KNOWLEDGE OF PROSTATE CANCER RISK FACTORS AND WILLINGNESS FOR SCREENING AMONG ADULT MEN IN IBADAN NORTH EAST LOCAL GOVERNMENT AREA,OYO STATE

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DECLARATION

I hereby declare that this work is original and solely carried out by me. The work has neither been submitted elsewhere.

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This work is dedicated to God Almighty

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DRE----------Digital Rectal Examination

LGAs----------Local Government Areas

PCa----------Prostate Cancer

PSA----------Prostate Specific antigen

SSA----------sub-Sahara Africa

ABSTRACT

Most adult men with prostate cancer present at a late stage, which has contributed to increase morbidity and mortality of the disease. Knowledge and willingness to embark on prostate cancer screening test, plays a pivot role in prevention of adverse outcomes. The objective of this study was to assess the knowledge of prostate cancer risk factors and willingness to be screened among adult men in Ibadan North East Local Government Area, Oyo State.

The study adopted a descriptive cross-sectional design. A total of 640 adult men were recruited from selected communities in Ibadan North East local government area using a 6-stage sampling technique. A pretested interviewer-administered, questionnaire was used to obtain data on socio-demographic characteristics, knowledge of prostate cancer risk factors, awareness of screening PCa test perception on prostate cancer screening test and willingness to be screened. The minimum score for knowledge of prostate risk factors was "15", maximum score was "60",while the median score was 42. Also minimum score for awareness of prostate cancer screening test was “2”, the maximum score was “11”, while the median score was 6. Data were analyzed using both descriptive and inferential statistics. Chi-square test was used to investigate the relationship between selected explanatory variables (socio-demographics, perception, level of knowledge on prostate cancer risk factors and the dependent variable (willingness to be screened). Multiple logistic regression was further used to investigate predictors of willingness to uptake prostate cancer screening test at $p<0.05$.

Results indicated that the mean age of the respondents was 50.5±7.5years and five hundred and seventy five (89.4%) were Yoruba compared to other ethnic groups. The mean score for knowledge of prostate cancer risk factors was 42.3±12.8.While the mean score of awareness of PCa screening test was 6.02±0.84, with 558(87.2%) having poor awareness of prostate cancer screening test. Three hundred and fifty (54.7%) participants had poor

knowledge about PCa risk factors, while 364(56.7%) had poor perception of the screening test and 534(83.6%) of the respondents were willing to be screened. The relationship between willingness to be screened for PCa and perception about PCa screening test was not statistically significant ($\chi 2$=0.151, p=0.698).There was an association on monthly income ($\chi 2$=15.385) and ethnic groups ($\chi 2$= 17.168) on willingness to uptake prostate cancer screening test. Participants between ₦30,000 and ₦99,999 as monthly income were 3.4odds (almost four times) more likely to be willing to uptake PCa screening test than other categories (OR=3.417, CI=0.667, 17.501). The study revealed a poor knowledge of prostate cancer risk factors and screening test for prostate cancer, with a majority of the adult men willing to embark on the screening test.

It is recommended that government should make the screening test free and readily available to all men, in order to encourage them to be screened. Mass sensitization, awareness creation, educational programme on PCa risk factors and screening test should be made accessible in our environment.

Key word: Knowledge, prostate cancer, risk factors, perception, willingness to be screened.

Word count: 490

CHAPTER ONE

INTRODUCTION

1.1 Background

Prostate cancer is the most commonly diagnosed cancer in men globally, with over 1.6 million cases. In 2015, according to (Global burden of Disease Cancer, 2017) prostate cancer was reported to have the highest occurrence of mortality rate for men in 103 countries, and was the leading cause of cancer deaths for men in 29 countries. The incidence of prostate cancer has been observed to be increasing in native African black men in the last four decades (Rebbeck *et. al.* 2013; Adeloye *et. al.* 2016).

Prostate cancer may have early signs and symptoms, but there is no simple test to detect it (American Cancer Society, 2016). The frequently used screening tests for prostate cancer are the Prostate Specific Antigen (PSA) and Digital Rectal Examination (DRE).The main indications for prostate biopsy are persistently elevated PSA, abnormal DRE findings and abnormal findings on prostatic imaging (Oliyide *et. al.* 2017). The total PSA and DRE remains the most commonly used tool for early detection of prostate cancer.

Currently, there is no substantial agreement on the age at which to commence PSA screening. Most guidelines recommend PSA screening to start no later than age 55 years (Carter *et. al.* 2013; United States Preventive Services Task Force, 2018). Some suggest starting screening in early mid-life for men with familial pre-disposition and men of African-American ancestry (Mottet *et. al.* 2017), another study suggested starting conversations about screening at age 45 for all men (Vickers *et. al.* 2016). Prostate Specific Antigen (PSA) screening tests are readily available in numerous urology clinics in Nigeria, though many primary and secondary health facilities still lack access to the test (Bello *et. al.* 2019).

In Nigeria, there is no structured prostate cancer screening policy yet and majority of the patients present late with advanced disease (Morhason–Bello *et. al.* 2013; Ogunmola *et. al.* 2013). In addition, the existing health policies or strategies for prostate cancer screening or control programmes in Nigeria lack focus (Bello *et. al.* 2019). According to Bello *et. al.* 2019, unlike most other countries faced with significant prostate cancer burdens, population screening is yet to be conducted anywhere in Nigeria. The current prostate cancer screening strategy in Nigeria advocates individualized screening, which lacks proper co-ordination and planning. This may give credence to the poor prostate cancer screening awareness and uptake observed by several authors in Nigeria (Olapade-Olaopa *et. al.* 2014; Ogundele *et. al.* 2015; Enaworu and Khutan, 2016; Bello *et. al.* 2019).

Morhason–Bello *et. al.* in 2013 explained that the baseline awareness of cancer and its screening test is less than 40% and 20% respectively among at risk population in sub-Saharan Africa. Most studies asserted that poor utilization of screening services may also be attributed to poor access to quality health care, wrong perceptions and beliefs and weak health systems in most parts of sub-Saharan Africa (Morhason–Bello *et. al.* 2013; Kangmennaang *et. al.* 2016; Abdulrahman *et. al.* 2016; Ojewola *et. al.* 2017).

Binka *et. al.* (2015) conducted a study among males in Kumasi, Ghana; the authors reported that most respondents had high level of awareness of prostate cancer and majority of the study participants (61.8%) had good knowledge of prostate cancer. This report was similar to that obtained in the study carried out by Ebuehi and Otumu (2011) among male staff of University of Lagos, Nigeria. They reported from their study that majority of the participants had good knowledge of prostate cancer (61.8%), while 67.1% had good perception of the disease and its vulnerability. According to Oranusi *et. al.* (2012), 74.1% of

the respondents in their study among male public servants in Anambra State, Nigeria had good knowledge of prostate cancer and about 90% of the respondents were willing to be screened.

1.2 Problem Statement

Prostate cancer is the fourth leading and commonly diagnosed cancer with about 1.3million cases and 7.1% incidence in men. It is the second leading cancer for both developed and developing countries, GLOBOCAN, (2018). According to Ferlay *et. al.* (2010), the disease burden is projected to increase with over 75 million prevailing cases, 27million incident cases and 17million of cancer deaths expected worldwide in 2030. Despite these prevailing challenges, it is difficult to know the true burden of prostate cancer in Africa due to poor health management systems. According to the Global Burden of Prostate Cancer, incidence increased 3.7 fold from 1990 to 2015 (from 436,858 person years to 1,618,087). The age standardized incidence rate also increased with 1.7-fold from 1990 to 2015 (from 32.93/100,000 person-years to 56.71/100,000 person-years). Global estimates of the age standardized death rate declined slightly to 14.24 deaths (95% uncertainty interval 11.8-17.95) per 100,000 person-years in 2015. Disability adjusted life years attributable to prostate cancer increased by 90% during the study period (Pshgar *et. al.* 2018).

Studies have shown that some of the challenges involved in the management of prostate cancer is due to lack of community-based screening, low knowledge of prostate cancer risk factors, poor access to healthcare services and high cost of treatment which has led to late presentation of the disease (Adebamowo and Akarolo, 2009; Baade *et. al.* 2009). Prostate cancer was ranked third in non communicable disease in Nigeria with 13,078 number of new cases (11.3%) and mortality rate of 5,806 (8.3%) according to GLOBOCAN

(2018).However, due to the high incidence and mortality rate caused by prostate cancer, the awareness and uptake of prostate cancer screening are major issues seeking address by researchers in Nigeria today (Bello *et. al.* 2019; Enaworu and Khutan, 2016; Abdulrahman *et. al.* 2016; Kolade *et. al.* 2017; Ojewola *et. al.* 2017; Bello *et. al.* 2019). Poor uptake of prostate cancer screening is associated with the increased morbidity and mortality rate caused by the disease. A substantial knowledge of the risk factors, extent and factors influencing the willingness of men to undertake screening is of great importance in the context of diagnosis and treatment of prostate cancer.

Studies conducted among civil servants in Iseyin Local Government Area of Oyo State and main city of Burkina Faso,Ouagadougou reported that the level of knowledge of prostate cancer was poor (Kabore *et. al.* 2014;Kolade *et. al.* 2017). Ojewola *et. al.* (2017) also conducted a study among 305 adult respondents in Ido/Osi Local Government Area, Ekiti State, Southwest of Nigeria; the researchers noted that the level of awareness and knowledge of prostate cancer was poor with only 47% of the respondents having good knowledge of the disease.

1.3 Justification

Over the years, studies have shown that diagnosis of prostate cancer (PCa) is common among men aged 50 to 70 years (American Cancer Society, 2016; Bock-Oruma *et. al.* 2014; GBD, 2017; AIHW, 2017). Although, most studies indicated that risk of PCa is significantly low among men below age 50. However, scholars have not identified specific age at which men are exposed to the risk of PCa. The risk of PCa varies significantly among individuals of different age-groups, race and family history.

Scholars have tried to assess perception of PCa, knowledge of PCa risk factors and knowledge of screening test among men in both hospital settings and communities locally and internationally. Despite different studies carried out to improve knowledge and awareness of men about PCa risk factors, most of these studies still reported low knowledge and awareness of PCa risk factors among men (Leitzmann and Rohrmann, 2012; (Castillejos and Gabillondo, 2016).

However, limited studies have been focused on willingness to uptake a screening among men in Ibadan North East Local Government Area, Ibadan, Oyo state. Findings from this study will help policy makers to design intervention that will improve the awareness and uptake of prostate cancer screening test. Also, knowing the risk factors among the participants will positively influence their willingness to uptake the screening test for the disease. Hence this study is set out to assess the level of knowledge of prostate cancer risk factors and willingness to be screened among adult men in Ibadan North East Local Government, Oyo State.

1.4 Research Questions

1. What is the level of knowledge of prostate cancer risk factors among adult men in Ibadan North-East LGA, Oyo State?
2. How do adult men perceive prostate cancer screening test?
3. Are adult men in Ibadan North-East LGA, Oyo State willing to be screened for prostate cancer?
4. What factors are associated with willingness to be screened for prostate cancer among adult men in Ibadan North-East LGA, Oyo State?

1.5 Study Objectives

1.5.1 Aim

To assess the level of knowledge of prostate cancer risk factors and willingness to be screened among adult men in Ibadan North East Local Government, Oyo State.

1.5.2 Goals

To achieve the broad objective, the following specific objectives were set up;

1. To assess the knowledge of prostate cancer risk factors among adult men in Ibadan North-East LGA, Oyo State
2. To explore the perception of prostate cancer screening among adult men in Ibadan North-East LGA, Oyo State.
3. To determine the willingness to be screened for prostate cancer among adult men Ibadan North East LGA, Oyo State.
4. To identify factors associated with willingness to be screened for prostate cancer among adult men in Ibadan North East LGA, Oyo State.

CHAPTER TWO

LITERATURE REVIEW

This chapter focused on the review of previous scholarly works relevant to this study. To be specific, it reviews relevant literature on socio demographic characteristics, knowledge of prostate cancer risk factors, perceptions, willingness for screening of prostate cancer and factors influencing the willingness to uptake the screening test.

2.1 Knowledge of Prostate Cancer (PCa) Risk Factors

The study of Turner& Drudge-Coates, (2010) indicated that diet, risky sexual behavior, alcohol consumption and occupational exposure were identified as risk factors of PCa. It also showed that higher BMI and weight gain as age increase are risk of PCa. This is also in accordance with the findings from the study of Adebamowo and Akarolo, (2009); Baade *et. al.* (2009) that poor knowledge about PCa risk factors is one of the challenges involved in the management of PCa. This was also a consequence of lack of community-based screening, poor access to healthcare services and high cost of treatment which has contribute greatly to late presentation of the disease. This supports the findings of Kolade *et. al.* (2017) in the studies conducted among civil servants in Iseyin local government area of Oyo state and the Burkina Faso Ouagadougou which reported that the knowledge of prostate cancer risk factors was poor (Kabore *et. al.* 2014). This also confirms the findings of Ojewola *et. al.* (2017) in a study conducted among 305 adult respondents in Ido/Osi local government area, Ekiti state, southwest of Nigeria, it was observed that knowledge of PCa risk factors was poor among the participants. In Canada, the reverse is the case, according to Kachuri et al 2013, despite the fact that men are knowledgeable about PCa risk factors, the incidence of prostate cancer in Canada has increased steadily over time. The study of Bray *et. al.* (2010)

also indicated that although, most men know about PCa risk factors but its incidence rate is highest reported in Northern Europe and the lowest in Eastern Europe.

A study conducted by Nwagwu *et. al.* 2020, among men aged 50 years and above in Umugolo, Ehime Mbano Local Government Area Imo State, with a sample of 223 found that less than half (44.6%)of the study participants were more knowledgeable about prostate cancer risk factors. A good number of the respondents (75.2%) had undergone the screening test prior to when the research was conducted. However, this finding regarding was similar to that reported in another study carried out in Benincity (Agbugui *et. al.*2013). The author's reported an in-depth lack in knowledge of PCa risk factors, with the overall mean knowledge of the risk factors, symptoms and treatment of prostate cancer being 3.4±1.2 out of 10.0; and less than half (43%) of the study participants were aware that age is a risk factor for prostate cancer. The poor knowledge and awareness of prostate cancer risk factors from reported from these studies was attributed to the study setting.

Nakandi *et. al.* 2013, reported that half of the study participants could not recognize any risk factors of prostate cancer. Despite different studies carried out to improve knowledge and awareness of prostate cancer risk factors, most of these studies still reported low knowledge and awareness of PCa risk factors among men (Leitzmann and Rohrmann 2012; Castillejos and Gabilondo,2016). Tasian et.al. 2012, conducted a study among primary care physicians. A good proportion of the study participants were able to identify risk factors for prostate cancer in terms of race and family history. However, conclusions drawn from these studies indicate that education and occupation play a vital role in the knowledge of prostate cancer risk factors

2.1.1 Age

Studies have revealed that prostate cancer is rare amongst men less than 40 years of age and most commonly diagnosed in men aged 60–79 years in the US (American Cancer Society, 2016). Moreover, research from Africa and particularly Nigeria have recorded 1.7% prevalence of prostate cancer in men aged 40-44years while those aged 65 years and above have 39.7% prevalence (Bock-Oruma *et. al.* 2014). In addition, the chances of having the disease rises rapidly after age 50 years, with the odds of 1 in 14 being reported at the global level between ages 0 to 79 years; while it ranges from 1 in 47 men for low-middle income countries and 1 in 6 men in high income countries (GBD, 2017; AIHW, 2017).

2.1.2 Heredity/family history

A person with family history of prostate cancer may also develop the disease, thus suggesting that prostate cancer cases may be inherited. It is reported that having a father or brother with the disease increases the chances of developing it more than twice the expected. However, the chances of developing the disease are higher for men having brothers with prostate cancer than those whose fathers are victims. Men with a number of affected relatives are highly susceptible to developing the disease, especially if the disease was diagnosed in their relatives at a young age (Cancer Council, 2018; American Cancer Society, 2016)

A study conducted in Italy by (Morlando *et. al.* 2017) reported 31.6% family history of prostate cancer as a risk factor, this similar to a study done in South African in which 32.3% of the study participants knew as the major cause of PCa, (Mofolo et.al. 2015). Another study conducted in Burkina Faso among black Africa men in which only 4.2% of the respondents knew family history as a prostate cancer risk factor (Kabore *et. al.* 2017).The

similarities of this findings is as a result of good identification and good knowledge about prostate cancer risk factor among the respondents

2.1.3 Race/ethnic origin

Prostate cancer varies noticeably in different part of the world and with ethnicity. The disease is predominant among African men, with indeterminate reasons. Men of African descent show a higher incidence of prostate cancer and generally have a more aggressive course of the disease than men of other races (Tan *et. al.* 2016).African-American men are reported to have a higher incidence (Panshanth, 2019) and more than twice likely to die of prostate cancer than white men. The occurrence of prostate cancer is low most times in Hispanic/Latino and Asian-American men than in non-Hispanic whites (American Cancer Society, 2016). Moreover, a variance has been reported within a particular race, thereby suggesting that ethnicity could be a risk factor (Sapira *et. al.* 2015).

In Nigeria, although clinical features, pattern of serum prostate specific antigen levels, grades of the tumors, tumor metastases and complications were similar for all ethnic groups, it was observed that the Igbos had more tumors with relatively more aggressive metastatic features than other ethnic groups/tribes, with respondents' age range from 40-49yrs at presentation (Sapira *et.al.*2015).

2.1.4 Geographical distribution

Prostate cancer disease is predominant in some regions such as Australia, the North America, Caribbean islands and the Northwestern Europe. The disease incidence is rare in Africa, Asia, South America and Central American. Asian Americans have a lower risk of the disease than white Americans do, but their risk is higher than that of men of similar backgrounds living in Asia. The rationales behind the variation of this occurrence is

indeterminate; but have been adduced to more intensive screening in some developed countries and lifestyle differences including diet (American Cancer Society, 2016).

2.1.5 Metabolic syndrome

Components of metabolic syndrome such as hypertension and waist circumference have been associated with a significantly greater risk of prostate cancer (Esposito *et. al.* 2013).

Obesity has been reportedly linked with lower risk of low-grade prostate cancer and higher risk of high-grade prostate cancer. Also, over weighted men are said to be more likely affected with advanced prostate cancer as well as exhibit higher mortality caused by this disease. However, the rationale behind these is not certain (Vidal *et. al.* 2014; American Cancer Society, 2016).

2.1.6 Smoking

There are conflicting reports on the effect of smoking on prostate cancer. Although most studies have found no link between them, there has been recommendation for more studies to confirm the association (American Cancer Society, 2016).

2.1.7 Further Exposure on Risk Factors of Prostate Cancer

Several studies (Islami et *et. al.* 2014; Lian *et. al.* 2015; Rao *et. al.* 2015; Ju-kun *et. al.* 2016; Zhou *et. al.* 2016; American Cancer Society, 2016) explained that some of these risk factors require more research-based evidence, which are prostatitis, balding, sexually transmitted infections, exposure to chemicals, occupational exposure to night shifts and being a pilot. However, there are conflicting reports about the risk of prostate cancer being linked with vasectomy, consumption of red meat or processed meat (Zhang *et. al.* 2015; Bylsma and

Alexander, 2015; American Cancer Society, 2016), as well as the use of aspirin or non-steroidal anti-inflammatory drugs (NSAIDs) (Huang *et. al.* 2014; kang *et. al.* 2018).

Risk factors for prostate cancer identified by the Nigerian respondents in a study include; age, presence of intact normal testes, diet, and family history (Ozoemena *et. al.* 2015).In another development, significant inverse associations have been reported between prostate cancer and height, weight and waist circumference among Nigerian respondents (Agalliu *et. al.* 2015). A study carried out among older men in South-west of Nigeria (Ojewola *et. al.* 2017) posited that positive history of sexually transmitted diseases was the most common false impression and unproven belief on the aetiology of prostatic disease among the 64.9% respondents.

2.2 Perception of prostate cancer screening test

The perception about prostate cancer screening test is major factor which influences early detection of prostate cancer and consequently reduces the mortality rate as a result of the disease. Several authors have carried out researches on the perception of prostate cancer screening test amongst men of different locality or region. It was observed that the perception differ with study area.

Adibe *et. al.* 2017, in their study carried out among male staff of the University of Nigeria,Nsukka and Enugu campus with a sample size of 351, found that 53.9 percent of the study participants had negative perception about prostate cancer screening tests and treatments. Contrarily, Yeboah-Asiamah *et. al.* 2017 in their study among male teachers in Sunyani Municipality, Ghana indicated that most of the respondents had positive perception towards the screening test. However, these findings show that most men have not undergone the screening for prostate cancer irrespective of their perception towards the test.

According to the study conducted by Atulomah *et. al.* 2010, among men in a rural community of Ikenne Local Government Area, findings indicate that the level of perception among the respondents was just above average and screening behavior was extremely low. This is similar to that conducted among male outpatients of a tertiary care hospital in south-east Nigeria, where more than half (53.6%) of the study participants had negative perception towards the disease and assumed that getting screened and treated for this disease can result to erectile dysfunction (Aluh *et.al.*2018).This negative perception of the screening test led to a poor level of participant's willingness to be screened of prostate cancer disease. Hence, it was suggested that community base screening for prostate cancer should be enforced in Nigeria, in order to detect the disease at early stage and get treated for so as to increase the chance of survival rate in men.

Wachira *et. al.* 2018, conducted a study at Mathare Health Centre in Nairobi County in Kenya among men aged 30 years and above attending the facility outpatient department, they found out the perception and self-vulnerability was low. While, another study carried out among male Public Staff in Kelantan Malaysia, reported that 95.0% of the respondents had good level of the respondents had good level of perception towards the disease (Muhammad *et.al.* 2016). Thus, the perception of prostate cancer screening test may be said to depend on the study area or setting , which is as a result of the level exposure or education of the participants.

2.3 Willingness to Uptake Prostate Cancer Screening

According to the study of Smith-Palmer *et. al.* 2019; the incidence of PCa has increased substantially in Germany, France, the United Kingdom and Canada. However, this has led to increased uptake of prostate specific antigen (PSA) screening test for earlier

detection, which has declined mortality rates. This is supported by the study of Oranusi *et. al.* (2012), which claims that 74.1 per cent of the respondents in their study among male public servants in Anambra state, Nigeria had good knowledge of prostate cancer and are willing to uptake PCa screening services test.

Studies conducted by (Ajape *et. al.* 2010; Kabore *et. al.* 2013; Mofolo *et. al.* 2015; Enaworu and Khutan, 2016) that unwillingness to uptake PCa screening test is associated with lack or poor awareness and knowledge about PCa and its risk factors among adult male patients has been identified as a key determinant contributing to unwillingness to undergo PCa screening. This is also similar to the findings of Ebuehi and Otumu (2011) which asserts that majority of the respondents (Nigerian men) are unwilling to uptake PCa screening testing. This is due to lack of awareness of PCa screening test. This is also in accordance with the study of Binka *et. al.* (2015) conducted among males in Kumasi, Ghana, which reported that despite the good awareness of PCa screening test among majority of the participants, most of them are still unwilling to uptake PCa screening test.

Willingness to undergo prostate cancer screening has been generally adjudged to be low or poor in developing countries such as Nigeria, due to poor knowledge and awareness of the disease (Ojewola *et. al.* 2017); and these conclusions were made evident in several studies. For instance, a study carried out in North Central Nigeria (Bello *et.al*. 2019) reported a low percentage (4.4%) of men willing to emabark in the screening test for prostate cancer; similar findings of poor willingness to be screened (5%) of the study participants was recorded among men aged 40-69years in kenya (Mbugua *et. al*. 2020). This level of poor willingness is attributed to poor knowledge, awareness of prostate cancer and its screening

method in most of these developing countries but, the level of willingness to be screened may be improved through public sensitization and educational programs.

However, studies conducted in Kitwe Teaching Hospital, Zambia conducted among Ugandan men shows that elderly men were willing to undergo screening for prostate cancer (Gift and Victor 2020; Nkandi *et. al.* 2013). Enemugwem *et. al.* 2010) also reported that 104(51.5%) were more willing to be screened for prostate cancer in Obio Akpor LGA, Rivers State, Nigeria. A similar cross-sectional descriptive study carried out among men aged 40 years and older (Ugochukwu *et al*.2019) reported that 104(51.7%) of the participants showed interest in screening within the next year. These findings were similar to reports from (Olademiji et. al. 2010; Adibe et.al. 2017) who indicated that most men were willing to embark in the screening test.

The undermining of prostate cancer screening has been linked with the perceptions that prostate cancer cannot develop into a major health risk and does not kill. However, it has been posited that men living in low income settings would be more willing to embark on regular screening for prostate cancer and attend to prostate health matters when they become more aware of their increased risk of having prostate cancer (Ikuerowo *et. al.* 2013).

2.4 Factors influencing willingness to undergo PCa screening

Notable determinants of acceptance and willingness to undergo prostate cancer screening by respondents include

2.4.1 Age

Ageing plays an important role in raising the consciousness and awareness of prostate cancer and general health in men, partly due to encounter of prostate cancer symptoms at old age (Mofolo *et. al.* 2015; Enaworu and Khutan, 2016).

2.4.2 Educational status

Educational status has also been linked to the willingness to undergo prostate cancer screening. Findings have it that respondents with higher educational level were more willing to undergo prostate cancer screening compared to those with lower educational qualifications (Ebuehi and Otumu, 2011; Ojewola *et. al.* 2017).

2.4.3 Occupation

According to the research carried out by Ebuehi and Otumu, (2011), respondents working in the academic cadre of service were reportedly more willing to undergo prostate cancer screening than their counterparts in the non-academic occupational cadre.

2.4.4 Marital status

According to Wallner *et. al.* 2008, reported that marital status was associated with family history of prostate cancer and it's screening, in the sense that married men were more favorable as compared to unmarried men with a decreased odds of frequent screening of prostate cancer. Nevertheless, most of the highlighted determinants of prostate cancer screening are still controversial as some studies have reported contrary views to the earlier positions (Ebuehi and Otumu, 2011; Sapira *et. al.* 2015; Enaworu and Khutan, 2016; Kangmennaang *et. al.* 2016; Mutua *et. al.* 2017; Kaninjing *et. al.* 2018).

Related to the sense of fear about prostate cancer among respondents was the stigma associated with the disease in a report from Cameroon. The respondents also pointed out the influence of socio-cultural impediments to public discussion and treatment of prostate cancer. A good instance is the strongly held belief among men in bamenda (Cameroon) that diseases like cap need to be treated as a spiritual illness and traditional medicine is better suited for such (kaninjing *et. al.* 2018).

2.4.5 Fear of positive result

The nursing of fear for the unknown about prostate cancer and prostate cancer screening has also been reported as an impediment to getting screened (Mutua *et. al.* 2017; Kaninjing *et. al.* 2018).

2.4.6 Perceived susceptibility

Perceived susceptibility to prostate cancer has been identified as a determinant of willingness to undergo Prostate cancer screening as it was reported that 53.5% of Nigerian respondents in a study felt that they could not have prostate cancer if they are unaware of it thereby limiting their chances of considering prostate cancer screening (Farazi *et. al.* 2019). Moreover, perceived benefits and barriers to PSA test, and health motivations have also been documented as possible predictors of willingness to undergo prostate cancer screening (Abuadas *et. al.* 2015).

2.4.7 Access to free medical services for screening

Accessing free or affordable health medical services as well as the ease of undergoing screening services has been reported as a determinant of prostate cancer screening acceptance and willingness (Kaninjing *et. al.* 2018).

2.4.8 Socio-economic factors

The economic status of respondents also determines willingness to undergo screening. Kaninjing *et. al.* (2018) observed affordability to be a major consideration in men's decision to pursue diagnosis or treatment for illness.

2.5 Awareness and knowledge of prostate cancer and screening methods

The lack or low level of awareness and knowledge about prostate cancer and its screening among adult male patients has been identified as a key factor affecting the

willingness to undergo Prostate cancer screening (Ajape *et. al.* 2010; Kabore *et. al.* 2013; Mofolo *et. al.* 2015; Enaworu and Khutan, 2016). Ebuehi and Otumu (2011) observed in their study that 32.4% of their respondents (Nigerian men) did not undergo testing because of lack of awareness of prostate cancer screening, while 30.2% did not undergo screening because their doctor did not recommend it. Ajape *et. al.* (2010) also reported in their research among Nigerian respondents that 78.8% have never heard any information on cancer of the prostate and only 5.8% have heard about PSA. They further reported that none of their respondents had ever undergone PSA test, even though 84% of them were ready to pay for prostate cancer screening tests.

However, physicians have been identified as the main source of information on prostate cancer screening (Arafa *et. al.* 2012). Apart from doctors/health workers, other sources of information or referral for prostate cancer screening include relatives'/friends' advice, medical condition as well as the media (whether print or broadcast) for example the magazines /newspapers and the internet (Ogundele and Ikuerowo, 2015; Enaworu and Khutan, 2016).

2.6 Knowledge of Prostate Cancer Screening test

A study conducted by (OzoemenaOyiogu *et. al.* 2015) showed that knowledge of prostate cancer and willingness to accept screening test was 68.8% high among respondents in south-south and south-east, Nigeria. This finding is in contrast to the study conducted in south-west by Oladimeji *et. al.* (2010), who indicated that respondents had insufficient knowledge about screening services. However, this disparity in knowledge of screening services may be associated with level of education and inaccessibility to information about the disease.

Another study conducted among public servants in Anambra state, Nigeria by Oranusi *et. al.* (2012) showed that knowledge of prostate cancer was high among the respondents. More than two-third were able to identify the symptoms of the disease while respondents with knowledge of the risk factors of the disease accounted for 87%. This result is in contrast with the reports obtained from a study conducted in IIorin-south local government secretariat of Nigeria; using a cross sectional study of 156 respondents, results showed that two-third of the respondents had inadequate knowledge of prostate cancer (Ajape *et. al.* 2010). However, these differences in knowledge of prostate cancer may be due to poor awareness of PCa screening services in the study area.

A cross sectional study conducted at UsmanDan-fodiyo University Teaching Hospital (UDUTH) in Sokoto, by Awosan *et. al.* (2018) indicated that majority of the respondents had insufficient knowledge of prostate cancer due to late presentation of the disease. This result is similar to that obtained in the studies carried out in north-western Nigerian among men in Birni Kudu in Jigawa State and south west (Abdulrahman *et. al.* 2016;Ojewola*et. al.* 2017). They explained that the level of knowledge of prostate cancer screening services among respondents was low due to the nature of their occupation. However, with these similar findings, it shows that the knowledge of prostate cancer screening services is associated with occupational status of the respondents.

A study conducted in Benin city Nigeria, shows that the level of knowledge was low with a score of 3.4±1.2 (Agbugui *et. al.* (2013). Similar findings were reported by Adebimpe and Fashina (2018) in their study carried out at Ilesha town in southwestern part of Nigeria. The result indicated a fair knowledge prostate cancer among the respondents due to the poor

level of education. However, disparities between these findings shows that community-based programs should be enforced so as to increase screening service among men

In Uganda, the level of awareness among men was low, as well as their participation in screening activities. Nakandi *et. al.* (2013) in their study among 270 educated Uganda men revealed that 59.4% of the men heard about prostate cancer and as few as 9% knew about serum prostate specific antigen (PSA) testing. Consequently, only 3.5% had ever undergone a serum PSA test. A study conducted in Ghana reported prostate cancer awareness level of 54.1% among participants (Binka *et. al.* 2015). These results cumulatively indicate that in Africa, Knowledge and awareness of prostate cancer is low and requires strategies for improvement. There is a clear need for health promotion interventions designed to increase awareness and improve prostate cancer practice.

2.7 Prostate

Prostate is a small, squishy gland located beneath the bladder and in front of the rectum. It is an essential reproductive organ found only in men, with about the size of a Ping-Pong ball (Prostate Cancer Foundation, 2017). Prostate is responsible for secreting the fluids needed by the sperm (produced from the testes) to travel and survive. It is divided into several anatomic regions or region. The peripheral zone (the back of the prostate) is of clinical significance, especially in the manifestation of some pathological conditions such as cancer (PCF, 2017).

2.7.1 Prostate cancer

Cancer is a condition in which a normal cell becomes abnormal and starts to grow uncontrollably without having the signals that stop typical cell growth. Cancer can be caused by DNA changes (mutations) that turn on oncogenes or turn off tumor suppressor genes

(American Cancer Society, 2016). Prostate cancer is a cancer with complex development, which occur when the prostate cells begin to grow abnormally or uncontrollably. It often grows slowly and does not progress outside of the prostate gland before the time of diagnosis (PCF, 2017). Basically, it is caused by changes in the DNA (genes) of a normal prostate cell which can either be inherited from a parent or can be acquired during a person's lifetime (American Cancer Society, 2016). The exact causes of prostate cancer are not known. Prostate cancer may be asymptomatic at the early stage and often has an indolent course that may require only active surveillance (Prashanth, 2019).

2.7.2 Aetiology of Prostate Cancer

The aetiology of prostate cancer has been linked to genomic transformations or mutation and the interactions between genetic and environmental factors (EAU, 2018). This is as a result of the fact that family history and racial/ethnic backgrounds have been associated with increased incidence of prostate cancer (Hemminki, 2012; Jansson *et. al.* 2012). Pritchard *et. al.* (2016) in their study reported that 11.8% of the men with metastatic prostate cancer incidence were identified with prevalence of germline mutations in genes mediating DNA-repair processes. Germline mutations in genes such as BRCA1/2 and HOXB13have also been associated with increased risk of prostate cancer (Ewing *et. al.* 2012; Lynch *et. al.* 2016).

2.7.3 Epidemiology of Prostate Cancer

Prostate cancer is the most common non-cutaneous malignancy in men worldwide (Fitzmaurice *et. al.* 2015) and the second most commonly diagnosed cancer in men. It has also been reported as the second leading cause of cancer related mortality in the world (Ebuehi and Otumu, 2011; EAU, 2017). Prostate cancer has also been described as the

prevalent cancer disease in elderly men above 70 years of age (EAU, 2015).The disease is occurring in younger age group in Africa, approximately a decade earlier, than it does in western countries, and the patients are also found to be present with advanced disease in over 70% of cases (Bowa, 2010).

2.7.4 Incidence of prostate cancer

The cases of prostate cancer reported to be approximately 1,276,106 worldwide according to GLOBOCAN, 2018 with higher occurrence in developing countries. The incidence rates vary across countries due to utilization of diagnostic testing (Panshanth, 2019).

The incidence of prostate cancer diagnosis varies widely between different geographical areas. It is reportedly highest in Australia/New Zealand with Age-Standardized Rates (ASR) of 111.6 per 100,000, Northern America 97.2 per 100,000, Western Europe ASR of 94.9 and Northern Europe ASR of 85.The incidence is low in Eastern and South-Central Asia with ASR of 10.5 and 4.5 respectively (Haas *et. al.* 2008; Ferlay *et. al.* 2015). Incidence rates are generally high in populations of African descent such as Caribbean with ASR of 29 per 100,000 and Sub-Saharan Africa (ASR of 19-24 per 100,000.Incidence rate is intermediate in the United State of America. In addition, the rates in Eastern and Southern Europe that were low showed a steady increase, while the incidence rate in Asia remains the lowest with 2.9 per 100,000 in South-Central Asia (Ferlay *et. al.* 2015).

However, there is a feeling that the incidence has been underestimated particularly in Africa (Bowa, 2010).Meanwhile, the incidence of prostate cancer in South Africa has been put at 90 cases per 100,000 while in Zimbabwe the figure stands at 35 per 100,000cases. Although Bowa (20I0) reported that the age adjusted incidence of prostate cancer in Nigeria

approaches that of African Americans and Jamaica, later findings posited that incidence rates in industrial countries are higher than rates in developing countries, while mortality rates in industrial countries are less than those in developing countries. This outcome was ascribed to possibly be as a result of the widespread screening in industrial countries, late stage diagnosis of cancer in developing countries and variations in male life expectancies across countries (Ferlay *et. al.* 2010; Stewart and Wild, 2014).

Prostate cancer is the most prevalent cancer with increasing incidence, morbidity and mortality in men of black ancestry (Ozoemena *et. al.* 2015; Ogundele and Ikuerowo, 2015; Agalliu *et. al.* 2015). Over a million new cases of prostate cancer are reported annually according to the GLOBOCAN/IARC 2012 databases (Adeola *et. al.* 2017) with an estimated 1.1 million diagnoses worldwide in 2012 thereby accounting for 15% of all cancers diagnosed with almost 70% of the cases (759,000) occurring in more developed regions (Ferlay *et. al.* 2015; NNCCP, 2018). Bello *et. al.* 2015 further reported prostate cancer prevalence of 5% at age less than 30 years, increasing by an odds ratio of 1.7 per decade, to a prevalence of 59% by age > 79 years.

The prevalence of prostate cancer is said to increase with age of 5% in adult men less than 30 years, while 59% in elderly men more than 79 years upon autopsy study (Bello*et. al.* 2015). According to (World Health Organization 2017) the mean life expectancy of men increases from 64.1years in 2000 to 69.1years in 2015.

Although prostate cancer cases are reportedly underestimated in Africa as a result of possible high degree of under diagnosis due to poor access to testing and diagnostic facilities (Evans *et. al.* 2010; Heyns *et. al.* 2011), it has been established that men of African origin are disproportionately affected by the prevalence of this disease compared to other races.

Other authors have also noted that tumor stage and grade at diagnosis of prostate cancer are highest among men in sub-Saharan Africa. While men of African origin in the USA (African-American men) and men of African origin in the Caribbean (Afro-Caribbean men) account for the highest prostate cancer incidence and mortality respectively (Odedina, *et. al.* 2009; Resnick *et. al.* 2009). Moreover, Forman *et. al.* (2014) posited that prostate cancer accounts for 14% of all cancer diagnosis and 12% of all cancer-related deaths in Sub-Saharan Africa.

Prostate cancer, described as the most common male cancer found in Nigeria and across border countries, constitutes 11-12% of all male cancers. It is seconded by liver cancer while larynx and Kaposi sarcoma were found to be the least common cancer for both males and females (Ebuehi and Otumu, 2011; Akinremi*et. al.* 2014; Baba and Hincal, 2016; Kolade, 2017). Research on prevalence of prostate cancer in Nigeria indicates that Rivers State recorded a prevalence of 6.5% (Bock-Oruma *et. al.* 2014), 1.9% was reported in Enugu State (Ugwumba*et. al.* 2017). Nwafor and Nwafor(2018), reported a prevalence of 25.8% in Akwa-Ibom State, 16.5% was documented in Kano State by Mohammed *et. al.* (2008), while Lagos recorded 9.92% (Jedy-Agba *et. al.* 2012).Aprevalenceof7.13% was reported in Benin City, Edo State (Okobia and Aligbe, 2005). A study conducted in Zaria, Kaduna State of Nigeria also recorded a prevalence of 9.2% (Afolayan, 2004).

An estimated 307,000 deaths were recorded from prostate cancer in 2012, and was reportedly the fifth leading cause of death from cancer in men with about 6.6% of the total men deaths (NNCCP, 2018). The total economic burden of prostate cancer in Europe has been estimated to be above €8.43 billion with a high proportion of the costs of prostate cancer care occurring in the first year after diagnosis (EAU, 2015). Kangmennaang *et. al.* (2016) explained that the as the global burden of cancer continues to rise, the burden of prostate

cancer in Sub-Saharan Africa (SSA) is expected to grow mainly due to growth and aging of population, changing diets, lifestyles, and socioeconomic conditions. Consequently, the disease is said to be a leading cause of mortality in resource poor settings (Chu *et. al.* 2011; Bastian *et. al.* 2012; Morhason-Bello *et. al.* 2013 Patrick *et. al.* 2015). Even though Sub-Saharan Africa (SSA) has a lower prevalence of prostate cancer disease compared to some other continents due to underestimation, it grapples with one of the highest incidence and mortality of the disease (Jemal *et. al.* 2012; Jedy-Agba *et. al.* 2012). Meanwhile, it is on record that Nigerian men exhibit more advance level of the disease at an earlier age than in several other ethnic groups (Akinremi *et. al.* 2014), nevertheless the true burden of the disease in Nigeria is not known (Ikuerowo *et. al.* 2015).

2.8 Prostate cancer screening in sub-Saharan Africa

Screening is highly recommended at age 45 for men with familial history and African- American men (Prashant, 2019).Some studies have argued that the somewhat relatively lower trends in sub-Saharan Africa (SSA) understate the true magnitude of the disease due to low detection rate as many cases go undiagnosed due to lack of medical knowledge, diagnostic facilities, trained health personnel, and prostate specific antigen (PSA) testing (Glenn *et. al.* 2012; Gorey *et. al.* 2013; Patrick *et. al.* 2015). Prostate cancer screening is unlikely to reduce morbidity and mortality in Nigeria. This is as a result of the fact that although most Nigerian men are aware of prostate cancer and PSA assist screening test, they prefer not to be treated if diagnosed with asymptomatic (OzoemenaOyiogu *et. al.* 2015).

In a study involving outpatients attending the University of Lagos Teaching Hospital, it was observed that majority of the respondents were aware of prostate cancer screening and

only a few had taken the test. In another development, 47.3% of respondents were aware of the screening while 52.7% had never heard of the disease. 13.7% were aware of the availability of a screening test for the disease while only 8.2% have had any form of screening for the disease (Ogundele and Ikuerowo, 2015).

Low utilization of prostate cancer screening service was reported among men (civil servants) in Iseyin LGA of Oyo State (Kolade, 2017). This contrasts with the report from Akinremi *et. al.* (2014) who reported a good year to year attendance at an all free prostate cancer and medical outreach/screening organized in Abeokuta, Ogun state.

Other findings however suggested that Nigerian men are a willing group for screening by both the PSA and DRE with the positive response to call for health screening and interest in prostate health (Akinremi *et. al.* 2014).In another development, some of the out patients being treated for prostate cancer at the University of Benin Teaching Hospital believed that it was necessary to take part in routine screening of prostate cancer in order to detect the disease at an early stage for treatment and to prevent its transformation into something more serious (Enaworu and Khutan, 2016).

Moreover, in Nigerian men, serum PSA concentration ranged from 0 to 438.3ng/ml with a median value of 1.5ng/ml, mean value of 2.5ng/ml and 95th percentile PSA value of 10.0ng/ml. Again, among those with pathological conditions of the prostate, majority were reported to have advanced and high-grade disease with Gleason's score of ≥7 (Ikuerowo *et. al.* 2015). In a study conducted by Ikuerowo *et. al.* (2015), serum total PSA was correlated with age; the age categories ranged from 40-49, 50-59, 60-69 and ≥70 years with corresponding median (and the 95th percentile) PSA yielding 0.8 (4.5), 1.3 (6.0), 1.6 (10.1) and 1.9 (13.4) ng/ml respectively. Respondents with Prostate cancer cases from another

study, had a median serum diagnostic PSA of 73 ng/ml, and a Gleason score of 8–10 tumor (Agallius *et. al.* 2015).Nevertheless, the finding of PSA >4 ng/ml in some population also reveals the need for greater awareness and measures to increase early detection while the value and validity of established PSA reference ranges and cutoff of 'normal' still need to be established (Akinremi *et. al.* 2014).

2.8.1. Prostate Specific Antigen (PSA)

The use of prostate-specific antigen (PSA) as a serum marker has revolutionized prostate cancer diagnosis (Stamey *et. al.*1987). Prostate-specific antigen is organ but not cancer-specific, therefore, it may be elevated in benign prostatic hypertrophy (BPH), prostatitis and other non-malignant conditions. As an independent variable, PSA is a better predictor of cancer than either DRE or trans-rectal ultrasound (TRUS) (Catalona *et. al.* 1994). There are no agreed standards defined for measuring PSA (Semjonow *et. al.* 1996), it is a continuous parameter with higher levels indicating greater likelihood of prostate cancer. Many men may harbor prostate cancer despite having low serum PSA (Thompson, *et. al.* 2004) but the use of monograms may help in predicting indolent prostate cancer (Dong *et. al.* 2008).

PSA is a protein made only by the prostate and the PSA blood test measures the level of PSA in the blood. Low concentration of PSA found in the blood of a man indicates healthy prostate, meanwhile a rapid rise in PSA may be a sign of a pathological development in the prostate with prostate cancer disease being the most serious cause of a high PSA result. Other clinical causes of high PSA include; benign (non-cancer) enlargement of the prostate also called BPH and prostatitis which is the inflammation of the prostate (UCF, 2018).

During a PSA test, a small amount of venous blood is collected to measure the level of PSA. PSA levels under 3.0ng/mL are usually considered normal in Europe and America (PCF, 2017); while a range of 0-4ng/ml have been employed in Nigeria (Bock-Oruma *et. al.* 2014; Akinremi *et. al.* 2014). However, the assessment of a normal PSA must take into account of the patient's age, prostate size, previous PSA tests, other medical conditions (prostatitis), drugs that may artificially lower PSA (finasteride, proscar, and dutasteride) and infections involving the urinary tract which can elevate the PSA.

2.8.2 Digital Rectal Examination (DRE)

The Digital Rectal Examination (DRE) involves the assessment of the prostate for possible abnormalities. Here, the medical examiner puts a lubricated gloved finger into the rectum of the patient and screens for an abnormal shape or thickness to the prostate. DRE is safe and easy to do but the DRE alone cannot detect early cancer. Hence, it should go along with the PSA test (UCF, 2018).

Most prostate cancers are located in the peripheral zone and may be detected by DRE when the volume is greater than or equal to 0.2 ml.In 18% of cases, prostate cancer may be detected by suspect DRE alone irrespective of PSA level (Richie *et. al.* 1993). A suspect DRE in patients with a PSA level less than or equal to 2 ng/ml has a positive predictive value of 5 to 30% (Carvalhal *et. al.* 1999). An abnormal DRE is associated with an increased risk of higher GS and is an indication for biopsy (Okotie, *et. al.* 2007; Gosselaar, *et. al.* 2008).

CHAPTER THRE

METHODOLOGY

3.1 Study Area

The study was carried out in Ibadan, the capital of Oyo State. Oyo State is in the South-western zone of Nigeria and it is the most populous city in the state with a population of over 3 million. Ibadan consist of 11 Local Government Areas (LGAs), each of which is further divided into wards. There are five urban LGAs and six semi-urban LGAs (National Bureau of Statistics, 2011). The number of primary, secondary and tertiary health facilities in Oyo State per 100,000 populations is 10.3, 6.4 and 0.05 respectively. The ratio of public to private health facility is 2.02 (Makinde *et. al.* 2018). There is currently no structure for prostate cancer screening programme in Oyo State.

Ibadan North East (IBNE) is one of the local government areas in Ibadan metropolis, Oyo State. According to National Population Commission (2016), it is projected to be the largest Local Government in Ibadan, Oyo State with a population of about 465,700 and administrative headquarters located at Iwo Road Barracks, Ibadan. The local government has multi-ethnic nationalities, predominantly Yoruba; amidst other tribes like Igbo, Urhobo, Itsekiri, Ijaw, Hausa. Majority of people from these tribes are traders, artisans while others are workers in both private and public sectors.

Ibadan North East comprises twelve (12) wards represented each by a counselor at the Legislative Council. The 12 wards under this local government areainclude; Ward 1 (OdoOsun, Labiran), Ward 2 (OgboriEfon, ItaBaale, Oranyan and Beyerunka), Ward 3 (Kosode, Labo, Alafara), Ward 4 (Adekile, Aremo, OritaAperin), Ward 5 (LabiranAderogba, Beyerunka), Ward 6 (OjeAderogba, Alafara), Ward 7 (Oke Offa, Atipe, Oja Igbo,

AremoAlafara, Ajegede), Ward 8 (Ode Aje, Padi, AlaseAremoAjibola) Ward 9 (Koloko, Agugu, Oke Ibadan, Idi-obi), Ward 10 (OjeIrefin,ItaAkinoloye, Baba Sale and Padi), Ward 11 (1wo Road, Abayomi, Basorun, Idi Ape BCOS Quarters) and Ward 12 (Part of Irefin, Agodi Gate, Oluyoro, Gbenla, OkeAdu, Aromolaran, and Onipepeye)

3.2 Study Design

A cross-sectional study design was used to assess the level of knowledge of prostate cancer risk factors and willingness for screening among adult men in Ibadan North East Local Government Area, Oyo State by using a semi structured interviewer-administered questionnaire.

3.3 Study Population

The study population comprised men aged 40-69 years in the selected communities in Ibadan North East, Ibadan, Oyo State.

3.3.1 Inclusion criteria

1. Men aged 40-69 years were eligible to participate in the study

3.3.2 Exclusion criteria

1. Men aged 40-69 years who were visitors in the selected communities were excluded from this study.
2. Men aged 40-69 years who have been clinically diagnosed of the disease were exempted from this study.
3. Mentally challenged men aged 40-69 years were excluded as they may find it difficult to give an appropriate response to the questions that were asked.

3.4 Sample Size Determination

The sample size for this research work was estimated using the Leslie Kish sample size formula for single proportion: Kish, L. (1965)

$$n = \frac{Z_{\alpha}^{2} pq}{d^{2}}$$

where:

n= minimum sample size

α = level of significance

Z= Standard normal deviate corresponding to confidence level; at 95% confidence level, Z =1.96 for a two -tailed test

p = estimate of true proportion in the population

p = Proportion of men who had good knowledge of prostate cancer in South Western Nigeria (Ojewola *et. al.* 2017)

p = 0.469

q =1- p = 0.531

d = Degree of precision

d = 0.05

$$n = \frac{(1.96)^{2} 0.469 \times 0.531}{(0.05)^{2}}$$

n = 383

Adjusting for non-response rate of 10%

$$= \frac{383}{(1-10\%)}$$

$$= \frac{383}{0.9}$$

= 426

Considering design effect of 1.5 to adjust for the cluster effect of the multistage sampling

= 426 × 1.5= 640

This will give a minimum sample size of 640 men.

For willingness to be screened

$$n = \frac{Z_{\alpha}^{2} pq}{d^{2}}$$

Where:

n= minimum sample size

α = level of significance

Z= Standard normal deviate corresponding to confidence level; at 95% confidence level, Z =1.96 for a two -tailed test

prevalence = estimate of true proportion in the population

p = Proportion of men who are willing to be screened for prostate cancer (Oladepo *et. al.* 2010)

p = 0.815

q =1- p = 0.185

d = Degree of precision

d = 0.05

$$n = \frac{(1.96)^{2} \times 0.815 \times 0.185}{(0.05)^{2}}$$

n = 231

Adjusting for non-response rate of 10%

$$= \frac{231}{(1-10\%)}$$

$$= \frac{231}{0.9}$$

= 257

Considering design effect of 1.5 to adjust for the cluster effect of the multistage sampling

= 257 × 1.5 =377

This will give a minimum sample size of 377 men.

N.B since we have two outcomes the one with the higher sample size was adopted in this study, which was 640 men.

3.5 Sampling Techniques

A multistage technique was adopted in this study.

Stage 1: Ibadan North East Local Government Area (LGA) was selected using simple random technique (balloting) out of 11 LGAs in Ibadan.

Stage 2: Out of the twelve wards that make up Ibadan North East Local Government, six wards were selected using simple random technique (balloting)

Stage 3: Two communities each were selected from each selected ward using simple random technique.

Stage 4: The list of streets were obtained from NPC and simple random sampling technique was adopted to select streets from the selected communities.

Stage 5: Building listing was done to generate a sampling frame. Buildings were selected from the streets using systematic sampling technique.

Stage 6: All men who met the eligibility criteria were selected from the marked buildings in the selected streets.

3.6 Data Collection

Data collection Instrument

A semi structured interviewer-administered questionnaire (Appendix 1) was developed by consulting relevant literatures. The questionnaire consists of 5 sections namely: Section A: Socio-demographic characteristics of respondents. Section B: Family history of prostate cancer among the respondents. Section C: Awareness of prostate cancer screening test among the respondents. D: Knowledge of prostate cancer risk factors. Section E: Knowledge of prostate cancer screening. Section F: Perception about prostate cancer screening test. Section G: Willingness to be screened for prostate cancer.

Section A of the instrument

This section was designed to collect information on socio-demographic characteristics such as age, ethnicity group, area of residence, marital status, religion, level education, occupation, and income.

Section B of the instrument

This section was designed to collect information on family history of prostate cancer among the study participants who have been diagnosed of the disease from their family members.

Section C of the instrument

This section was designed to collect information on the awareness of prostate cancer screening test among the respondents such as their source of information and the screening test for prostate cancer. Incorrect response to question on awareness of PCa screening test was scored "0", while correct response was scored "1".The minimum score for awareness of prostate cancer screening test was "2", the maximum score was "11". The median score for

awareness of PCa screening test was obtained to be 6. Therefore, scores between 0-6 was regarded as "poor awareness" and scores 7-11 was regarded as "good awareness".

Section D of the instrument

This section was designed to collect information on Knowledge of prostate cancer risk factors among the respondents. The score for knowledge of prostate cancer risk factors were obtained by adding the scores of the individual items that comprise the domain. Incorrect response to question on knowledge of prostate cancer risk factors was scored "0", while correct response was scored "1". The minimum score for knowledge of PCa risk factors was "15", the maximum score was "60".The median score for knowledge of PCa risk factors was obtained to be 42. Therefore, scores between 0-42 was regarded as "poor knowledge" and scores 43-60 was regarded as "good knowledge".

Section E of the instrument

This section was designed to collect information on Knowledge of prostate cancer screening test among the participants. Incorrect response to question on knowledge of PCa screening test was scored "0", while correct response was scored "1". The minimum score for knowledge of prostate cancer screening tests was "0, the maximum score was "18". The median score for knowledge of PCa screening test was obtained to be 15. Therefore, scores between 0-15 was regarded as "poor knowledge of prostate cancer screening" and scores 16-18 was regarded as "good knowledge".

Section F of the instrument

This section was designed to collect information on perception towards the screening test among the participants on how they perceived negatively or positively towards the screening test for prostate cancer. Incorrect response to question on perception of PCa

screening test was scored “0”, while correct response was scored “1”. The minimum score for perception about prostate cancer screening test was “19, the maximum score was “99”. The median score for perception of PCa screening test was obtained to be 73. Therefore, scores between 0-73 was regarded as “negative perception” and scores 74-100 was regarded as “positive perception”.

Section G of the instrument

This section was designed to collect information on willingness to be screened among the study participants. To assess the willingness to uptake PCA screening test, "No" was coded “0”, while "Yes" was coded “1”.

The pre-test of the questionnaire was carried out among 64 participants in Ojoo, Akinyele Local Government Area, to measure the internal consistency of the research instrument and identify ambiguous question.

3.7 Validity of Instrument

The questionnaire was reviewed by the study supervisors for face validity.

3.8 Reliability of the Instrument

The internal consistency of the instrument was assessed after the pre-test and a Cronbach's alpha coefficient was 0.782.

The questionnaire was translated into the Yoruba language and back translated to English language to ensure consistency.

Data collection procedure

Local Government Secretariat in Ibadan North East (IBNE) was visited to obtain information about the wards in the Local Government Area on where the research will be conducted, a mapper or linked officer was assigned from the community who knows Ibadan

North East settlement and understand their language. The linked officer meet with the stakeholders on my behalf to schedule an appointment prior my visitation regarding my research work. The principal investigator meet with stakeholders, introductions were made, purpose of research and benefit of the study. The stakeholders were well informed, meeting with the stakeholders was an approval to enter the community in other to conduct the study and individual consent was obtained from the study participants before commencing on the study.

Three research assistants with a Bachelor of Science holder were trained for three days on the purpose of the study and how to administer the questionnaires. A community survey was carried out among adult men aged 40-69 years old residing in Ibadan North East Local Government Area, Oyo State.

3.9 Study Variables

The study variables are of two types namely; the dependent variable and independent variables

3.9.1 Dependent variables

Knowledge of prostate cancer risk factors

willingness to be screened for prostate cancer, (Yes/No).

3.9.2 Independent variables

Age, sex, ethnicity, religion, occupation, family history of Prostate cancer, and other socio demographic characteristics.

3.10 Data Analysis

Data obtained were entered, cleaned and analysed using Statistical Package for Social Sciences version 21 (SPSS Inc. Chicago, USA). The socio-demographic characteristics of the

participants were presented and summarized using percentages and frequency. Chi square test was used to test the relationship between an outcome variable including knowledge and willingness to be screened for prostate cancer and explanatory variables including socio demographic (age, ethnicity group, marital status, educational status, and monthly income). Multiple logistic regression was used to determine the predictors of willingness to uptake PCa screening test. Results were statistically significant if $p<0.05$.

Incorrect response to question on awareness of PCa screening test was scored "0", while correct response was scored "1".The minimum score for awareness of prostate cancer screening test was "2", the maximum score was "11". The median score for awareness of PCa screening test was obtained to be 6. Therefore, scores between 0-6 was regarded as "poor awareness" and scores 7-11 was regarded as "good awareness".

Incorrect response to question on knowledge of prostate cancer risk factors was scored "0", while correct response was scored "1". The minimum score for knowledge of PCa risk factors was "15", the maximum score was "60".The median score for knowledge of PCa risk factors was obtained to be 42. Therefore, scores between 0-42 was regarded as "poor knowledge" and scores 43-60 was regarded as "good knowledge"

Incorrect response to question on knowledge of PCa screening test was scored "0", while correct response was scored "1". The minimum score for knowledge of prostate cancer screening tests was "0, the maximum score was "18". The median score for knowledge of PCa screening test was obtained to be 15. Therefore, scores between 0-15 was regarded as "poor knowledge of prostate cancer screening" and scores 16-18 was regarded as "good knowledge".

Incorrect response to question on perception of PCa screening test was scored “0”, while correct response was scored “1”. The minimum score for perception about prostate cancer screening test was “19, the maximum score was “99”. The median score for perception of PCa screening test was obtained to be 73. Therefore, scores between 0-73 was regarded as “negative perception” and scores 74-100 was regarded as “positive perception”.

"No" was coded “0”, while "Yes" was coded “1” for willingness to uptake prostate cancer screening test.

3.11 Ethical Considerations

Ethical approval was obtained from the Research Ethics Review Committee of the Oyo State Ministry of Health, Ref,No, AD 13/479/1525[A] [Appendix 3]. The nature, purpose and process of the study were explained to the participants and a written informed consent was obtained.[Informed consent form Appendix 4]

3.11.1 Confidentiality of Data

All data collected in the course of the research were kept confidential and anonymity was assured. Information given by the participants will not be link to them or any identifier will not be used in any publication or reports from this study.

3.11.2 Beneficence to Participant

Findings from this study will help policy makers to design intervention that will improve the awareness and uptake of prostate cancer screening test. Also, knowing the risk factors among the participants will positively influence their willingness to uptake the screening test for the disease.

3.11.3 Non-maleficence to Participants

The study was not to pose any harm to the participants since it did not require invasive procedure. However, their time for participation were being considered.

3.11.4 Voluntariness

Participation was voluntary, participants reserved the right to withdraw their consent at any time they choose without loss of benefit. Therefore, the participants were not coerced for participating in this study.

3.11.5 Justice

There was a fair selection of participants without bias.

CHAPTER FOUR
RESULTS

4.1 Socio-Demographic Characteristics

The result obtained for the socio-demographic characteristics is reported in Table 4.1a the mean age of the respondents was 50.5±7.5years. About 322(50.3%) of the respondents were below 50years of age, almost half 285(44.5%) were within age 50-65years while only 23(3.6%) of the respondents were above age 65years, while only 10(1.6%) non-responses. In terms of area of residence, two hundred and fifty three 253(39.5%) of the respondents reside in urban area while 387(60.5%) of them resides in rural area The results also indicated that significant proportion 582(91.1%) of the respondents were married, 20(3.1%) single, 16(2.5%) widower, 5(0.6%) divorced while 16(2.5%) were separated. On the basis of ethnicity, five hundred and seventy-two 572(89.4%) were Yoruba, 13(2.0%) Hausa, 49(7.7%) Igbo while 6(0.9%) represented other ethnic groups (such as Ijaw and Efik). This implies that the Yoruba ethnic group was the most predominant.

In terms of religion, three hundred and seventy-two (58.1%) of the participants were Islam, below half 258(40.3%) were Christian, while only 10(1.6%) were traditional worshippers. Of the respondents, 50(7.8%) of them had no formal education, 190(29.7%) had primary education, 273(42.7%) had secondary education while only 14(19.6%) had tertiary education. Results also showed that almost half 300(46.9%) of the respondent were artisans, 220(34.3%) were self-employed, 78(12.2%) were engaged in paid employment, 33(5.2%) clergy, 7(1.1%) farmer while only 2(0.3%) were unemployed.

In (Table 4.1) regarding the level of daily income of the respondents, the mean daily income was ₦6,229.49 ± ₦4,487.32. Out of which 242(37.6%) of the respondents earned

more than ₦1,500 on daily basis and 8(1.3%) of them earned at most ₦900 on daily basis, about 62(9.7%) of them earned between ₦1000 to ₦1,500 and about 328(51.3%) did not respond to the question. The mean weekly income was ₦19,019.1±₦1,106.97. About 255(30.8%) earned above ₦10,000, 21(9.6%) earned between ₦1,500 and ₦10,000 while only 2(3.0%) earned below ₦1,500 but there were records of 362(56.6%) non-response. Regarding the monthly income of the respondents, the mean monthly income of the respondents was ₦56,871.64±₦8,141.75. About 186(29.1%) earned below national minimum wage of ₦30,000, 228(35.6%) earned between ₦30,000 and ₦99,999 while 67(10.5%) of them earned at least ₦100,000 but there were account for 159(24.8%) non-response.

Table 4.1a Frequency distribution of socio-demographic characteristics among respondents (n=640)

	Variables	Frequency	Percentage
Age group	<50years	322	50.3
	50-65years	285	44.5
	>65years	23	3.6
	NR**	10	1.6
Area of residence	Urban Settlement	253	39.5
	Rural Settlement	387	60.5
Marital status	Single	20	3.1
	Married	582	91.1
	Widower	16	2.5
	Divorced	5	0.8
	Separated	16	2.5
Ethnic group	Yoruba	572	89.4
	Hausa	13	2.0
	Igbo	49	7.7
	Others	6	0.9
Religion	Christianity	258	40.3
	Islam	372	58.1
	Traditional	10	1.6
Educational status	No formal education	50	7.8
	Primary education	190	29.7
	Secondary education	273	42.7
	Tertiary education	14	19.6
Occupation	Self employed	220	34.3
	Employed	78	12.2
	Clergy	33	5.2
	Artisans	300	46.9
	Farmer	7	1.1
	Unemployed	2	0.3

Table 4.1b Frequency distribution on economic characteristics among respondents (n=640)

	Variables	Frequency	Percentage
Daily income	≤N900	8	1.3
	(N1,000-	62	9.7
	N1,500)	242	37.6
	More than		
	N1,500		
	NR	328	51.3
Weekly income	Less than	2	3.0
	N1,500	21	9.6
	(N1,500-	255	30.8
	10,000)	362	56.6
	More than		
	N10,000		
	NR		
Monthly income	<N30,000	186	29.1
	(N30,000-	228	35.6
	N99,999)	67	10.5
	≥100,000	159	24.8

NR** =non-response

4.2 Family history of prostate cancer

Result obtained from the study on family history of Prostate Cancer (PCa) indicated that five hundred and seventy-two (89.4%) of the participants' relatives have never been diagnosed of PCa while only 68(10.6%) of the participants' relatives has never diagnosed of PCa. About 11(16.2%) of the respondent's father have diagnosed of PCa, 10(14.7%) maternal grandfather, twelve(17.6%) paternal grandfather, 11(16.2%) full brother, twelve(17.6%) half brother, 8(11.8%) uncle (father's side),while 3(4.4%) uncles (mother's side) and only one(1.4%) son have been diagnosed of prostate cancer.

Table 4.2 Frequency Distribution of family history of prostate cancer among respondents

Responses		Frequency	%
male relatives diagnosed of prostate cancer [N=640]		68	10.6
Family member diagnosed of prostate cancer [N=68]	Father	11	16.2
	Maternal grandfather	10	14.7
	Paternal grandfather	12	(17.6
	Full brother	11	16.2
	Half brother	12	17.6
	Uncle (Father side)	8	11.8
	Uncles (Mother side	3	4.4
	Son	1	1.5

4.3 Awareness of Prostate Cancer Screening Test

The mean score awareness of PCa screening test was 6.02±0.84. Result shows that more than two-thirds 471(73.6%) of the participants have poor awareness about PCa screening test while less than a third 169(26.4%) of the participants had good awareness about it. About three hundred and fifty-six (56.2%) have heard about PCa while 284(43.8%) participants are not aware of PCa. In term of their source of information, 103(28.2%) heard about PCa over the radio, 61(16.7%) friends, 52(14.2%) television and 38(10.4%) physician.

A total of 471(73.4%) of the participants have not heard about PCa screening test while 169(26.6%) have heard about PCa screening test in the past. In (figure 4.3c) result indicated that 70(41.4%) of the study participants identified prostate specific antigen (PSA) as one of the PCa screening test, sixty two (36.7%) of them identified ultrasound as a screening test for PCa while 25(14.8%) identified digital rectal examination.

Out of the participants who had sufficient awareness about PCa screening test, only 47(27.8%) have been ever screened for PCa while a significant proportion have never been screened for PCa less than five years out of those that have been screened, only 17(736.2%) were screened for more than 5years.

Table 4:3a Level of Awareness of prostate cancer screening test among respondents

Awareness [N=640]	Frequency	Percentage
poor awareness	558	87.2
good awareness	82	12.8

Table 4.3b Frequency distribution of the responses to questions on prostate cancer screening test awareness among respondents

Reponses		n	%
Have heard about prostate cancer [N=640]		356	56.2
If yes, what is the source of information on PCa[N356]	Physician	38	10.4
	Nurse	7	1.9
	Television	52	14.2
	Radio	103	28.2
	Friends	61	16.7
	Relative	34	9.3
	Newspaper	4	1.1
	Church program	9	2.5
	Online	24	6.6
	Others	24	9.0
Have heard of any screening test for prostate cancer [N=640]		169	26.6
Ever been screened for prostate cancer [N= 169]		47	27.8
When last screened for prostate cancer [N=47]	≤5 years	30	63.8
	>5 years	17	36.2

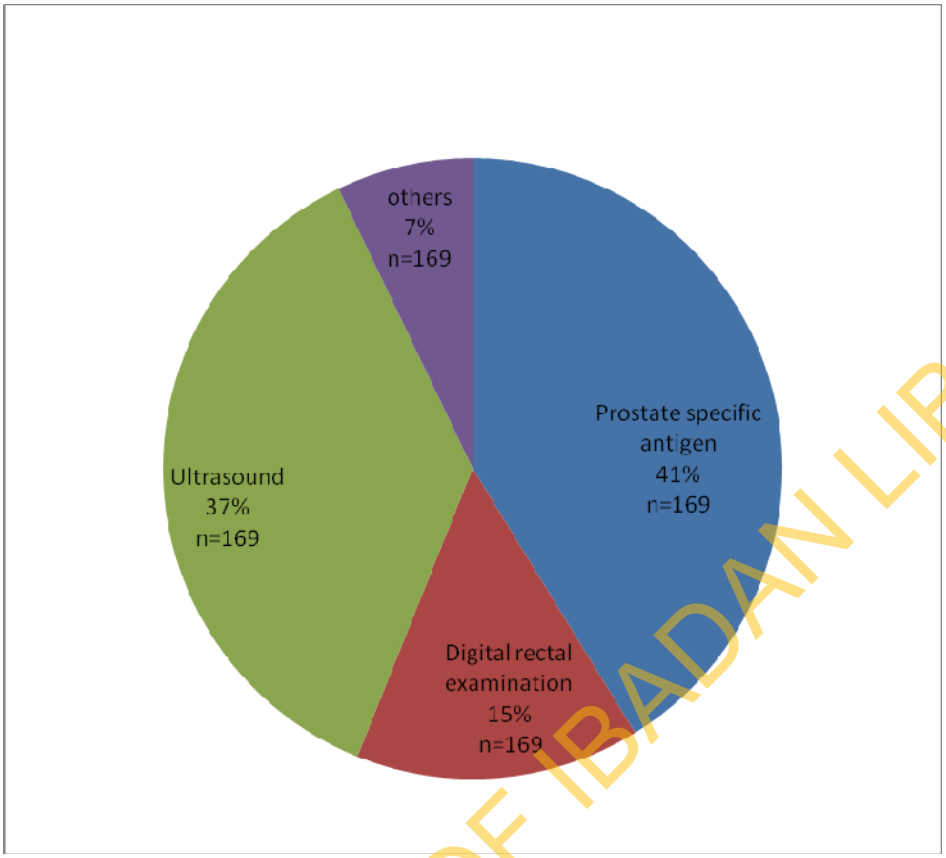

Figure 4.3c Type of prostate cancer screening test among respondents

4.4 Knowledge of Prostate Cancer Risk Factors

The mean score knowledge of prostate cancer (PCa) risk factor was 42.3±12.8. The level of PCa risk factors was categorized into poor and good. Result shows that three hundred and fifty 350(54.7%) of the participants had poor knowledge about PCa risk factors while two hundred and ninety 290(40.5%) had good knowledge about PCa risk factors. Among those who are knowledgeable, 238(37.2%) indicated that they are PCa is located in the testis. About three hundred and twenty-nine 329(51.3%) of the participants could not identify increase in age of >50years as risk of PCa. About 302(47.3%) identified excess of alcohol intake as risk of PCa. Below half, 311(48.8%) of the participants have good knowledge PCa is genetic in nature (Table 4.4b). A substantial proportion 541(74.5%) of the participants do have poor knowledge that PCa is sometimes asymptomatic.

Table 4.4a Frequency distribution of responses to questions on Knowledge of prostate cancer risk factors among respondents [N=640]

Knowledge	Correct	Incorrect	I don't know (%)
The prostate is located in the testis	238(37.2)	15(2.3)	387(60.5)
The risk of having prostate cancer increases with age (>50 years)	286(44.8)	25(3.9)	329(51.3)
Smokers are at higher risk of having prostate cancer	345(54.2)	59(9.3)	236(36.5)
Excessive alcohol consumption can cause prostate cancer	302(47.3)	83(13.0)	255(39.7)
Those who have never had sex have a lower risk of developing prostate cancer	178(27.9)	113(17.7)	349(54.4)
Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer	311(48.8)	43(6.8)	286(44.4)
A man can have prostate cancer and have no problems or symptoms	99(15.5)	253(39.7)	288(44.8)
Prostate cancer is more common among black African men	100(15.7)	194(30.4)	346(53.9)
Multiple sexual partners predispose one to have prostate cancer	371(58.4)	53(8.3)	216(33.23
A diet high in fat will decrease the chance of getting prostate cancer	253(40.2)	95(15.1)	292(44.7)
Sign and symptoms			
Frequent in urine	143(22.5)	167(26.3)	330(51.2)
Blood in urine	254(39.8)	102(16.0)	284(44.2)
Painful urination	303(47.5)	32(5.0)	305(47.5)
Erectile dysfunction	294(46.0)	28(4.4)	318(49.6)
Loss of appetite	154(24.2)	154(24.2)	332(51.6)
Weakness in the legs or feet	160(25.2)	134(21.1)	346(53.7)
Unexplained weight loss	140(22.0)	154(24.3)	346(53.7)
Pains in the back and hips	186(29.2)	110(17.2)	344(53.6)
Pains in the bone	184(28.8)	106(16.6)	350(54.6)
Painful ejaculation	304(47.6)	26(4.1)	310(48.3)

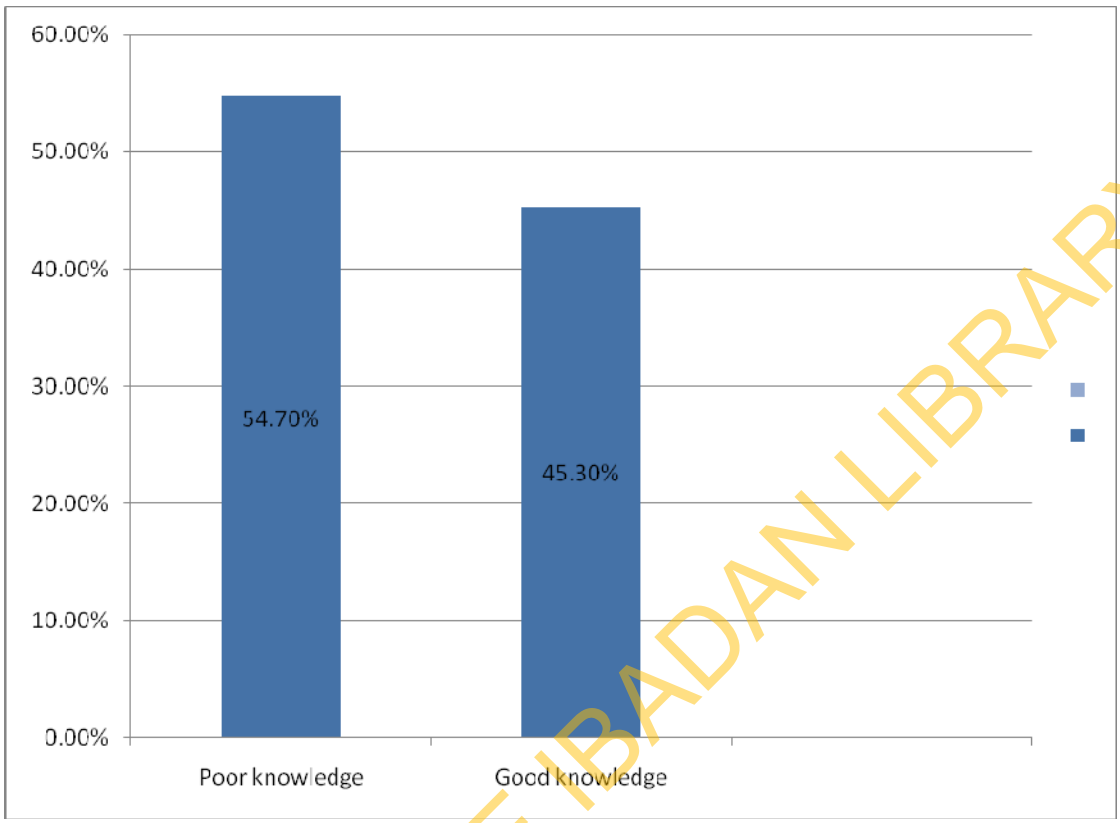

Figure 4.4b Level of Knowledge of prostate cancer risk factors among respondents

4.5 Knowledge of prostate cancer screening tests

The mean score knowledge of prostate cancer (PCa) screening test was 14.4±3.2. The level of PCa screening test was categorized into poor and good. Result shows about 427(66.7%) of the participants had poor knowledge about PCa screening test and two hundred and thirteen 213(33.3%) had about PCa screening test. However, four hundred and forty eight 448(69.7%) of the respondents have good knowledge in identifying prostate specific antigen (PSA) tests as PCa screening test. Similarly, more than half 440(68.7%) of the respondents felt that PCa screening test negatively affect men's reproductive life. Result also indicated that one hundred and sixty seven 167(26.1%) participants believed it is important for ≥80years old men to uptake PCa screening test.

4.5a Level of knowledge of PCa screening tests among respondents

Knowledge [N= 640]	Frequency	Percentage
Poor knowledge	427	66.7
Good knowledge	213	33.3

Table 4.5b Frequency Distribution of knowledge of PCa screening tests among respondents [N=640]

Variables	Correct	Incorrect	I don't know
Prostate specific antigen test is done using urine	192(30.3)	11(1.7)	437(68.0)
Prostate cancer screening negatively affect a man's reproductive life	200(31.3)	72(11.3)	368(57.4)
Prostate cancer screening can detect who may die of prostate cancer	179(28.0)	93(14.6)	368(57.4)
An abnormal prostate specific antigen (PSA) test results means I have prostate cancer for sure	77(12.1)	58(9.1)	505(78.8)
I can have prostate cancer and have a normal PSA test	59(9.3)	43(6.8)	538(83.9)
Most 80 years old men do not need screening	167(26.1)	221(34.6)	252(39.3)

4.6: Perception about prostate cancer screening test

Result showed that the mean score perception of prostate cancer (PCa) screening test was 73.1±10.2. Perception was categorized into negative and positive perceptions. Three hundred and sixty four 364(56.7%) of the participants have negative perception towards PCa screening test while two hundred and seventy six 276(43.1%) of the participants have positive perception towards PCa screening test. Result also show that five hundred and forty two 542(84.7%) of the participants felt that they do not have prostate cancer (Table 4.6)Majority of the respondents felt that they could have prostate cancer without showing symptoms. More than half 349(54.6%) of them have fear of being tested positive for PCa. More than half 405(63.5%) of the participants have negative perception because they do not have idea of the healthcare facilities that does PCa screening test. More than half 345(54.2%) perceived that it is expensive and not sure if National Health Insurance Scheme (NHIS) covers the PCa screening test. The participants' perception about PCa screening test is presented in Table 4.6b

Table 4.6a Level of Perception about prostate cancer screening test

Perception [N=640]	Frequency	Percentage
Negative perception	364	56.9
Positive perception	276	43.1

Table 4.6b Frequency of perception about prostate cancer screening test [N=640]

Variables	SD(%)	D(%)	U (%)	A(%)	SA (%)
I have a high probability of having prostate cancer	487(76.1)	55(8.6)	70(11.0)	22(3.4)	6(0.9)
I have a high probability of having prostate cancer in the next few years	496(77.6)	77(12.1)	58(8.9)	7(1.1)	2(0.3)
I have a feeling that I will have prostate cancer at some time in my life	456(71.7)	116(18.2)	58(8.8)	7(1.1)	1(0.2)
It frightens me to think of prostate cancer	133(20.8)	232(36.4)	90(13.8)	132(20.7)	53(8.3)
I have important things to do than participating in screening	55(8.6)	225(35.3)	76(11.5)	69(10.8)	215(33.8)
I do not know whether the health insurance covers screening	17(2.7)	44(6.9)	234(36.2)	261(41.0)	84(13.2)
I do not know which specialist to see for screening	52(8.3)	111(17.7)	96(13.4)	238(37.8)	143(22.8)
I do not need to participate in screenings, since I am not experiencing any problems	65(10.3)	156(23.7)	43(6.7)	112(17.7)	264(41.6)
Doctors who perform prostate cancer examination treat patients impolite	104(16.4)	109(17.1)	359(55.8)	45(7.1)	23(3.6)
Participating in screening will help diagnose of prostate cancer early	6(.9)	3(.5)	70(10.3)	256(40.3)	305(48.0)
If prostate cancer is diagnosed early and treated, I will know I have a higher chance to survive	4(.6)	2(.3)	73(10.6)	241(38.0)	320(50.5)
If I participate in screenings I will know the truth about my health condition	5(.8)	1(.2)	43(5.7)	231(36.5)	360(56.9)

4.7 Willingness to be screened for Prostate Cancer

The analysis on willingness to uptake prostate cancer screening test showed that 534(83.6%) of the participants were willing to be screened if the screening test is made available in their local environment.

Table 4.7a shows responses from the study participants on willingness to be screened for prostate cancer some reasons includes 528(82.5%) health status, 88(13.8%) uninterested and 14(2.2%) fear of being positive for the disease. One hundred and twenty one (18.1%) of the participants are still unwilling to utilize PCa screening test even if their relatives or friend are positive due to cost of the screening 632(98.7%) and about five hundred and fifty nine 559(87.3%) remained unwilling because of lack of interest in mass screening for PCa in Nigeria.

The mean amount participants are willing to pay for PCa screening test was N1, ₦686.1±₦874.4. About four hundred and sixty three 463(72.3%) of the participants mentioned they could be willing to pay ₦1,000 for the PCa screening test while only 72(11.3%) of them are willing to pay <₦1,000 for PCa screening test.

Table 4.7a Responses from the respondents on willingness to be screened for prostate cancer among respondents

	Yes	No
State your reason for willing to be tested [N=640]		
Health status	528(82.5)	112(17.5)
Not interested in screening test	88(13.8)	552(86.2)
Afraid of positive result	14(2.2)	626(97.8)
Not available for test	4(0.6)	636(99.4)
Would you be more willing to utilize prostate cancer screening if anyone you know was diagnosed of prostate cancer [N=640]	519(81.9)	121(18.1)
State your reason for being more willing [N=640]		
Not aware of the screening	5(0.8)	635(99.2)
Not interested in prostate cancer screening	97(15.2)	543(84.8)
To know my health condition	519(81.0)	121(19.0)
Afraid of positive result for prostate cancer	9(1.4)	631(98.6)
Free screening service	10(1.6)	630(98.4)
If the screening test is covered by health insurance that you won't have to pay, will you be willing to utilize the service	524(82.4)	116(17.6)
Amount willing to pay for prostate cancer screening test		
≤N1000	463	72.3
>N1000	72	11.3
NR**	105	16.4
Would you encourage mass screening for prostate cancer in Nigeria [N=640]	463(73.0)	58(9.1)
State your reason for encourage mass screening for prostate cancer in Nigeria [N=640]		
Not aware of mass screening in Nigeria	1(0.2)	639(99.8)
Afraid of positive result from the screening	12(1.9)	628(98.1)
To know my health condition	500(78.0)	140(22.0)
If Government enforce mass screening in Nigeria	13(2.0)	627(98.0)
Less expensive	8(1.3)	632(98.7)
Not interested in mass screening in Nigeria	81(12.7)	559(87.3)
Personal choice to embark for mass screening	25(3.9)	615(96.1)

NR** =non-response

4.8 Relationship between willingness and perception about PCa screening test among respondents

Result showed that the relationship between willingness to be screened for PCa and perception about PCa screening test is not statistically significant (χ^2=0.224, p=0.636). This shows that perception about prostate cancer screening test does not determines the willingness to be screened for PCa.

Table 4.8: Relationship between willingness and perception about PCa screening test among respondents

	Willingness to be screened PCa			Chi-square χ^2	p- value
Perception about PCa screening test	Willing N=524	Not willing N= 112	Total N=636		
Negative perception	296(56.5%)	66(58.9%)		0.224	0.636
Positive perception	228(43.5%)	46(41.1%)			

4.9 Relationship between willingness and awareness about PCa screening test among respondents

Result showed that the relationship between willingness to be screened for PCa and level of awareness about PCa screening test is not statistically significant (χ^2=0.575, p=0.448). This shows that awareness of prostate cancer screening test does not determines the willingness to be screened for prostate cancer among the study participants.

Table 4.9:Relationship between willingness and awareness about PCa screening test among the respondents

	Willingness to be Screened for PCa		Chi-square statistic χ^2	p-value
Awareness about PCa screening test	Willing N=524	Not willing N= 112	Total N=636	
Negative awareness	454(86.6%)	100(89.3%)	0.575	0.448
Positive awareness	70(13.4%)	12(10.7%)		

4.10 Relationship between willingness and Knowledge of PCa Risk factors among respondents

Result showed that the relationship between willingness to be screened for PCa and level of knowledge of risk factors of PCa is statistically significant (χ^2=16.571, p<0.0001). Knowledge of the risk factors of prostate cancer determines the willingness to be screened for prostate cancer.

Table 4.10: Relationship between willingness and Knowledge of PCa Risk factors among the respondent

	Willingness to be Screened for PCa			Chi-square statistic χ^2	p-value
Knowledge of PCa Screening test	Willing N= 524	Not willing N=112	Total N=636		
low knowledge	307(58.6%)	42(37.5%)		16.571	0.001
high knowledge	217(41.1%)	70(62.5%)			

** *Statistically significant at p<0.0001*

4.11 Relationship between willingness and Knowledge of PCa screening

Result showed that the relationship between willingness to be screened for PCa and level of knowledge of PCa screening test was statistically significant (χ^2=21.235,p=0.0001).Knowledge of prostate cancer screening test determines the willingness to be screened.

Table 4.11 Relationship between willingness and Knowledge of PCa screening among respondent

	Willingness to be Screened for PCa		Chi-square statistics χ^2	p-value
Knowledge of PCa screening test	Willing N=524	Not willing N= 112	Total N=636	
Negative awareness	371(70.8%)	54(48.2%)	21.235	0.000
Positive awareness	153(29.2%)	58(51.8%)		

** *Statistically significant at p<0.0001*

4.12 Bivariate analysis on the relationship between socio-demographic characteristics and willingness to be screened for PCa

There was an association between monthly income($p=0.000, \chi2=15.385$) and ethnic groups($p=0.001, \chi2=17.168$) among the respondents on willingness to uptake prostate cancer screening test.

Results showed that age of the study participants does not significantly influences the willingness to uptake prostate cancer screening test ($p=0.471, \chi2=1.506$). There was no relationship between education and marital status on willingness to uptake prostate cancer screening test among the participants ($p=0.299, \chi2=4.888$, $p=0.164, \chi2= 6.513$) respectively.

Table 4.12 Bivariate analysis on the relationship between socio-demographic characteristics and willingness to be screened for PCa among the respondent

	Willingness to be screened for PCa				
Socio-demographic characteristics	**Willing n(%)**	**Not willing n(%)**		**Chi-square (χ2)**	**p-value**
Age				1.506	0.471
<50years	259(50.2)	62(56.4)			
(50-65)years	237(45.9)	45(40.9)			
>65years	20(3.9)	3(2.7)			
Total	**516**	**110**	**626**		
Marital status				6.513	0.164
Single	16(3.0)	4(3.6)			
Married	482(92.2)	97(86.6)			
Widower	12(2.3)	3(2.7)			
Divorced	3(0.6)	2(1.8)			
Separated	10(1.9)	6(5.4)			
Total	**523**	**112**	**635**		
Ethnic group				17.168	0.001
Yoruba	478(91.2)	92(82.1)			
Hausa	6(1.1)	7(6.2)			
Igbo	34(6.5)	13(11.6)			
Others	6(1.1)	0(0.0)			
Total	**524**	**112**	**636**		
Educational status				4.888	0.299
No formal	38(7.3)	12(10.7)			
Primary	150(28.7)	39(34.8)			
Secondary	226(43.2)	45(40.2)			
Tertiary	108(20.8)	16(14.3)			
Total	**522**	**112**	**634**		
Monthly income				15.385	0.001
<30,000	144(35.4)	41(58.6)			
30,000 - 99,999	207(50.9)	19(27.1)			
≥100,000	56(13.8)	10(14.3)			
Total	**407**	**70**	**477**		

****Statistically significant at p<0.001***

4.13 Predictors of willingness to be screened among the respondents

Result showed that participants below age 50years are 1.2 times more likely to be willing to uptake PCa screening test than other age groups (OR=1.202, CI=0.533, 2.713).

It also indicated that participants who earn between ₦1,000 and ₦1,500 daily are 1.9 times more likely to be willing to uptake PCa screening test than other categories (OR=1.912, CI=0.105, 34.663).

Result also showed that participants who earn above ₦10,000 weekly are 2.2 twice more likely to be willing to uptake PCa screening test than other categories (OR=2.249, CI=0.490, 10.318).

It also indicated that participants who earn between ₦30,000 and ₦99,999 monthly are 3.4 almost four times more likely to be willing to uptake PCa screening test than other categories (OR=3.417, CI=0.667, 17.501).

Table 4.13 Predictors of willingness to be screened among the respondents

Variables	Exp(B)	95% Cl for Exp(B)		p-value
	OR	Lower	Upper	
Constant	1.000			.0078**
Age				
< 50 years	1.202	.533	2.713	0.657**
50-65 years	0.002	0.001	1.021	0.490**
> 65 years	0.042	0.031	0.078	0.248**
Daily income				
(1,000-1,500)	1.912	.105	34.663	.661**
>1,500	.826	.302	2.261	.710**
Weekly income				
>10,000	2.249	.490	10.318	.297**
Monthly income				
(30,000-99,999)	3.417	.667	17.501	.140**
(>100,000)	1.184	.237	5.920	.837**

**= *Not statistically significant at p<0.05*

CHAPTER FIVE

5.1 DISCUSSION

Prostate cancer (PCa) is the second most frequent cancer diagnosis made in men and the fifth leading cause of death worldwide (GLOBOCAN, 2018).Prostate cancer may be asymptomatic at the early stage and often has an indolent course that may require only active surveillance(Rawla,2019). This study was set out to assess the level of knowledge of prostate cancer risk factors and willingness to be screened among adult men in Ibadan North East Local Government, Oyo State

Socio demographic characteristics

Results showed that the mean age of the respondents was 50.46±7.5years which is similar to the findings of Oladepo *et. al.* (2010), whose respondents mean age was 60years.In this study, the age distribution showed that more than half of the respondents were below 50years of age, almost half were within age 50-65years while only a few of the respondents were more than 65years.Monthly income of the participants was found to be significantly influencing the willingness to uptake PCa screening test. This study is in support with Kaninjing *et. al.* (2018) which observed that affordability is a major consideration in men's decision to pursue diagnosis or treatment for the disease. Also ethnicity of the respondents was found to be significantly influencing the willingness to uptake prostate cancer screening test in this study. This is in accordance with Sapira *et. al.* (2015) reported that ethnicity is a risk factor for prostate cancer.

Awareness of prostate cancer screening test

This study indicated that more than two-thirds of the participants have poor awareness about PCa screening test while less than one-third of the participants had good awareness about it. This supports the findings from the studies of which showed that majority of their study participants have poor awareness of (PCa) screening test. (Olapade-Olaopa *et. al.* 2014; Ogundele *et. al.* 2015; Enaworu and Khutan, 2016; Bello *et. al.* 2019) This may be as the consequence of lack of proper co-ordination and planning of the current PCa strategy in Nigeria, which advocates individualized screening (Ogundele *et. al.* 2015). This contradicts the study of Binka *et. al.* (2015) conducted among male university students in Kumasi, Ghana, which reported that most of the males had high level of awareness of PC ascreening test. This report was similar to the findings of Ebuehi and Otumu (2011) conducted among male staff of University of Lagos, Nigeria. It was reported that majority of the study participants had good awareness of PCa screening test. This is in contrast with another study conducted by Nakandi *et. al.* (2013) among Ugandan men regarding to PCa screening test, reported that the level of awareness of PCa screening test was significantly low. This is as a result of the study area at where the study was carried out.

Family history

More than two-thirds of the participants' relatives have never been diagnosed of PCa but only a few of the participants' relatives have been diagnosed of PCa. In this study, the chance of risk of PCa is low due to minimal population of the affected relatives. This is because, the risk of PCa increases as the proportion of affected family members increases; men with two or three first-degree relatives affected have a five to tenfold increased risk of

developing the disease. This is in support with a study of(Turner & Drudge-Coates, 2010) which indicated that family history of PCa is one of the identified risk factors. It also stated that men who have a first-degree relative with prostate cancer have a twofold risk of developing the disease in future.

Knowledge of prostate cancer risk factors

Knowledge of PCa risk factors varies significantly among the participants. More than half of the participants had poor knowledge about PCa risk factors such as excessive alcohol consumption, occupational exposure and diet. Majority of the participants could not identify factors affecting the risk of progression from a latent PCa to a clinical PCa. This is similar to the study of Turner& Drudge-Coates, (2010) indicating that diet, risky sexual behavior, alcohol consumption and occupational are exposure risk factors of PCa. It also showed that higher BMI and weight gain as age increase are risk of PCa. This is also in accordance with the findings from the study of (Adebamowo and Akarolo, 2009; Baade *et. al.* 2009) that poor knowledge about PCa risk factors is one of the challenges involved in the management of PCa. This was also a consequence of lack of community-based screening, poor access to healthcare services and high cost of treatment which has contribute greatly to late presentation of the disease. This support the findings of Kolade *et. al.* (2017) in the studies conducted among civil servants in Iseyin local government area of Oyo state and the Burkina Faso Ouagadougou which reported that the knowledge of prostate cancer risk factors was poor (Kabore *et. al.* 2014). This also confirms the findings of Ojewola *et. al.* (2017) in a study conducted among 305 adult respondents in Ido/Osi local government area, Ekiti state, southwest of Nigeria, it was observed that knowledge of PCa risk factors was poor among the participants. In Canada, the reverse is the case, according to Kachuri et al 2013, despite the

fact that men are knowledgeable about PCa risk factors, the incidence of prostate cancer in Canada has increased steadily over time. The study of Bray *et. al.* (2010) also indicated that although, most men know about PCa risk factors but its incidence rate is highest reported in Northern Europe and the lowest in Eastern Europe.

Knowledge of prostate cancer screening tests

Majority of the participants had poor knowledge about PCa screening test. This is due to low knowledge in identifying prostate specific antigen (PSA) tests as PCa screening test. This supports the study of Ogundele and Ikuerowo, (2015) which indicated that most participants have poor knowledge of PCa screening test but only a few are willing to uptake PCa screening test. A substantial proportion of the respondents felt that PCa screening test will negatively affect their reproductive life. This may be attributed to poor utilization of screening services and inaccessibility to quality healthcare in the study area. This supports of the findings from the studies of (Morhason-Bello *et. al.* 2013; Kangmennaang *et. al.* 2016; Abdulrahman *et. al.* 2016; Ojewola *et. al.* 2017) which stated that poor utilization of screening services may also be attributed to poor access to quality healthcare, wrong perceptions and beliefs.

Perception about prostate cancer screening test

Most of the participants had negative perception towards PCa screening test. Majority of the participants perceived that they do not require to uptake PCa screening test because they are have fear of being tested positive. Inaccessibility of healthcare facilities and cost of prostate cancer screening test were identifies as major reason for negative perception about PCa screening test. This is in accordance with the study of Adibe *et. al.* (2017) conducted among male staff of the University of Nigeria,Nsukka and Enugu campus with a sample size

of 351, reported that 53.9 per cent of the study participants had negative perception about PCa screening tests and treatments. Although, the relationship between willingness to be screened for PCa and perception about PCa screening test is not statistically significant, a substantial proportion of the participants who have negative perception about PCa careening test are unwilling to uptake the screening test.

Willingness to be screened for prostate cancer

Majority of the study participants were willing to be screened for PCa.This supports the studies of (Olademiji et. al. 2010; Adibe et.al. 2017) who indicated that most men were willing to embark in the screening test. Also few men were unwilling to be screened for PCa, some of the participants claimed to remain unwilling to uptake PCa screening test based on the following reasons such as poor awareness, stigmatization, uninterested, and fear of being tested positive for the disease. This supports the studies of (Ajape *et. al.* 2010; Kabore *et. al.* 2013; Mofolo *et. al.* 2015; Enaworu and Khutan, 2016) that unwillingness to uptake PCa screening test is associated with lack or poor awareness and knowledge about PCa and its risk factors among adult male patients has been identified as a key determinant contributing to unwillingness to undergo PCa screening.

Studies conducted in Kitwe Teaching Hospital, Zambia conducted among Ugandan men shows that elderly men were willing to undergo screening for prostate cancer (Gift and Victor 2020; Nkandi *et. al.* 2013). (Enemugwem *et. al.* 2010) also reported that 104(51.5%) of the study participants were more willing to be screened for prostate cancer in Obio Akpor LGA, Rivers State, Nigeria.This is also in contrast with the finding of Ebuehi and Otumu (2011) which asserts that majority of the respondents (Nigerian men) are unwilling to uptake PCa screening testing. This is due to lack of awareness of PCa screening test. This is also in

accordance with the study of Binka *et. al.* (2015) conducted among males in Kumasi, Ghana, which reported that despite the good awareness of PCa screening test among majority of the participants, most of them are still unwilling to uptake PCa screening test.

According to the study of Smith-Palmer *et. al.* 2019; the incidence of PCa has increased substantially in Germany, France, the United Kingdom and Canada. However, this has led to increased uptake of prostate specific antigen (PSA) screening test for earlier detection, which has declined mortality rates. This is supported by the study of Oranusi *et. al.* (2012), which claims that 74.1 per cent of the respondents in their study among male public servants in Anambra state, Nigeria had good knowledge of prostate cancer and are willing to uptake PCa screening services test.

In this study a substantial proportion of the participants were willing to uptake PCa screening test. Willingness to uptake PCa screening test is based on knowledge and awareness of its risk factors of prostate cancer.

This study is limited to use questionnaire through a cross-sectional survey among adult men in Ibadan North East Local Government, Oyo state. This self-reported questionnaire was used to assess their level of knowledge of PCa risk factors and willingness to uptake its screening test which might have led to overestimation of some of the results due to the differentials observed in different articles and study areas. Therefore, the representative of the findings may not be generalized since the study is limited to adult men in Ibadan North East Local Government, Oyo state.

5.2 CONCLUSION

The proportion of participants who have poor awareness about PCa screening test is significantly higher than those who have good awareness about PCa screening test. Most of the participants had poor knowledge about PCa risk factors such as family history, excessive intake of alcohol, fear of being tested positive and stigmatization. In terms of family history of PCa, men who have a first-degree relative with prostate cancer will have a twofold risk of developing the disease in future which may lead to the risk of progression from a latent PCa to a clinical PCa.

More than two-thirds of the participants had poor knowledge about PCa screening test. This is as a consequence of the perception that PCa screening test is meant only for adult men which likely to be attributed to poor utilization of screening services and inaccessibility to quality healthcare in the study area. Most of the participants have negative perception towards PCa screening test.

Willingness to uptake PCa screening test is significantly associated with ethnicity and monthly income. The willingness to uptake PCa screening test depend on diverse ethnic groups in the country and monthly income of men.

5.3 RECOMMENDATIONS

Based on the findings of this study the following are recommended:

1. Government should break the jinx to utilization of prostate cancer screening services imposed by cost by making the service free or highly subsidized.
2. Government should involve health workers to carry these services to the door steps of individuals especially in the work place is necessary since work schedule was found to inhibit utilization of prostate cancer screening services among the respondents.
3. Mass sensitization, awareness creation and educational programme are necessary for every group in the society on the dangers of prostate cancer. This effort must not be erroneously directed to men alone as every woman and child equally has an important right to whom this knowledge can be passed.
4. Utilization of prostate cancer screening services can be greatly achieved through the subsidizing the cost of screening and health education that can discontinue misconceptions about prostate cancer screening.

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APPENDIX 1

QUESTIONNAIRE

SECTION A: SOCIO-DEMOGRAPHIC CHARACTERISTICS

Instruction: please fill in the box and space provided below

1. How old were you as at your last birthday……. years

2. what is your address? .....

3. What is your marital status? 1. Single 2. Married 3.Widower 4.Divorce 5. Separated ☐

4. What is your ethnic group? 1. Yoruba 2. Hausa 3.Igbo 4.Others (Specify) ☐

5.What is your religion? 1. Christianity 2. Islam 3. Traditional 4.Others (Specify) ☐

6.What is your highest level of education? 1. No formal Education 2. Primary Education

3.Secondary Education 4. Tertiary Education ☐

7. What is your current occupation? ……..

8. What is your daily income (#).....?

9.What is your weekly income (#).....?

10.What is your monthly income (#).....?

SECTION B: AWARENESS OF PROSTATE CANCER SCREENING TEST

11. Have you ever heard about prostate cancer? 1. Yes 2. No ☐

12. If yes to Q11, where did you hear it from?1.Physician 2. Nurse 3.Television 4. Radio

5.Friends 6.Relative 7.Newspaper 8. Church program 9.Online 10. Specify Others ☐

13. Have you ever heard of any screening test for prostate cancer? 1. Yes 2. No ☐

14. Which of the prostate cancer screening test have you heard about? 1. Prostate Specific

Antigen 2. Digital Rectal Examination 3. Ultrasound 4. Others (Specify) ☐

15. Have you ever been screened for prostate cancer?1. Yes 2. No ☐

16. When last were you screened for prostate cancer……years

B (1) FAMILY HISTORY OF PROSTATE CANCER

17. Has any of your male relatives been diagnosed with prostate cancer? 1. Yes 2. No ☐

If yes to Q17which of the relatives?

Type of relative with prostate cancer				If yes, age of relative at cancer diagnosis
Father	1. Yes	2. No	3. Don't know	
Maternal grandfather	1. Yes	2. No	3. Don't know	
Maternal grandfather	1. Yes	2. No	3. Don't know	
Full brother	1. Yes	2. No	3. Don't know	
Half brother	1. Yes	2. No	3. Don't know	
Uncle (father side)	1. Yes	2. No	3. Don't know	
Uncle (mother side)	1. Yes	2. No	3. Don't know	
Son	1. Yes	2. No	3. Don't know	

How many brothers (full brother or half brother) do you have? _____

How many uncles (father or mother side) do you have? _____

How many sons do you have _____

SECTION C (1): KNOWLEDGE OF PROSTATE CANCER RISK FACTORS

Please select the appropriate response to express your knowledge about prostate cancer

SN	**Knowledge Questions on Prostate Cancer risk factors**	**Yes**	**No**	**I Don't know**

18	The prostate is located in the testis			
19	The risk of having prostate cancer increases with age (> 50years)			
20	Smokers are at higher risk of having prostate cancer			
21	Excessive alcohol consumption can cause prostate cancer			
22	Those who have never had sex have a lower risk of developing prostate cancer			
23	Men who have several family members (blood relatives) with prostate cancer are more likely to get prostate cancer			
24	A man can have prostate cancer and have no problems or symptoms			
25	Prostate cancer is more common among Black African men			
26	Multiple sexual partners predispose one to have prostate cancer			
27	A diet high in fat will decrease the chance of getting Prostate cancer			
28	The followings are symptoms of prostate cancer			
	Frequent urine			

	Blood in urine			
	Painful urination			
	Erectile dysfunction			
	Loss of appetite			
	Weakness in the legs or feet			
	Unexplained weight loss			
	Pains in the back and hips			
	Pains in the bone			
	Painful ejaculation			

SECTION C (II): KNOWLEDGE OF PROSTATE CANCER SCREENING

	Knowledge of Prostate Cancer Screening	**Yes**	**No**	**Don't know**
29	Prostate-specific antigen test can be done using urine			
30	Prostate cancer screening negatively affect a man's reproductive life			
31	Prostate cancer screening can detect who may die of prostate cancer			
32	An abnormal prostate-specific antigen (PSA) test results means I have prostate cancer for sure			
33	I can have prostate cancer and have a normal PSA test			
34	Most 80-years old men do not need screening			

SECTION D: PERCEPTION ABOUT PROSTATE CANCERSCREENING TEST

Kindly tick the appropriate column below: **D**=Disagree; **SD**=Strongly Disagree;

UD=Undecided; **A**= Agree; **SA** = Strongly Agree

	Perception about Prostate Cancer screening	**SD**	**D**	**UD**	**A**	**SA**
35	I have a high probability of having prostate cancer					
36	I have a high probability of having prostate cancer inthe next few years					
37	I have a feeling that I will have prostate cancer at some time in my life					
38	I fear that I may die because of prostate cancer					
39	I have a high probability of having prostate cancer when compared to other men of my age					
40	It frightens me to think of prostate cancer					
41	I fear screening because I do not know how it is performed					
42	I do not know where and how to go for the screening					
43	It takes a lot of time to participate in screening					
44	I forget to participate in screening					
45	I have important things to do than participating in screening					
46	I do not know whether the health insurance covers screening					
47	I do not know which specialist to see for the screening					

48	I am scared in participating for the screening, I will feel I have it					
49	If I am diagnosed with prostate cancer after screening, there will be nothing to do for its treatment					
50	I do not need to participate in screenings, since I am not experiencing any problems					
51	I fear that the results of screening will be bad					
52	Prostate examination is very upsetting					
53	Prostate examination is very painful					
54	Doctors who perform prostate cancer examination treat patients impolite					
55	I will be doing something good for myself if I participate in screening					
56	If I participate in prostate cancer screening, I won't have to worry about it					
57	Participating in screening will help diagnose of prostate cancer early					

58	If prostate cancer is diagnosed early and treated, I will know I have a higher chance to survive					
59	If I participate in screenings I will know the truth about my health condition					

SECTION E: WILLINGNESS TO BE SCREENED FOR PROSTATE CANCER

60) If screening test is made available in your community, would you be willing to be tested for it 1. Yes 2. No

61) State reason for your answer in Q60.....

.....

.....

62) Would you be more willing to utilize prostate cancer screening if anyone you know was diagnosed of prostate cancer?1. Yes 2. No

63) State reasons for your answer in Q62……..

……

……

64) If the screening test is covered by health insurance that you won't have to pay, will you be willing to utilize the service? (1) Yes (2) No ☐

65) What is the maximum amount you will be willing to pay for prostate cancer screening test? ..... Naira

66) Would you encourage mass screening for prostate cancer in Nigeria?

(1) Yes (2) No (3) Indifferent ☐

67) State reasons for your answer in Q 66……

We have come to the end of this questionnaire.

Thank you for your time.

APPENDIX 2

IWE IBEERE

ABALA A; AWON ONAN APEJUWE ATI IDANIMON EDA

Ilana Ateele :Dakunfalasiawonapotiatiaayeti o wan iisaleyii

1. Omoodun melon i o nigbati o se ojoibirekehin ----------
2. Kin niadiresiibiti o hung be ----------
3. Kinin ipoilokotabilaya re 1 Apon/omidan 2 loko/laya 3 opo 4 kikoraenisile 5 aijogbe po
4. Omoeya wo lo je 1. Yruba 2 Awusa 3. Yibo 4 Iyoku (Safihan)
5. Kiniesin re 1. Igbagbo 2 Musulumi3.Alabalaye 4.Iyoku(safihan)
6. Ipoti o kawe de 1. O kawerara 2. Alakobere3.Girama 4. Ile eko giga
7. Ise won iohun se lowolow ----------
8. Elo niowoti on wole fun e lojumo# ----------?
9. Elo ni on ro lose #----------?
10. Elo ni o ngbalosu # ……?

ABALA B :MIMO NIPA AISAN JEJERE INUN OMO KUNRIN:

11. Nje O otigbo nipa jereyiiri 1 Beeni 2 Beeko
12. To ba je be nisiibeerekokanla ,niboni o tigbo nipa re 1. Lododokita 2 Noosi3.Inunamonmaworan 4.Inun asoromagbesi 5.Ore 6.Ebi 7.Iweiroyin 8 etososi 9.Ero aye lujara 10. Dakun se afihan
13. Nje o tigbo nipa ayewoaisanjejereinunokunrinri? 1. Beeni 2Beeko
14. Ewoninunawonayewojejereyiini o tigbo nipa re ri ?
15. Nje won ti se ayewojeje fun e ri 1Beeni 2. Beeko
16. O to igba wo ti o ti se ayewoyii ……..odun

B 1 ITAN EBI LORI AISAN JEJERE IBI NKAN OMOKUNRIN

17. Nkanokunrin Kankan ninunebi yin tin iaisanjejereibinkanomokunrinri? 1 Beeni 2. Beeko

Ti o ba je be niidahunibeereketadinlogun ,ewoninunawonmonlebiyiini

IruEbi to niaisanjejere to ni se peluOkunrin	To ba je beeniojoorieni be nigbatiayewofihan
Baba 1. Beeni 2. Beeko 3. Mi o mo	
Baba iya 1 Beeni 2 Beeko 3. Mi o mo	
Mama iya 1. Beeni 2. Beeko 3. Mi o mo	
Egbonokunrin 1. Beeni 2. Beeko 3. Mi o mo	
Omo baba lokunrin 1. Beeni 2. Beeko 3, mi o mo	
Aburo baba lokunrin 1. Beeni 2. Beeko 3. Mi o mo	
Aburoiyalokunrin 1. Beeni 2. Beeko 3. Mi o mo	

Omokunrin 1. Beeni 2. Beeko 3. Mi o mo

Egbonokunrin melon i o ni (omoiya) …….

Egbonokunrinmeloni o ni(omo baba)……

Omookunrinmeloni o ni ----------

ABALA C (1) IMO NIPA AWON OHUN TI O LE SE OKUNFA JEJERE OMOKUNRIN

Dakun mu eyiti o babamu to le se afihanimo re nipa aisanjejereyii

S/N	Imo ibeere nipa ohunti o le se okunfajejerenkanokunrin	Beeni	Beeko	Mi o mo
18	Posiretiyiwanibikoroepon			
19	Ojoori je okan Pataki ti o le se okunfaaisanposireti			
20	Awonti n mu siga le teteniaisanposiretijueniti ko mu siga lo			
21	Otiamupara le fa aisanposireti			
22	Awonti ko ti ma niibalopo ko niniaisanjejere to ni se peluokunrin.			
23	Awonokunrinti won niaisanjejereyiininuebiseseki won ni			
24	Okunrin le niaisanjejereki o ma niisorotabiohuntiyoo fi han wipe o ni			
25	Aisanjejereyiwopolarinawonalawodudu			
26	Ibalopopelueniyanpupo le fa aisanjejereyi			
27	Onjeti o nioraninu le se adikusiatiniaisanjejere			
28	Awonnkanwonyini o le se afihanaisanjejere to ni se peluokunrin			
29	Tito nilemolemo			
	Ejeninuito			
	Iniralasikoti a bafe to			
	Aileragege bi omokunrin			
	Ainiokunfaonje			
	Rire lati ese			
	Ailesalayeriru			
	Eyindidunatiigbaroko			
	Eegundidun			
	Didunnibiibalopo			

	Erongbaloriayewoaisanjejereibinkanomokunrin						
35	Mo mo wipe o sesegidiki n niaisanjejereibinkanomokunrin						
36	O sese kin niaisanjejereyiniigbesi aye						
37	Mo n riro wipe mo le niaisanjerere yin iigbesi aye						
38	Mo n beru wipe mo le kunipaseaisanjejereyii						
39	Mo mo wipe o se seki n niaisanyiijuawonokunrinyoku lo						
40	O ma n bamileruti mob a tinro nipa aisanyii						
41	Mo n beruayewonitoripe mi o mobo se ri						
49	Bi mob a niaisan nan leyinayewo ko sionan fun itoju re						
50	Ko je dandan fun mi lati kopaninuayewo nan nitoripa n okojuisorokankan						
51	Mo n ro wipe esiayewo nan ko le dara						
52	Ayewo fun aisanyii ko baeniyanlara mu						
53	Ayewoyiinirapupo lati se						
54	Awondokita tin se ayewoyi n se itoju re peluonanti ko to						
55	Mo n se ara mi lore bi mob a kopaninuayewoyii						
56	Bi mob a kopaninuayewoyii, okan mi yoo bale						
57	Kikopaninunayewoyoo je kiaisanyii je titetemokiakialojuojo						
58	Bi aisanyiiba je titetemolojuojo ,yoo je ki n gbaye pe						
59	Bi mobakopaninuayewoyiiyoo je ki n moipoilera mi						

ABALA C (II) IMO NIPA AYEWO JEJERE ABE OKUNRIN

	Imo nipa ayewojejereabeokunrin	Beeni	Beeko	Mi o mo
29	Ayewo lati fi aisanyihan le jejesisepeluito			
30	Ayewo lati moipojejereyiilaraokunrin le se okufaomobibi			
31	Ayewoyii le je ka moenitiaisanyiiyo pa			
32	Ayewoti o bafihan wipe ipo PS Aga tumosi wipe enyan tin iaisanyii			
33	Eniyan le niaisanyiikiayewo PSA sidara			

ABALA D : ERONGBA LORI AYEWO AISAN JEJERE IBI IKAN OMOKUNRIN

Dakunfalasieyiti o baye ninunawonwonyi D- Aifaramo , SD Aifaramotogbongbon UD Aisepinnu A – Fifaramon SA – Fifaramon to gbongbon.

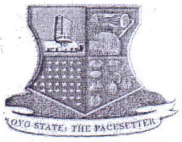
ABALA E: GBIGBELARA LATI KOPA NINU AYEWO JEJERE NKAN OMO KUNRIN

60. Nje bi ayewoyiiba wan iagbegbe re nje o setan lati kopaninu re 1. Beeni 2 Beeko

61. Daku so idi fun idahun re niibeereogota
……
……
62. Nje o se tan lati mu ayewoyilokunkundun bi eniyankanti o mob a niaisanjejereyii 1 beeni 2 Beeko
63. Dakunsialayeti o dahuniberekejilelogotabaye……
……

APPENDIX 3

TELEGRAMS..... TELEPHONE.....



MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/479/ 1525A

27th November, 2019

The Principal Investigator,
Department of Epidemiology and Medical Statistics,
Faculty of Public Health,
College of Medicine,
University of Ibadan,
Ibadan, Nigeria.

Attention: Okolo Aizehi

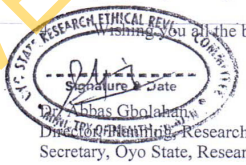
ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Knowledge of Prostrate Cancer Risk Factors and Willingness for Screening among Adult Men in Ibadan North East Local Government Area, Oyo State." has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

Wishing you all the best.



Abbas Gbolahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee

APPENDIX 4

KNOWLEDGE OF PROSTATE CANCER RISK FACTORS AND WILLINGNESS FOR SCREENING AMONG ADULT MEN IN IBADAN NORTH EAST LOCAL GOVERNMENTAREA, OYO STATE.

INFORMED CONSENT FORM

My name is OKOLO, Aizehi Jessica, a postgraduate student of Department of Epidemiology and Medical Statistics, Faculty of Public Health, University of Ibadan. Presently, I am embarking on an academic research work on **Knowledge of prostate cancer risk factors and willingness for screening among adult men in Ibadan North East Local Government Area, Oyo State.** A questionnaire will be given to you, in order to answer the appropriate questions. It is important to inform you that your responses will be kept confidential such that any information you provide will not be directly linked to you. You will not be coerced to participate in this study and your participants will not pose any harm to you since this study will not require any invasive procedure.

Your sincere and honest responses to the questions in the questionnaire, will help for a better understanding of knowledge of prostate cancer risk factors and identify factors affecting the willingness to be screened in this survey, more especially to the community in order to promote health policy, formulate laws, guidelines and design interventions that will improve the perception, awareness and uptake of prostate cancer screening services.

However, you have every right to continue or withdraw from this study at any given time. I enjoined you as well appreciate your efforts in giving your best response to this survey. Your help will be highly appreciated in responding to the survey and taking part in the study.

CONSENT: Now that the study has been well explained to me and without any coercion and not under duress fully understand the content of the process, I will be willing to take part in this survey.

_____ _____

Signature/Thumbprint ***Date***

_____ _____

Interviewer Signature ***Date***

Serial number_____

IMO NIPA OHUN TI O LE FA IASAN JEJERE IBI NKAN OMOKUNRIN ATI IFI ARA ENI SILE FUN EYEWO LAARIN AWON AGBALAGBA OKUNRIN NI IJOBA IBILE IWO OORUN IBADAN NI IPINLE OYO

FOOMU IBUWOLU FUN IFARAMO

Oruko mi ni OKOLO Aizehi Jessica, mo je omoakekooniimoijinlekejiniekati n risiAjakaleaisanationanileranifasitiile Ibadan. Lowolowobayimo gun le iseiwadiloriimo nipa ohunti o le sokunfaaisanjejereibinkanomokunrinatiifiaraenisile fun ayewolaarinawonagbalagbaokunrinniijobaibile Ibadan North East niipinleoyo.A o fun yin niiweibeere lati dahunawonibeereti o ye. O se Pataki lati so fun yin wipe gbogboidahun yin niyoo je fifi pamonti ko sinisionan lati roroyin, A ko ni fi tipatikuku fi o si bi iwadiyitididarapo re ko si ko aburu Kankan ba e. nitoripeiwadiyii ko nigbankankanninuara re. Idahunlonantootoationan to ye fun awonidahun re ninuiweibeereyoo je iranlowo lati nioyekikunloriimo nipa ohunti o le sokunfaaisanjejereibinkanomokunrinatiawonnkan to nfatiawonokunrinkife fi ara won sile fun ayewo , ni papa julo fun awujoti se igbelarugeetoilera, se awonofin, tabiawononanaatele fun iranlowo , onan lati fi to awoneniyanletiki won le fi ara won jin fun ayewoaisanjejere.

Lonanmiran, o nianfani lati tesiwajutabijawoninuiwadiniigbakugba. Mo lu o niogoenun lati gbiyanjuagbara re nipa didahunawonibeereyiinionan to ye. Iranlowo re yoo je eyitiinunwayoo dun sit i o babawadarapomoiwadiyii.

Ifaramo :Nisinsinyiti mot igboalayelekunrereloriiwadiyii, ati wipe ti e ko fi tipatipafimisinuniwadiyi, Mo sit inioye to kunrereloriiwadiyi, nisinsinyimogba lati kopaninuniwadiyii.

…… ……

Ibuwolu/itekaojo

…… …….

Olubeereojo

Nanba

……

MAUSCRIPT FOR PUBLICATION

International Journal For Preventive Medicine