics Review Committee (JKU/2/4/B668) and the Ministry of Health, Kenya, before the study commenced. Written consent was sought from the participants before data collection following the explanation of the purposes, benefits and risks of the study. Participation in the study was voluntary, and confidentiality of participants was ensured throughout the entire process.

Consent for publications

Not applicable.

Competing interest

The authors declare no conflict of interest.

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ORIGINAL ARTICLE

Barriers and Facilitators to Uptake of Prostate Cancer Screening in a Kenyan Rural Community

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Abstract

Background: Prostate cancer (PC) is curable with early detection, yet it remains a major public health problem globally and a leading cause of mortality among men. The objective of the study was to explore the barriers and facilitators to the uptake of prostate cancer screening among men aged 40–69 years in a rural community in Kenya. **Methods:** We utilized an explorative qualitative design and purposive sampling to select participants. Six focus group discussions (FGDs) and seven in-depth interviews were conducted among 59 men aged 40–69 years and key informants in Kiambu County, Kenya. Data was collected using a semi-structured guide and content analysis was done. **Results:** The facilitators of screening included experience of symptoms, proximity and prominence of cancer, accessibility, and advocacy. The barriers to screening included lack of knowledge, fatalistic beliefs, low risk perception, stigma, and male dominance factors. **Conclusion:** This study provides vital information for the development of interventions to enhance shared decision-making in regard to PC screening. Capacity building of clinicians, task shifting and provision of well-coordinated affordable culturally sensitive screening services should be explored. The concerted effort among policy makers and all health care workers to overcome the stated barriers to screening is highly recommended.

Keywords

Barriers, facilitators, prostate cancer, screening, Kenyan men, Kenya

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Introduction

Prostate cancer (PC) is curable with screening and early detection, yet it remains a major public health problem globally as it is among the leading causes of cancer-related mortality among men worldwide. African men suffer disproportionately from PC with higher mortality reported among men in Sub-Saharan Africa (1, 2). In Kenya, PC is ranked as the most prevalent cancer in males with 2864 new cases (14.9%) in 2018 (3). Generally, low rates of PC screening have been reported among Black men (4, 5).

Globally, prostate specific antigen (PSA) screening remains a much debated issue with varying recommendations across countries. Nevertheless, there is a general agreement on utilization of shared decision-making in-line with the US Preventive Services Task Force recommendations (6). The screening guidelines in Kenya recommend individualized risk-based screening through shared decision-making between the client and clinician among men aged 40–69 years (3). The screening rates, however, remain abysmally low despite high intention to screen (7–10). Unfortunately, the number of men diagnosed with advanced aggressive PC is on the rise with an alarming increase in mortality attributed to low uptake of screening (3, 11). Despite equivocal evidence given on the effects of PC screening on mortality, risk-based screening aimed at early treatment initiation is vital (7).

The low uptake of PC screening among Kenyan men despite a considerably high level of awareness remains a great puzzle in public health that requires further investigation. There is a paucity of studies on barriers to PC screening in developing countries. The few studies carried out in Kenya are quantitative, hence they lack a deeper exploration of the factors influencing screening. The success of PC prevention and control programs requires an in-depth understanding of contextual factors influencing uptake of screening. The study therefore applied a qualitative approach to explore context-specific barriers and facilitators to PC screening among Kenyan men in a rural community.

Methods

Design

We used a descriptive exploratory qualitative study design.

Study site

The study was conducted in Gatundu-North and Kiambu Sub-counties in Kiambu County, which are located in the central region of Kenya. The sub-counties were selected as they have linked health facilities which offer PC screening services. The population in the study area is demarcated into Community Units (CUs) for the purpose of implementation of community health strategy. All the 17 CUs were included in the study.

Study population

The study participants included 59 men aged 40–69 years, the eligible age for screening in Kenya (3). The key informants (KIs) included members of the County and Sub-county Health Management Committee including public health nurses and officers and community health strategy coordinators.

Sampling technique

The focus group discussion (FGD) participants were purposively selected which aimed at ensuring heterogeneity and representation of various socio-economic and demographics characteristics. The selection of the KIs was facility-based and included the key people involved in the implementation of the Community Health Strategy in the sub-counties.

Data collection tools

A semi-structured guide based on the key themes of the study was used to conduct the interviews in the months of March–April 2019. The key themes of the study which included the barriers and facilitators of the uptake of screening were included in the guide.

Internal validity and reliability

Lincoln and Guba criteria were used for enhancing trustworthiness. Several debriefing sessions were held by the research team members, who used multiple coders ensuring consensus from the team members before the generation of themes. Referential adequacy was ensured by a review of the original data and findings by two members of the research team who had vast experience in qualitative data analysis and multiple reviews of the data by other research team members before generation of codes to ensure the credibility of the data. Operationalization was also done through member checking at the end of interviews and keeping an audit trail of all the steps undertaken during analysis to ensure rigor.

Researcher and methodological triangulation was also done (12).

Data collection procedure

We conducted six FGDs which consisted of 59 community members and seven individual in-depth interviews with KIs and achieved saturation with a total of 66 participants. Each FGD was made up of the principal investigator and two research assistants. The FGD was conducted in a private set-up within the linked health facilities at the study site. The FGD was made up of nine to eleven participants. The average duration was 82 minutes. The KI interviews lasted between 30 and 45 minutes. All the interviews were audio recorded and transcribed verbatim.

Ethical approval

The study was approved by the Jomo Kenyatta University of Agriculture and Technology Institutional Ethics Review Committee (JKU/2/4/896B), the National Council of Science and Technology (NACOSTI P/19/71673/28322) and the Ministry of Health. Participant's autonomy and privacy were maintained throughout the study and written consent was sought following the explanation of the purposes, benefits, risks, and ground rules of the session by the moderator.

Data analysis

The study applied inductive thematic analysis. The transcripts underwent de-identification of participants with codes. The research team immersed themselves in the data to enhance familiarization and triangulation of the data. The data was then coded independently by two researchers using the grounded theory (12). The final codes were generated based on consensus from the research team which included experienced researchers. The coding entailed the analysis of specific statements and their categorization into themes. This was followed by searching for the themes and researcher triangulation coupled with the diagrammatic representation of the connection of themes for further interrogation. Then a review of the themes and sub-themes was done and comparison with the raw data and the transcripts was done multiple times before the generation of codes. The main themes were then named and defined through consensus of the research team members and consultation of two experts in the subject. This was followed by the final analysis of the data using the established themes. The six steps of data analysis as guided by Braun and Clarke were applied in the study (12). The analysis also embedded some direct quotations of the participants to reflect their opinions.

Results

The socio-demographic characteristics of the respondents are presented in Table 1.

Table1: FGD participants socio-demographics characteristics

VARIABLE	CATEGORY	TOTAL
Age in years	40–49	25 (42.4)
	50–59	21 (35.6)
	60–69	13 (22.0)
Marital status	Married	48 (81.4)
	Single	4 (6.8)
	Widowed	3 (5.0)
	Separated	4 (6.8)
Religion	Christian	49 (83.1)
	Traditionalist	4 (6.8)
	Muslim	6 (10.1)
Education	None	6 (10.1)
	Primary	20 (33.9)
	Secondary	27 (45.8)
	Tertiary	6 (10.2)

FGD, focus group discussion.

Facilitators to uptake of PC screening

Four themes emerged as facilitators of PC screening which included experience of symptoms, proximity and prominence of cancer, accessibility of screening services and community advocacy as presented in Table 2.

Table 2: Facilitators to uptake of screening

THEMES	SUB-THEMES
Accessibility of screening services	Provision of free screening
	Inclusion of screening in National Health Insurance
	Provision of screening services in the peripheral facilities
	Inclusion in medical camps
Experience of symptoms	Presence of symptoms
Proximity and prominence of cancer	Death of family member/friend/community member
	Witnessing bad experiences of a relative/friend/community member affected by prostate cancer
Community advocacy on PC screening	Awareness created in the community/medical camps/mass media
	Health care workers health education/recommendation

Experience of symptoms: The respondents reported the experience of symptoms as a facilitator to the uptake of screening as stated, "I was visiting the toilet all the time to pass urine, so I decided to go to hospital to get checked: The doctor recommended that I get screened for prostate cancer."

Proximity and prominence of cancer: The experience of negative outcomes from PC among family members or friends and having a close person diagnosed with PC was reported by participants as a facilitator to the uptake of screening. A participant stated: "I lost my friend recently who was very close to me from prostate cancer, so I decided to take up screening."

Accessibility of screening services: The provision of free screening services which are available in peripheral health facilities and the inclusion of screening services in the National Health Insurance Fund was highlighted by the majority of the respondents as a facilitator of screening. A participant stated, "If the government provides these screening services for free, many men, including myself, might consider taking up the test."

Advocacy on prostate cancer screening: The creating of awareness through various channels of communication in the community was highlighted by the participants as a motivator to the uptake of PC screening. "I was informed about prostate cancer screening in church, and since I had also heard about it on the radio, I decided to go for the test."

Barriers to uptake of PC screening

Five themes emerged as barriers to the uptake of prostate cancer screening which included lack of knowledge, fatalistic beliefs, low perception of self-vulnerability, stigma, and male dominance factors as presented in Table 3.

Table 3: Barriers to uptake of PC screening

THEMES	SUB-THEMES
Lack of knowledge and awareness	Lack of knowledge on PC disease
	Lack of information on screening (where/methods/cost)
	Confusion of PC with being an "old man's disease" (BPH)
	Myths and misconceptions on etiology of prostate cancer (denial of conjugal rights)
Perception of fatalism towards PC	Pessimism towards PC
	Perception of death inevitability on diagnosis/death sentence
	Fear of a diagnosis of PC
Low perception of self-vulnerability	Consider themselves at low risk
	Lack of symptoms
Male dominance factors	Association of sickness with femininity
	Masculinity threatened by low sexual performance
	Secrecy among men
	Preference of older males for screening
Stigma	Social isolation due to shame
	Embarrassing disease associated with sexual changes

Lack of knowledge

Lack of knowledge was reported by participants as a barrier to the uptake of screening. Myths and misconceptions also deterred the uptake of screening with the predominant cause of PC reported being the denial of conjugal rights as illustrated by one participant: "This disease is caused by lack of sex, so men don't want to go for screening because it will indicate their sexual life has a problem."

Perception of fatalism towards PC

Fatalistic beliefs were reported as a barrier to screening. The participants seemed to perceive a diagnosis of PC as a death sentence as expressed by a participant: "With cancer in the equation, the denominator is always death. I fear cancer more than any other disease." A key informant stated, "In the community people equate cancer to death, which has contributed to the majority of the men not undertaking screening and resulting in using herbal medication."

Low perception of self-vulnerability

Low perception of the risk of PC was reported as a barrier to the uptake of PC screening. One participant stated: "I have not been screened since I believe that I cannot get this disease after all, I take lots of healthy juices and my marriage is okay, you know what I mean..." A KI asserted, "The medical camps have seen a very low turn-out of men for cancer screening since the majority don't think they are at risk."

Male dominance factors

Male dominance factors emerged as barriers which included threatening of masculinity due to poor sexual performance, association of sickness with being female, and screening by older male clinicians. As reported by a participant: "There was a time there was a medical camp offering cancer screening in our village, and I did not see men going to be screened, most of these things are for women."

Stigma associated with PC

Stigma associated with PC was also cited as a barrier due to its association with sexual behavior. A participant stated: "Who really wants to go for

screening? It will be like you are informing other people of your inability to perform sexually, it's too shameful for any man."

Discussion

Our study identified several barriers and facilitators to the uptake of PC screening in a rural community in Kenya. Experience of symptoms, proximity and prominence of cancer, accessibility of screening services, and advocacy were reported as facilitators of screening similar to those reported in other studies (13, 14). Clinicians should engage at-risk men presenting with urinary symptoms in shared decision-making in line with the screening guidelines (3). The provision of affordable screening services and the inclusion of peripheral facilities can be explored to circumvent the barriers to accessibility of the services. Public health awareness on PC should be incorporated in routine care and reinforced in the community through a collaboration of clinicians and community-based health workers.

In the study, lack of knowledge on PC was reported as a major barrier to uptake of screening. This finding is corroborated with studies conducted among men in the Sub-Saharan African region and Kenya (8, 9, 15). Participation of men in screening is highly dependent on their knowledge about PC and the benefits of early detection. Low perception of self-vulnerability to PC reported among this at-risk population has been reported in previous studies (16–18). Perception of self-vulnerability is critical in enhancing the uptake of screening (19). Targeted programs involving clinicians to reach at-risk men to enhance PC awareness and risk perception in the health care facilities and communities are urgently required.

Fatalistic beliefs reported as barriers to screening in our study have been reported previously (9, 20). Fatalism is mainly attributed to a lack of knowledge and negative outcomes of PC (21). Clinicians can overcome these fatalistic beliefs through education of at-risk men, timely diagnosis and navigation of patients which will contribute towards improvement in PC treatment outcomes (20, 22). The male dominance factors reported in the study have been documented in previous studies (14, 23, 24). The preference of provision of screening services by older men was reported in the study. This can be explored by capacity building of male clinicians and inclusion of lower cadres like male nurses for provision of culturally acceptable screening services.

Clinician recommendation is fundamental in PC decision-making processes. Evidence shows that low PC screening is associated with weak physician recommendation (25). An important question given our results is the involvement of clinicians in awareness creation and recommendation of screening to at-risk men. A study conducted in Kenya reported that only 10% of the screened men had a recommendation from a health care provider while a majority were not involved in decision-making (7). The need for sensitization of all clinicians on the current screening guidelines cannot be over emphasized. The study recommends the development of decision aids to enhance informed decision-making among men and to facilitate the implementation of shared decision-making process among clinicians.

Conclusion

The study identified several barriers and facilitators to PC screening. Lack of knowledge remains a major barrier to screening as it contributes to myths and misconceptions, low perception of self-vulnerability, and negative beliefs. There is a need for targeted programs involving clinicians to reach at-risk men to enhance public awareness on PC. Integration of culturally sensitive education to regular care should be adopted. Capacity building of clinicians, task shifting, and provision of well-coordinated affordable screening services in peripheral facilities should be explored. The concerted effort among policy makers and all health care workers to overcome the stated barriers to screening is highly recommended.

Strengths and limitations

The strength of the study includes the use of multiple methods of data collection that enhanced the validity of the study. However, the selection of participants

was purposive sampling. Nevertheless, the researchers ensured heterogeneity in regard to socio-economic and demographic characteristics and stratification using the CUs while the KIs were multi-disciplinary. The participants were from a rural community, and hence the results may not be entirely generalized to urban communities.

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