CARE OF PROSTATE CANCER PATIENTS IN SELECTED UROLOGY CLINICS IN NAIROBI COUNTY

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A THESIS SUBMITTED IN PARTIAL FULIFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS OF SCIENCE (REPRODUCTIVE HEALTH) IN THE SCHOOL OF PUBLIC HEALTH OF KENYATTA UNIVERSITY.

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DECLARATION

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

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We confirm that the work reported in this thesis was carried out by the candidate under our supervision.

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DEDICATION

This thesis is dedicated to my parents Moses Kinoti and Gladys Kinoti.

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First and foremost I would like to thank the almighty God for his mercies and grace during my postgraduate studies.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATIONS

CAP	Prostate cancer
CDC	Center for Disease Control
DRE	Digital Rectal Examination
JNC	Journal of National Cancer Institute
KNCC	Kenya National Cancer Control Strategy
TRUS	Trans Rectal Ultra Sound

ABSTRACT

Prostate cancer is an adenocarnoma of significant reproductive health burden in the world. Of the thirteen million cancer cases in the world, prostate cancer accounts for nine hundred thousand cases translating to 13.6% of the total cases and ranks as 5th most common cancer. The mortality rate among black population is 19 per 100,000 while among the Asian populations is 2.5 per 100,000.In Africa, of the six hundred thousand cancer cases reported, prostate cancer accounts for thirty four thousand cases and is responsible for twenty four thousand deaths ranking 6th cause of death among men. In Kenya, twenty eight thousand cancer cases are reported and of these, prostate cancer accounts for 15.3% incidence of the total and causes a mortality of eight hundred and fifty effective management of prostate cancer is largely dependent on early diagnosis, prompt treatment and follow up. However, due to lack of policy and adherence treatment protocols in Kenya, prostate cancer deaths have remained high. The study objectives were; to determine the availability, type and usage of standard clinical protocols in selected urology, to evaluate the urologist's characteristics that influence prostate cancer care in selected urology and to establish the Socio-demographic characteristics of prostate cancer patients attending selected urology clinics within Nairobi County. Therefore, the study was descriptive cross sectional study which evaluated the care of prostate cancer patients in selected urology clinics within Nairobi County. The study established the existing discourse on prostate cancer management and practices. A total of 156 patients and 13 urologists were enrolled into the study. It enrolled all the patients with a diagnosis of prostate cancer and were undergoing treatment at the various urology clinics. Structured questionnaires were used to collect social demographic data and data on availability and usage of prostate cancer protocols. Clinical information such as biometric values from the study participants were also recorded in the questionnaires. Data was cleaned and coded, dual entered in SPSS version 20.chi-square was used in determining associations between the urology characteristics and usage of protocols. Categorical data such as tumor grade and PSA levels were summarized using contingency tables and bar charts, quantitative data was summarized using proportions, medians, means, tabulated and graphed. The findings revealed that the common clinical protocols in selected clinics in Nairobi County are the WHO (38.5%) and MOH protocols(38.5%) . Patient variables like age, income, mode of payments influence the choice of urologist but do not affect the care given. The study recommends that; WHO and MOH protocols should be fully adhered to ensure optimum cancer care, government should ensure equity in access through subsiding and ensuring that prostate cancer is covered under a medical scheme. There is also need to expand prostate cancer research to other Kenyan regions especially at county level to identify the unique factors influencing care to formulate relevant and specific targeted interventions for the disease.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Prostate cancer is a malignant neoplasm of the prostate gland in the male reproductive system.

Worldwide there are about 12.7 million new cancer cases with 7.6 million deaths. According to the National cancer institute, globally, prostate cancer is the 6th leading cause of cancer related deaths in men, estimated to be responsible for 258,000 deaths in 2008(GLOBOCAN, 2008).There are 618,000 new cancer cases, with 512,000 deaths in the African continent (IJC, 2012).Based on data from the International Agency for Research on Cancer, there will be 1.27 million new cases in Africa, with 970,000 deaths by 2030.According to the Nairobi cancer registry, of all cancers registered in 2006 prostate cancer accounted for 11.9% and has increased significantly since then to 15.7% in 2013.

Prostate cancer care is based on proper screening, staging, location and whether or not there are metastases (IJC 2013). The WHO has adopted cancer treatment guidelines from the International cancer institute and the MOH has similarly adopted the guidelines from the world health organization.

Taken together prostate cancer is increasingly becoming an important reproductive health burden in men globally and particularly in Kenya.

1.2. Statement of the Problem

Prostate cancer mortality in Kenya is alarming with an estimated annual incidence of 1,007 new cases per year and 850deaths. This can't be compared with that of the United States where the estimated new cases are 238,590 and the estimated deaths are 29,720(NCI, 2013).Prostate cancer frequently responds to treatment when diagnosed early and in the absence of co morbidities (NCI, 2013).

Data from the regional cancer registry at KEMRI posits that about 80% of reported cases of cancer are diagnosed at advanced stages, when very little can be achieved in terms of curative treatment, (KNCCS, 2011-16).Prostate cancer management utilizes WHO guidelines which are not adhered to, no follow up systems in place, patient related factors such as low level of income hinder seeking of treatment and finally there is inadequate cancer equipped facilities and also inadequate essential cancer commodities. According to the Kenya cancer control strategy, Cancer research in Kenya is not commensurate with the magnitude of the problem. There is need therefore, to conduct a study of this nature to determine the care of prostate cancer patients in selected urology clinics within Nairobi County.

1.3. Objectives of the Study

1.3.1. Broad Objective

To explore the care of prostate cancer patients in selected urology clinics within Nairobi County

1.3.2. Specific Objectives

1. To determine the availability, type and usage of standard clinical protocols in selected urology clinics within Nairobi County.
2. To evaluate the urologist's characteristics that influence prostate cancer care in selected urology clinics within Nairobi County.
3. To establish the Socio-demographic characteristics of prostate cancer patients attending selected urology clinics within Nairobi County.

1.4. Research Questions

(i) What is the availability, type and usage of standard protocols in the management of prostate cancer in the selected urology clinics within Nairobi County?

(ii) What urologist's characteristics influence the care of prostate cancer in the selected urology clinics within Nairobi County?

(iii) What socio-demographic characteristics of the patient affect the management of prostate cancer in the selected urology clinics within Nairobi County?

1.5 Conceptual Framework

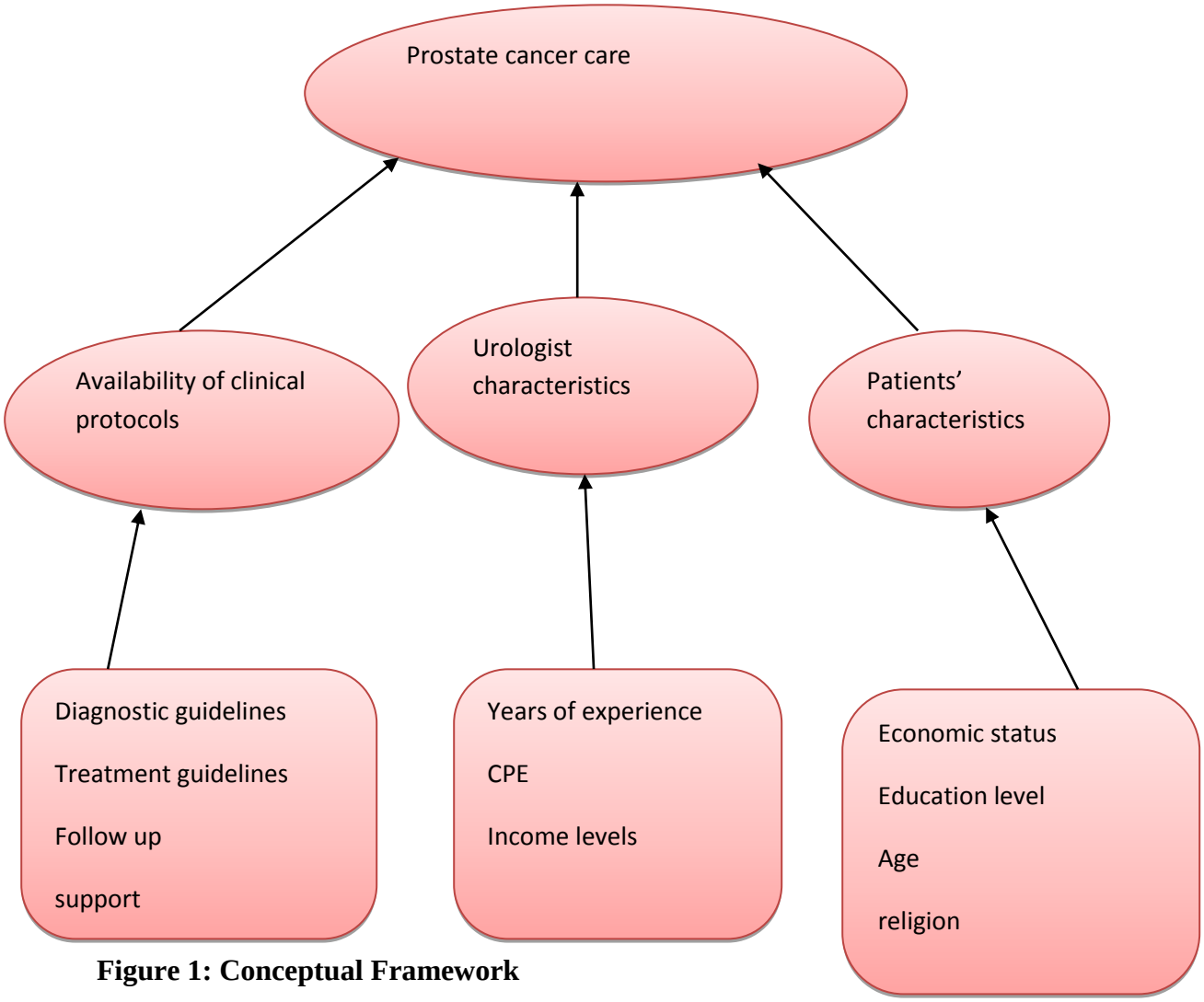

Figure 1: Conceptual Framework

(Designed using information from Jemal& Murray 2012, Lozano *et al* 2012, GLOBOCAN, 2008 and IJC, 2013)

1.6. Justification of the Study

Cancer is the 3rd highest cause of morbidity in Kenya [7% of deaths per year], after infectious diseases and cardiovascular diseases. In men Prostate cancer is the leading cause of morbidity and mortality accounting for 17 per 100,000 populations.
Kenya has five main treatment center's all based in Nairobi (KNH, MP Shah, Nairobi Hospital, Aga Khan and Texas cancer center). In addition most of the prostate cancer specialists are based in Nairobi (4 Radiation oncologists, 6 medical oncologists and 18 urologists) Thus Nairobi County serves as the best location for the study.

Therefore, the study is envisaged to significantly improve the quality of care of prostate cancer patients and consequently reduce the reproductive health burden of the disease not only within the selected urology clinics within Nairobi County but also globally.

1.7 Significance and Expected Outputs

The study sort to contribute greatly to the limited existing knowledge on prostate cancer treatment guidelines. It also sort to provide a basis to develop an essential cancer drug list that will be integrated into the national essential drug list. The study was intended to be of great use by the advocacy groups and also relevant ministries in the government in pushing for the availability of cancer treatment equipment and commodities in the country. The research also illuminated the obvious economic constraints that impend on treatment and thus serve as a platform to petition health insurance providers for inclusion of cancer treatment and care. The research will also embellish the existing discourse on prostate cancer management and practices. The basic policy makers will have a reference point with regard to quality assurance and standard guidelines in prostate cancer treatment.

CHAPTER TWO: LITERATURE REVIEW

2.1 Epidemiology of Prostate Cancer in the World

Prostate cancer is the second most frequently diagnosed cancer of men (899 000 new cases, 13.6% of the total) and the fifth most common cancer overall (NCI, 2008).

Nearly three-quarters of the registered cases occur in developed countries (644 000 cases). Incidence rates are relatively high in certain developing regions such as the Caribbean, South America and sub-Saharan Africa. The lowest age-standardized incidence rate is estimated in South-Central Asia (2.5 per 100,000).With an estimated 258 000 deaths in 2008, prostate cancer is the fifth leading cause of death from cancer in men (6.1% of the total) (GLOBOCAN, 2008).

A review article published in the International Journal of Cancer in January reports that in 2008, there were 618,000 new cancer cases, with 512,000 deaths in the African continent. The article, whose authors are affiliated with the International Agency for Research on Cancer, estimates that by 2030, there will be 1.27 million new cases in Africa, with 970,000 deaths.

In Kenya, cancer accounts for 28,000 cases with a recorded mortality of 22,000 deaths and the risk of dying from cancer before 75 years is 12% (WHO, 2013). Prostate cancer accounts for 3.9% of the total cases (1087 cases) and 850 deaths of men (NCR, 2013).

2.2 Prostate Cancer Screening and Diagnosis

Early detection comprises early diagnosis of cancer in symptomatic populations and screening in asymptomatic high risk populations. It is an approach that promotes vigilance for signs and symptoms that may be indicative of early disease (KNCCS, 2011-16).

The screening methods used include: digital rectal examination, biochemistry, histopathology, cytopathology and imaging.

2.3 Prostate Cancer Management

The initial evaluation of and treatment discussion with a patient with prostate cancer should focus on the following two factors: The patient's overall life expectancy (as determined by age and comorbidities) and overall health status The biologic characteristics of the tumor, together with its predicted aggressiveness and behavior (American Urological Association 2015).

Standard treatments for clinically localized prostate cancer include the following: Active surveillance, Watchful waiting, Radical prostatectomy, Radiation therapy and Hormone therapy

2.3.1 Stage I Prostate Cancer Treatment

Stage I prostate cancer is defined by the American Joint Committee on Cancer's TNM classification system:T1a–c, N0, M0, prostate-specific antigen (PSA) <10 ng/ml, Gleason ≤6 while T2a, N0, M0, PSA <10 ng/ml, Gleason ≤6 and T1–2a, N0, M0, PSA X, Gleason X.

Many stage I cancers are well differentiated and only focally involve the gland (T1a, N0, M0); most require no treatment other than careful follow-up.

In younger patients (aged 50–60 years) whose expected survival is long, treatment should be considered. Radical prostatectomy, external-beam radiation therapy (EBRT), interstitial implantation of radioisotopes, and watchful waiting and active surveillance yield apparently similar survival rates in non-controlled, selected series.

According to the World Health organization treatment guidelines adopted from the National cancer institute, the Standard treatment options for stage I prostate cancer include the following: Watchful waiting or active surveillance, Radical prostatectomy, External-beam radiation therapy (EBRT) and Interstitial implantation of radioisotopes.

Consideration may also be given to postoperative radiation therapy (PORT) for patients who are found to have seminal vesicle invasion by tumor at the time of prostatectomy or who have a detectable level of PSA more than 3 weeks after surgery(Paradelo, *et al*, 2012).

2.3.2 Stage II Prostate Cancer Treatment

Stage II prostate cancer is defined by the American Joint Committee on Cancer's TNM classification system.

Table 1.1 Stages IIA

STAGE	**PSA Levels**	**Gleason Score**
T1 a-c, No, M0	<20 ng/ml	7
T1 a-c, No, M0	≥10 <20 ng/ml	≤6
T2 a-c, No, M0	≥10 <20 ng/ml	≤6
T2 a-c, No, M0	<20 ng/ml	7
T2 a-c, No, M0	<20 ng/ml	≤7
T2 a-c, No, M0	C	X

Table 1.2 StageII B

STAGE	**PSA Levels**	**Gleason Score**
T2c, No, M0	Any PSA	Any Gleason
T1 -2, No, M0	PSA≥20 ng/ml	Any Gleason
T1 -2, No, M0	Any PSA	≥ 8

Standard treatment options for stage II prostate cancer include the following: Watchful waiting or active surveillance, Radical prostatectomy and External-beam radiation therapy (EBRT) with or without hormonal therapy and 3-dimensional (3D) conformal radiation therapy. Interstitial implantation of radioisotopes.

Radical prostatectomy, usually with pelvic lymphadenectomy (with or without the nerve-sparing technique designed to preserve potency) is the most commonly applied therapy with curative intent(Blute, *et al.*, 1994).

EBRT is another treatment option often used with curative intent. Definitive radiation therapy should be delayed 4 to 6 weeks after TURP to reduce the incidence of stricture. Adjuvant hormonal therapy should be considered for patients with bulky T2b to T2c tumors (Aronson,*et al*, 1999).

2.3.3 Stage III Prostate Cancer Treatment

Standard treatment options for stage III prostate cancer include the following: External-beam radiation therapy (EBRT) with or without hormonal therapy, Hormonal manipulations (orhiectomy or luteinizing ,Radical prostatectomy with or without EBRT, Watchful waiting or active surveillance, EBRT alone or hormonal therapy luteinizing hormone-releasing hormone (LH-RH) agonist or orchiectomy) in addition to EBRT should be considered.

Definitive radiation therapy should be delayed until 4 to 6 weeks after transurethral resection to reduce the incidence of stricture.

Hormonal therapy should be considered in conjunction with radiation therapy especially in men who do not have underlying moderate or severe co-morbidities(Harrison , *et al,* 2006)

2.3.4 Stage IV Prostate Cancer Treatment

Stage IV prostate cancer is defined by the American Joint Committee on Cancer's TNM classification system:

- T4, N0, M0, any prostate-specific antigen (PSA), any Gleason.
- Any T, N1, M0, any PSA, any Gleason.
- Any T, any N, M1, any PSA, any Gleason.

Extraprostatic extension with microscopic bladder neck invasion (T4) is included with T3a.

Treatment selection depends on the following factors: Age, Coexisting medical illnesses, Symptoms and the presence of distant metastases (most often bone) or regional lymph node involvement only.

Standard treatment options for stage IV prostate cancer include the following: Hormonal manipulations, Bisphosphonates, External-beam radiation therapy (EBRT) with or without hormonal therapy, Palliative radiation therapy, Palliative surgery with transurethral resection of the prostate (TURP), Watchful waiting or active surveillance.

Hormonal treatment is the mainstay of therapy for distant metastatic prostate cancer. Cure is rare, if ever, possible but striking subjective or objective responses to treatment occur in most patients.

Hormonal manipulations effectively used as initial therapy for prostate cancer include the following: Orchiectomy alone or with an androgen blocker, Luteinizing hormone-releasing hormone (LH-RH) agonists, such as leuprolide in daily or depot preparations. These agents may be associated with tumor flare when used alone; therefore, the initial concomitant use of antiandrogens should be considered in the presence of liver pain, ureteral obstruction, or impending spinal cord compression, Leuprolide plus flutamide however, the addition of an antiandrogen to leuprolide has not been clearly shown in a meta-analysis to improve survival.Estrogens (diethylstilboestrol [DES], chlorotrianisene, ethinyl estradiol, conjugated estrogens-USP and DES-diphosphate.

2.4 Prognostic Factors

The survival of patients with prostate cancer is related to several factors, including the following: Extent of tumor, histologic grade of tumor, patient's age and health and finally Prostate-specific antigen (PSA) level.

2.4.1 Extent of Tumor

When the cancer is confined to the prostate gland, long-term prognosis is excellent. Patients with locally advanced cancer are not usually curable, but 5-year survival is still very good. If prostate cancer has spread to distant organs, current therapy will not cure it. Median survival is usually 1 to 3 years, and most of these patients will die of prostate cancer. Even in this group of patients, indolent clinical courses lasting for many years may be observed (Nelson *et al*, 2003).

2.4.2 Histological Grade of Tumor

Poorly differentiated tumors are more likely to have metastasized before diagnosis and are associated with a poorer prognosis. The most commonly used method to report tumor differentiation is the Gleason score (NCI, 2013).

2.4.3 Patient's Age and Health

Any benefits of definitive local therapy with curative intent may take years to emerge. Therefore, therapy with curative intent is usually reserved for men with a sufficiently long life expectancy. For example, radical prostatectomy is often reserved for men with an estimated life expectancy of at least 10 years (NCI, 2013).

2.4.4 PSA level

PSA, an organ-specific marker, is often used as a tumor marker. The higher the level of PSA at baseline, the higher is the risk for metastatic disease or subsequent disease progression. However, it is an imprecise marker of risk (Pisansky*et al*, 2003).

2.5 Influence of Urologist On Prostate Cancer Care

Assessing the quality of care has become increasingly important to providers, regulators, and purchasers of care. In recent years, providers have begun to be interested in evidence-based medicine and purchasers have begun to focus on the cost-

effectiveness of health care in producing health outcomes.The question, therefore, is what do we know about the quality of health care? literature indicates :(i) a lack of documentation about how major illnesses are treated in most health care systems; (ii) a lack of systematic outcome assessment; (iii) a lack of resource evaluation related to quality for specific diseases; (iv) persisting variations among providers in care for similar patients; and (v) that few formal monitoring systems are in place by health care providers or regulators (Laustsen*et al*, 2001). For most diseases, potential quality problems and their prevalence and incidence are unknown in many countries.

2.6 Influences of Socio Cultural Characteristics of the Patient on Prostate Cancer Care

Research has shown that men's reactions to being diagnosed with prostate cancer are influenced by socio-demographic factors such as race and education. For example, African American men reported lower quality of life than white men at diagnosis and required a longer time to return to baseline levels of functioning following treatment (Jayedevappa *et al*, 2007).

Similarly, Eton and colleagues found that after controlling for treatment type, co-morbidities, and age, white men reported significantly higher levels of urinary, bowel, and general physical functioning than African American men (Elton *et al*, 2001).

Mental health functioning was also lower among prostate cancer survivors with fewer years of formal education (knight *et al*, 2007).

However, socio-demographic factors may not be the only determinants of reactions to prostate cancer diagnosis; conceptual models of cancer survivorship suggest that psychological factors such as cognitive appraisals (e.g., perceptions of stress) are important to outcomes following diagnosis (Garofalo*et al*, 2006).

Despite this, empirical data are not available on whether or not these factors have a significant effect on reactions to being diagnosed with prostate cancer.

In addition to psychological factors, cultural beliefs and values are important to men's reactions to being diagnosed with prostate cancer. Culture is defined as a set of shared and socially transmitted ideas about the world that are passed down from generation to generation (D'Andrade, 1992).

The construct of world view is used within the concept of culture to describe beliefs and values regarding the nature of time (e.g., present, future), social relationships, and the presence or absence of natural and supernatural entities that are shared among racial and ethnic group members. Previous research has shown that spiritual beliefs are significant predictors of health-related quality of life in African American and Hispanic cancer patients (Krupski*et al,* 2006).

All at a glance the socio-demographics of a patient play a vital role in determining when they seek care, if they can afford that care, what the possible outcomes are and finally whether they will seek care at all.

CHAPTER THREE

3.1 METHODOLOGY

This chapter discusses the methodology that were used in the study.

3.1.1 Research Design

The study utilized a cross sectional approach aiming at getting a snap shot of the care to prostate cancer patients.

3.1.2 Study Variables

The independent variables included: Clinical guidelines (Screening, treatment, and follow up) prostate cancer care, while the dependent variables were: usage of the guidelines, urologist socio-demographics and patients' socio-demographics.

3.1.3 Location of the Study

The study was carried out within Nairobi County which is one of the capital cities of Kenya. It borders the following counties: Kiambu County to the North West, North and North East, Machakos County to the East and South East, Kajiado County to the South, South West and West. it has a total of 496 health facilities categorized as follows: District Hospitals (3), Referral Hospitals(2),Dispensaries(156),Health Centres(71), Medical Clinics (144), Maternity Homes (14), Health s (4), Nursing Homes (21), VCTS's(39),Others(42)Doctors to Population Ratio: 1: 23,000.

18 urology clinics within Nairobi County were selected to participate in the study. These clinics are operated by urologists with a registered sub-specialization in urology by the Kenya medical and dentist practitioners' board.

3.1.4 Target Population

The study targeted prostate cancer patients and 18 urologists within Nairobi County.

3.1.5 Sample Size

The study targeted population of 1007 in Nairobi area (NCI, 2013). According to Nassiuma (2000) the sample size is determined by;

$$S = \frac{N(CV^2)}{CV^2 + (N-1)e^2}$$

Where

S=Sample size

N=Population

CV=Coefficient of valuation (take 0.5)

e=Tolerance at desired level

This unit a population of 1007, the sample size is

$$S = \frac{1007(0.5)^2}{(0.5)^2 + (1007-1)(0.05)^2}$$

S=85, however the study population was deemed small and thus increased based on medical and life expectancy as shown in formula below.

Data from the regional cancer registry at KEMRI posits that about 80% of reported cases of cancer are diagnosed at advanced stages, when very little can be achieved in terms of curative treatment, (KNCCS, 2011-16). From studies, previous exposure to late diagnosis was a risk factor to cancer treatment outcome. The proportion of life expectancy for early diagnosis and late diagnosis for cancer was 71% and 47.1% respectively

Using Fleiss formula (Fleiss, 1981)

$$n_1 = \frac{\left[z_{\alpha/2}\sqrt{(r+1)\bar{p}\bar{q}} + z_{1-\beta}\sqrt{rp_1q_1 + p_2q_2} \right]^2}{r(p_1 - p_2)^2}$$

$$n_2 = r \times n_1$$

Where; n1 = number of case

n2 = number of controls

Zα/2 = z-score for two-tailed test based on α 0.05level
Z1-β = z-score for one-tailed test based on β level
r = ratio of controls to cases = 2
p1 = proportion of cases with exposure (0.471)
q1 = 1- p1 (0.529)
p2 = proportion of controls with exposure (0.71)
q2 = 1- p2 (0.29)

The following assumptions were made;

2- Tailed level of significance (**α**) = 5% thus Z score=1.96

Power of the study (**1-β)** = 80%, (**β)** = 0.20 giving a Z score=0 .84

Sample is independently and randomly selected.

Hence a minimum sample size of **156** (61 short life expectancy and 95 long life expectancy) was sampled. The groups with short life expectancy outcome form the cases of the study and included patients who were diagnosed late for their treatment and care. The long life expectancy group formed the controls of the study and included patients with "who were diagnosed early and are showing positive response to treatment".

3.1.6 Inclusion and Exclusion Criteria

The study included all patients with a positive diagnosis of cancer only, only urologist with a valid 2014 registration status participated. It excluded very sick patients who could not give informed consent and those who may have refused conventional treatments. It also excluded non registered urologist even if actively practicing.

3.1.7 Data Collection Methods

Structured questionnaires were used to collect data from the patients and data from records were used to get the exact values of some variables like PSA at diagnosis and tumor stage. These tools were coded and did not collect any identifying data. Only data that is necessary to achieve the study objectives was collected.

3.1.8 Validity

Validity was ensured by standardizing the research instruments through a pilot study conducted at the Mater Hospital Urology clinic, statistically determining the sample

power, using same research assistants and not varying the research instruments during the study.

3.1.9 Reliability

Correlation coefficient was calculated to demonstrate the strength of reliability. A pilot study was conducted to explore on the planned research design and tools. This enabled the researcher to test the reliability of the instruments and refine the overall data collection, pretesting was repeated twice on the same type of population and 10% portion of similar target groups was undertaken and the results subjected to Cronbach's Alpha and measured against 7.0 threshold, the pilot results gave value of 8.56 which was above 7.0 and thus the data collection tool was considered reliable for the actual study..

3.1.10 Data Analysis

Data was analyzed using SPSS windows data entry program, Categorical data such as tumor grade and PSA levels were summarized using contingency tables and bar charts, quantitative data will be summarized using proportions, medians, means, tabulated and graphed. Descriptive statistical analysis were used to describe the sample, cross tabulations to assess associations between variables and chi square to determine significant associations.

3.1.11. Ethical Considerations

Ethical approval was obtained from Kenyatta University Ethics Review committee, consultant urologists operating the clinics and also the patients. The purpose of the study was explained to all participating patients. For the purposes of confidentiality the identity of the participating clinics, urologist and those of the patients was withheld.

Protection of Research Participants Confidentiality

The researcher is a professional nurse registered and licensed to practice by the Nursing Council of Kenya. He has experience in clinical practice and recruited 3rd year nursing students as research assistants for the purposes of data collection. All measures were taken to ensure utter most confidentiality of patients information and records including but not limited to handling of the questionnaires by trained research assistants, safe keeping of the questionnaires awaiting analysis, retrieval of patients files when keying in test values and destroying the questionnaires after the study which was done within 6 months from the date of data collection.

Personal data was only associated with an arbitrary number and that same number was used in transcribing the data from the printed questionnaire.

The researcher made every effort to prevent anyone outside of the study from connecting individual subjects with their responses.

The researcher did not collect identifying information of individual subjects (e.g., name, address, Email address, etc.), and did not link individual responses with participants' identities to ensure anonymity.

Care and Protection of Research Participants

There is no good reason to believe that participants are at risk of significant harm by taking part in research or by the behavior of anyone conducting research, however, could there be any concern the researcher made provision to raise the issue with the primary doctors and if not fully satisfied to take the matter up with K.U ERC.

CHAPTER FOUR: RESULTS

This chapter reports the results of the study organized according to the research objectives.

4.1 BASELINE CHARACTERISTICS OF THE STUDY POPULATION

4.1.1 baseline Urologist Characteristics

A total of 18 urologists were approached to participate in the study, out of this 14 consented to the study. Of the 14, 13 participated in the study. (One questionnaire was incomplete). Their education was 1st degree n=11 (84.6%) Mbchb, n=2 (15.2%) MBBS, 2nd n=9,69.2% had M.Med (Surg), n=2, 15.3% MSc. Urology, N=1,7.6% FRCS(Glasg) , and n=1, 7.6% FMCS as their second degree. Sub-specialty, n=4, 30%Msc.Urology, N=1, 7.6% had a fellowship n=1, 7.6% had a post graduate diploma. Their income was Kshs 200,000 to Over 500,000, the experiences ranged between16-40 years, as shown in the table below.

Table 4.1: Urologist Characteristics

UROLOGIST ID	Age (years)	Religion	Marital status	1st degree	Year	Postgraduate	Year	Sub-specialty	Year	Experience (years) As a Doctor	Experience (years) as a Urologist	Income levels
1	49	Muslim	Married	MBChB(Nairobi)	1992	M.Med(Surg)(Nbi)	2000	UROLOGY(KCMC)	2003	22	11	300,000-500000
2	48	Christian		MBChB(Nairobi)	1993	M.Med(Surg)(Nbi)	2000	MSc.Urology	2010	21	4	200000-300000
3	47	Muslim	Single	MBChB(Nairobi)	1994	M.Med(Gen.Surg)(Nbi)	2008	ASEA(UROLOGY)(KCMC)	2013	19	2	200000-300000
4	47	Christian	Married	MBChB(Nairobi)	1994	M.Med(Gen.Surg)(Nbi)	2008	ASEA(UROLOGY)(KCMC)	2013	20	2	300,000-500000
5	46	Christian	Married	MBChB(Nairobi)	1995	M.Med(Gen.Sur.Uro)(Nrb)	2002	FMCS(Nigeria)	2012	19	2	Above 500,000
6	47	Muslim	Married	MBChB(Nairobi)	1994	M.Med(Surg)(Nbi)	2001	UROLOGY(KCMC)	2010	20	4	200000-300000
7	47	Christian	Married	MBChB(Nairobi)	1994	M.MedSurg(Nbi)	2000	Msc. Urology	2008	20	6	300,000-500000
8	48	Christian	Married	MBChB(Nairobi)	1993	M.Med(Surg)(Nairobi)	2001	UROLOGY(KCMC)	2005	21	9	200000-300000
9	43	Christian	Married	MBChB(Moi)	1998	M.Med(Surg)(Nairobi)	2008	Msc. Urology	2013	16	2	Above 500,000
10	68	Christian	Married	MBBS(Egypt)	1973	M.Med(Sur)(Nairobi)	1984	MSc.Uro(Cairo)	1986	41	28	200000-300000
11	66	Muslim	Married	MBChB(Nairobi)	1979	M.Med(surg)(Nbi)	1986	FRCS(Glasg)	1992	35	22	Above 500,000
12	60	Muslim	Married	MBChB(Nairobi)	1985	M.Med(Surg)(Nbi)	1991	FMCS(Nigeria)	1998	23	16	200000-300000
13	67	Christian	Married	MBBS(Lagos)	1978	M.Med(surg)(Nigeria)	1985	FWACS	1990	40	25	200000-300000

*The responses were presented in number (n) and proportions percentages (%)**FMCS**- fellow of medical college of surgeons, **FRCS**- fellow of Royal college of surgeons, **FWCS**- fellow of west African college of surgeons, **MBCHB** - Medicinae Baccalaureus, Baccalaureus Chirurgiae (bachelor of medicine bachelor of surgery) **ASEA**- association of surgeons of east Africa, KCMC- Kilimanjaro Christian medical centre*

4.1.2 Patient Characteristics

In summary, a total of 156 patients were recruited for the study. They were categorized by stage of cancer they presented in, Stage I, n=70(44.9%), Stage II n=30, 19.2%), Stage III, n=22(14.1%) and Stage IV, n=34(21.8%). According to study n= 132, (84.6%) were Christians with n= 24, (15.4%) being Muslims.

Most of the respondents n=58(37.2%) of the patients aged above 60 years, n=56, (35.9%) aged between 50-59 years and n=42, (26.9%) aged between 40-49 years.

Most of the respondents n=100, (64.1%) have secondary level of education, n=26, (16.7%) college, n=23, (14.7%) primary, n=5, (3.2%) no education and n=2, (1.3%) university education.

When asked how they pay their bills n=101, (64.7%) pay out of their pockets n=35, (22.4%) through pocket and medical insurance while n=20, (12.8%) pay through medical insurance and In relation to marital status n=87, (55.8%) were married, n=42, (28.8%) were single and n =24(15.2%) widowed. Most of the patients n (89 (57.1%) earn <kshs 50,000, n=34 (21.8%) earn above kshs 100,000 with n=33, (21.2%) earning between kshs 50,000 to 100,000.

From the findings all the urologists partner with other oncologists in the management of prostate cancer, most of the patients n= 134, (85.9%) agree that they do not get all the treatment modalities they seek in one hospital with only n=22, (14.1%) who agreed that they get all modalities in same hospital and this could be reason why they oncologists partner with prostate oncologists. The urologist care and management of prostate cancer requires collaboration of specialists and from findings the patients revealed that they could not get all the treatment modalities needed in one hospital. This supports the findings where doctors agreed to partner with oncologists.

Table 4.2: Patient Characteristics and use of standard protocols

Independent Variable	Category	Stage I 70	Stage II 30	Stage III 22	Stage IV 34	Chi-Square Test
Age	40-49yrs	21(13.5)	5(3.2)	5, ((3.2)	11, ((7.1	X2=1.256[a] P=0.06 DF=8
	50-59 yrs	28, (17.9)	12, (7.7)	7, (4.5)	9, (5.8)	
	> 60 yrs	21, (13.5)	13, (8.3	10, (6.4)	14, (9)	
Education	No educ	4, (2.6)	11, (7.1)	0, (0.0)	0, (0.0)	X2=10.256[a] P=0.056 DF=11
	Pry level	8, (5.1)	6, (3.8)	12, (7.7)	7, (4.5)	
	Sec level	43, (27.6)	17, (10.9)	18, (11.5)	22, (14.1)	
	College/university	13, (8.3)	6, (3.8)	5, (3.2)	26, (16.7)	
Religion	Christian	62, (39.7)	26, (16.7)	16, (10.3)	28, (17.9)	X2=83.308[a] P=0.032 DF=3
	Muslim	8, (5.1)	4, (2.6)	16, (10.3)	6, (3.8)	
Marital status	Single	21, (13.5)	6, (3.8)	6, (3.8)	12, (7.7)	X2=41.026[a] P=0.019 DF=4
	Married	34, (21.8)	18, (11.5)	14, (9)	21, (13.5)	
	Widowed	15, (9.6)	6, (3.8)	12, (7.7)	11, (7.1)	
Income levels	Less than ksh 50, (000	36 , (23.1)	20, (12.8)	13 , (8.3)	20, (12.8)	X2=51.923[a] P=0.00 DF=12
	ksh 50, (000-100, (000	27, (17.3)	1 4, (8.9)	6, (3.8)	12, (7.7)	
	Above ksh 100, (000	7 , (4.5)	6 , (3.8)	9 , (5.8)	12 , (7.7)	
Payment mode	Medical insurance cover	2, (1.3)	11, (7.1)	5, (3.2)	12, (7.7)	X2=46.231 P=0.00 DF =4
	self out of pocket	53, (34)	19, (12.2)	13, (8.3)	16, (10.3)	
	Both	15, (9.6)	10, (6.4)	14, (8.9)	6, (3.8)	
PSA levels at diagnosis done	Yes	70, (44.9)	30, (19.2)	22, (14.1)	34, (21.8)	X2=10.211 P=0.00 Df=2
	No	0	0	0	0	
Physical exam done	Yes	70, (44.9)	30, (19.2)	22, (14.1	34, (21.8)	X2=16.145 P=0.00 Df=4
	No	0	0	0	0	

The responses were presented in number (n) and proportions percentages (%)

4.2 Availability type and usage of standard protocol

4.2.1 Availability of Protocols

Available n=13 (100%), all the urologist had a protocol.

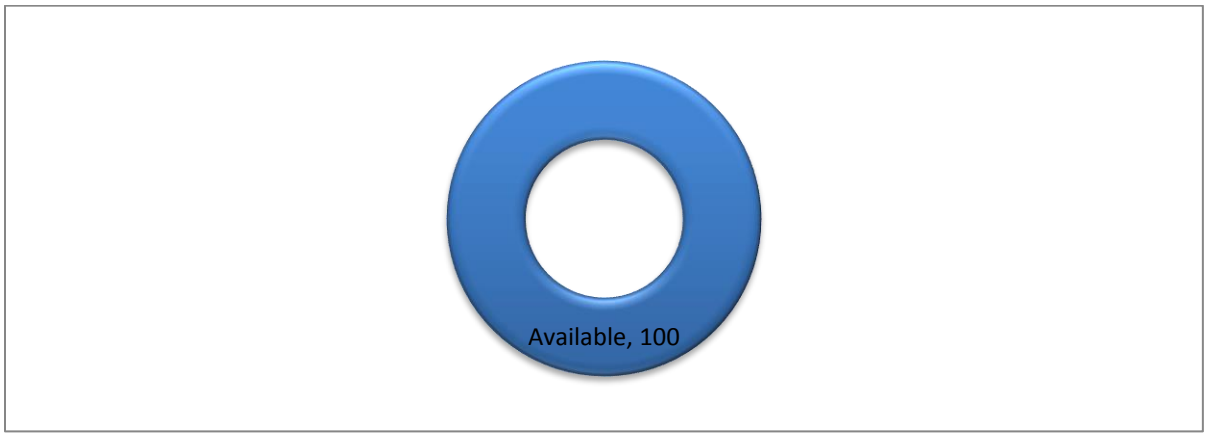

Figure 4.1: Availability of Protocols

4.2.2 Type of Protocols

Out of the 13 who participated in the study n=5 (38.5%) had MOH protocol, n=5 (38.5%) had WHO protocol, n=3 (23.0%) had ICI protocol. This shows that all the 13 Urologists have adhered to certain protocols in their practice.

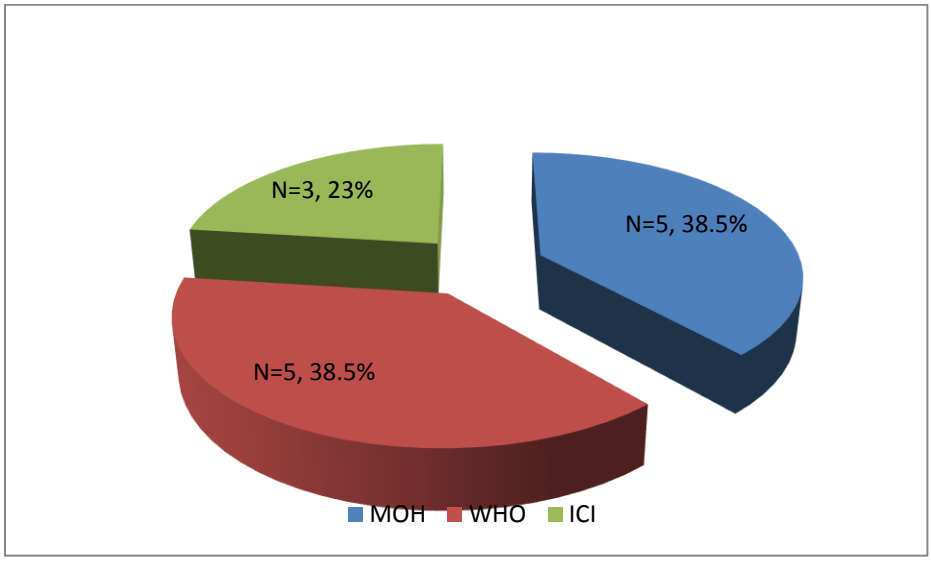

Figure 4.2: Type of Protocols

All doctors were adhering to the protocols, as revealed by the treatments they were given compared to the prescribed care guidelines by standard protocols.

4.2.3 Usage of Protocols

In summary most of the patients in stage I urology care and management n=130, (83.3%) were under watchful waiting or active surveillance, n=85, (54.5%) under radical prostatectomy, n=58, (37.2%) under External-beam radiation therapy (EBRT), n=40, (25.6%) under interstitial implantation of radioisotopes at stage II, 58, (37.2%) were watchful waiting or active surveillance, n=40, (25.6%) were under, radical prostatectomy, external-beam radiation therapy (EBRT) and hormonal therapy. At stage III, 21(13.5%) were under external-beam radiation therapy (EBRT) with or without hormonal therapy, hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) an, radical prostatectomy with or without EBRT and Watchful waiting or active surveillance while at stage IV n=38, (24.4%) of the patients were under ; hormonal manipulations, bisphosphonates, external-beam radiation therapy (EBRT) with or without hormonal therapy, palliative radiation therapy, Palliative surgery with transurethral resection of the prostate (TURP)and Watchful waiting or active surveillance as shown in Table 4.3 in Appendix VI.

4.3 Urologist Characteristics that influence prostate cancer care.

This section of the study presents findings on relationship between urologist characteristics ad usage of clinical protocols.

4.3.1 Age of Urologist

Most of the all the urologist under all age category undertook PSA and Physical examinations for their patients under all stages. Most of those aged between 40-50 have at least n=12, (7.7%) of the patients with most of them n=11, (8.5%) in stage I of treatment. For those aged between 50-60 years they have 4(28.6%) patients, with most of their patients 38(29.1%) in stage I and under watchful waiting and surveillance. With those urologist over 60 years most of their patients n= 97,(62.2%) were in stage I but under Interstitial implantation of radioisotopes, further, X^2=13.532,DF=6, P=.035 at

α=0.05 significance level, it was concluded that there a relationship between urologist age and protocols usage as shown figure 4.2 and illustrated in table 4.5 in appendix VI as well as in table 4.16.

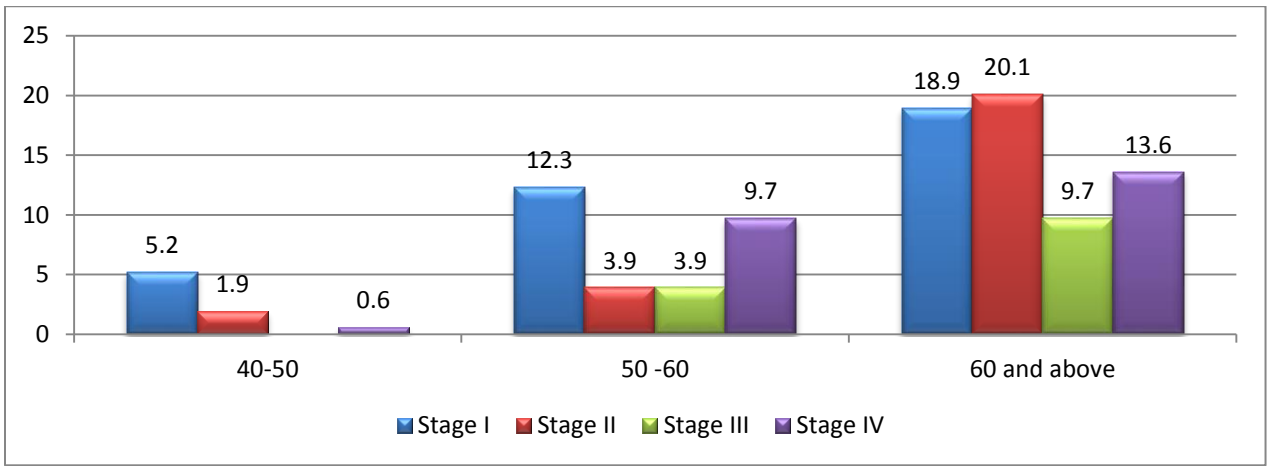

Figure 4.3: Age of Urologist and prostate cancer patients in stages.

Urologists above the age of 60 years had more patients and they adhered to the protocols. The age of urologists did not influence the treatment and care as shown in figure 4.4.

4.3.2 urologist Experience as a doctor

Most of the urologists with experience of less than 20 years n=4, (30.8%) had n=42, (26.9%) patients, those with 21-30 years of experience as a doctor were n=7, (53.8%) and had n=97, (62.2%) patients and those with above 30 years of experience were n=2 (15.4%), with n=17, (10.9%) patients, all of the urologist regardless of their experience have undertaken PSA and physical examination on their patients and majority of their patients were in stage I of treatment and under watchful waiting or active surveillance, also X^2=80,DF=4, P=.000 at α=0.05 significance level shows that there is association of urologist experience as a doctor with usage of standard clinical protocols as shown in figure 4.4 and illustrated table 4.8, in appendix vi.

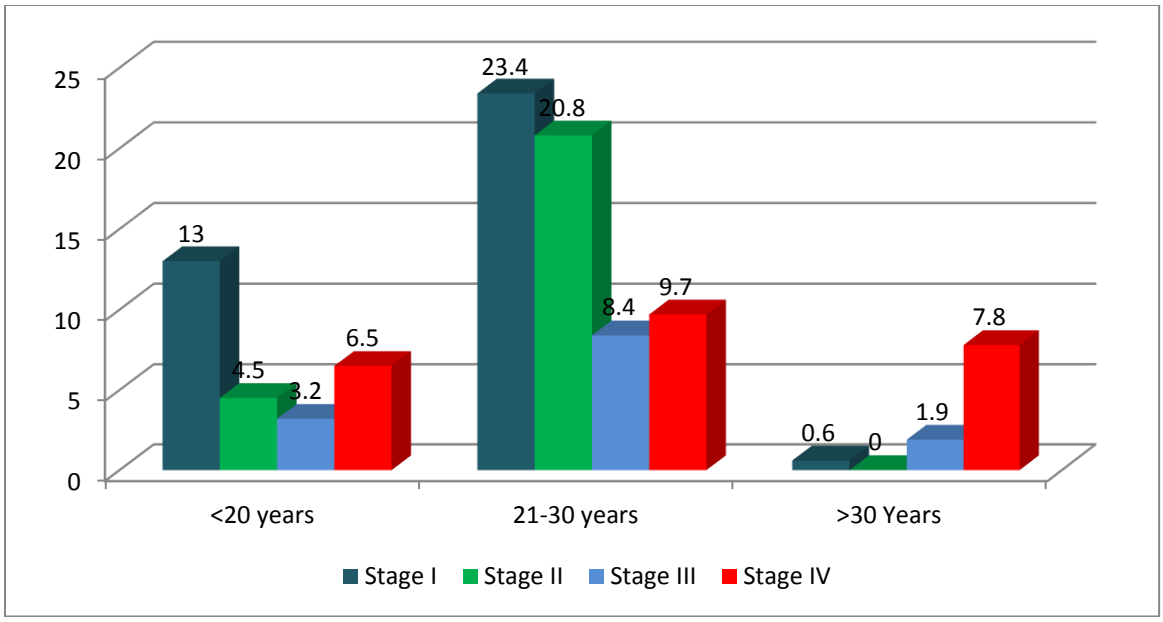

Figure 4.4: clinicians Experience as a doctor with usage of standard clinical protocols

4.3.3 Clinicians Experience as Urologist with usage of standard clinical protocols

In relation to urologist experience as urologist and protocols it was revealed that n=8, (61.5%) of the urologists have less than 10 years of experience and had n=81, (51.9%) patients, most of those with over ten years of experience n=5, (38.5%) had n=75, (48.1%) patients. Most the urologists have patients under watchful waiting or active surveillance which is stage I of treatment. Also X^2=80,DF=4, P=.000 at α=0.05 significance level shows that there is association of urologist experience as a doctor with usage of standard clinical protocols as shown in figure as shown in figure 4.5 table 4.9 in Appendix VI.

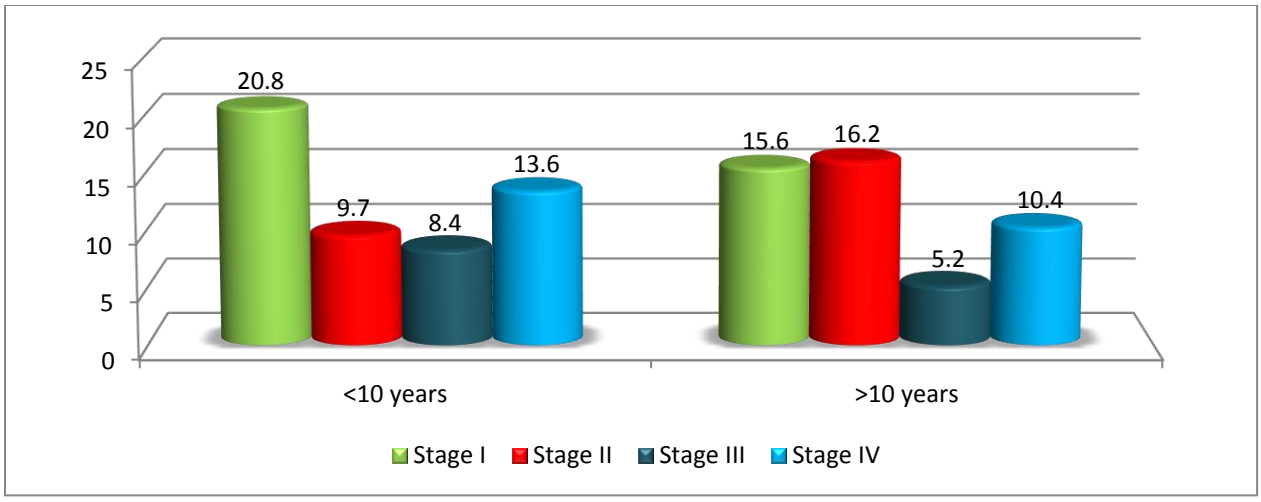

Figure 4.5: Clinicians Experience as a Urologist with usage of standard clinical protocols

4.4 Patients Socio-economic and prostate cancer Care

This section presents the findings on the relationship between the socio-economic status and prostate cancer care of the patients.

4.4.1 Patients age

The patients aged between 40-50 years were n=42, (26.9%) with n=16, (10.4%), those aged 51-59 years, n=56, (35.9%) with most of them , n=27, (17.5%) in stage I of treatment and those aged above 60 years were n=56, (35.9%) in stage I of treatment, n=13, (18.4%). The chi-square results X^2=10.720 DF=6, P=.007 at α=0.05 significance level shows that there is association of patients age with clinical stages as illustrated in figure 4.6 and table 4.12 in Appendix VI.

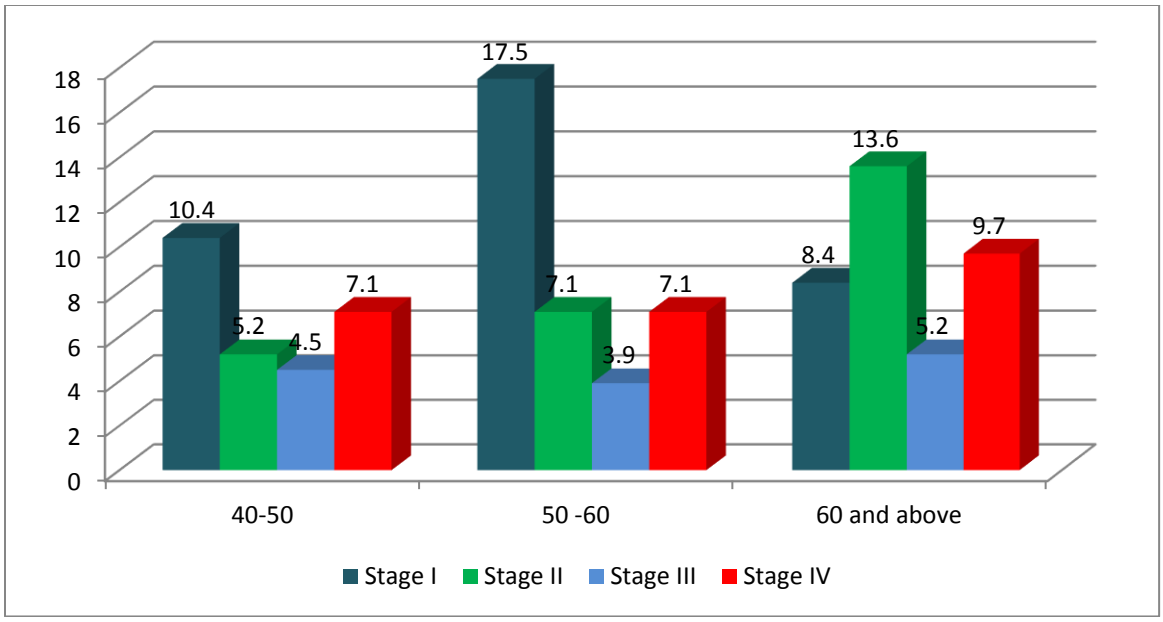

Figure 4.5: Patients age and clinical stages

4.4.2 Patients Education

The study sought to find out the level of patients education, it was revealed that there were n=5, (3.2%) patients with no education and all of them were in stage I of treatment, most of them had physical examination, DRE and biopsy with all of them under; Watchful waiting or active surveillance, Radical prostatectomy, External-beam radiation therapy (EBRT) and also Interstitial implantation of radioisotopes. Those with primary level of education were n=23, (14.7%), n=100, (64.1%) secondary and n=26, (16.7%) college and n=2, (1.3%) university, most of this patients regardless of their education were in stage I of treatment and under watchful waiting or active surveillance, non-parametric test revealed that X^2=10.720 DF=6, P=.007 at α=0.05 significance level shows indicates that there is association of patients education with standard protocols as shown in figure 4.6 and table 4.14 in Appendix VI. This could be because the understanding of prostate cancer and the care needed needs formal education of referral and the highly educated are more likely to get access to information from friends and academic institutions thus they are more likely to seek the best and specific services and care from the urologist with best reputation.

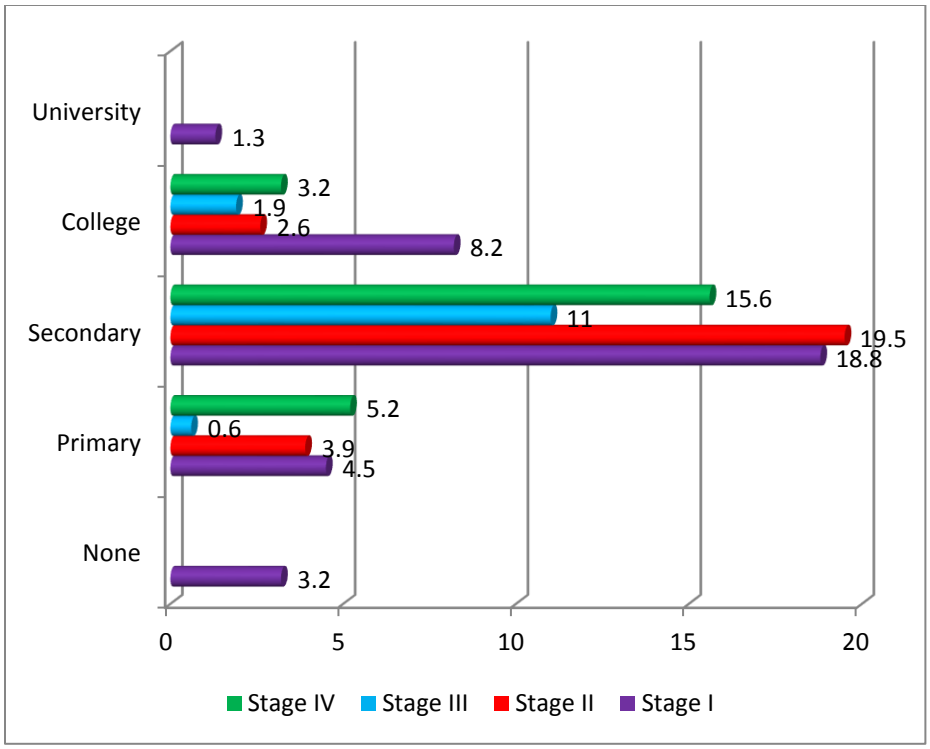

Figure 4.6: Patients Education

4.4.4 Patients Payment Method

The study results showed that most of the patients who earn Less than ksh 50,000 were n=88, 57.1%), and most of them n=33, (21.4%) were in stage I of treatment, those who were earning ksh 50,000-100,000 were n=33, (21.2%) with most of them n=21, (31.6%) in stage I of treatment while those earning Above ksh 100,000 were n=34, (21.8%) as revealed most of the patients were in stage I and majority of them were still under Watchful waiting or active surveillance n=72, (55.4%), n=31, (23.8) and n=8, (5.1), this implies most of the patients in stage I could not afford the treatment due to their income compared to others stages also non-parametric test revealed that X^2=10.720 DF=6, P=.007 at α=0.05 significance level shows indicates that there is an association between of patients association of patients payment method with clinical protocols as shown in figure 4.8 and table 4.15 in Appendix VI. This could be because professional qualification of the urologist translates to fee they charge for consultation and the patients

who visit them are those who can afford the fees and those who have medical plans have options of seeking services of best and highly paid urologists.

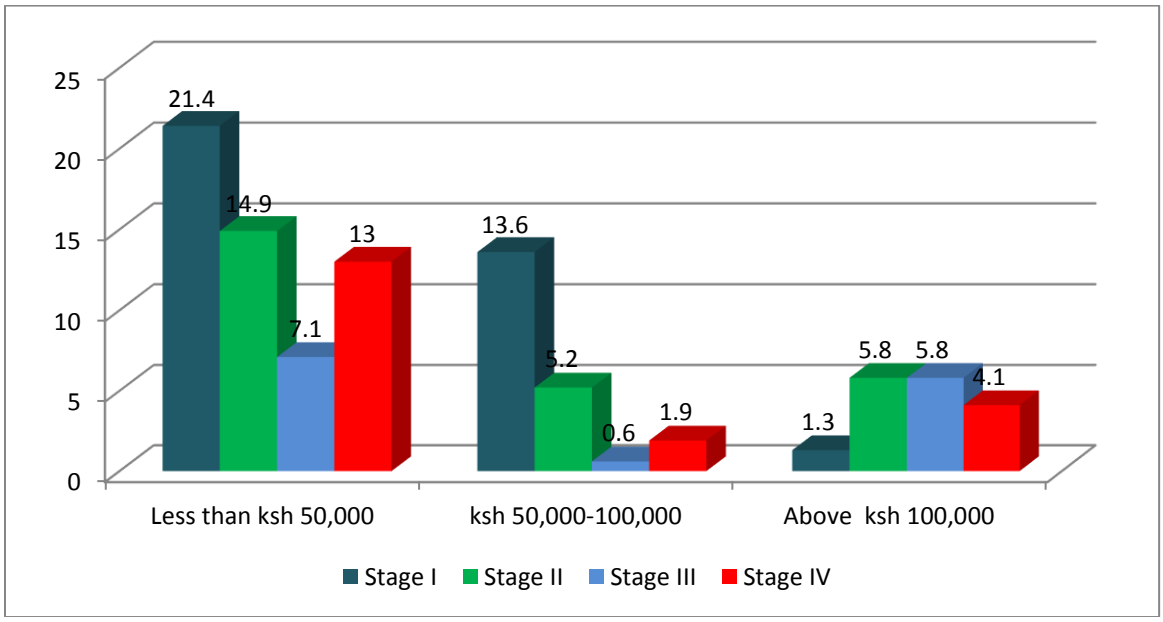

Figure 4.8: Patients Payment Method

Past studies for example, Ayanian and colleagues studied nearly 5,000 patients with cancer and found that patients who were uninsured or were significantly less likely to present at local stages of disease. Moreover, among patients with regional and distant disease, these same groups of pateints had approximately a 50% increase in the odds of dying from their disease as did privately insured patients, suggesting that under-insured patients received less optimal local or systemic treatment (Ayanian, 1993). Patients without private insurance have also been noted to receive surgery for non-small cell lung cancer less often than those privately insured (Greenberg et al, 1988), this supports the current study findings.

4.5 Association between health provider characteristics and use of standard protocol

Most of the respondents aged n=5, (38.5%) aged above 60 years implement the standard protocols in their daily routine with n2, (15.4%) who do not follow the standard protocols in their daily treatment. Also n=6, (46.2%) who are married do follow the standard protocols with most of them being Christians as compared to Muslims, also n=4(30.8%) who have experience of between 20-30 years as doctors follow the standard protocols with n=4, (30.8%) who have experience of above 10 years as urologist who follow the standard protocols as shown in table 4.16.

Table 4.16: Association between health provider characteristics and use of standard protocol

Variable	**Category**	**Use of standard protocol**		**Chi-square test**
		Use	**Not use**	
Age	40-50	1(7.7%)	1(7.7%)	χ^2 =36.325 DF=2 P=0.002
	50 -60	2(15.4%)	2(15.4%)	
	60 and above	5(38.5%)	2(15.4%)	
Marital status	Single	1(7.7%)	1(7.7%)	χ^2 =16.802 DF=6 P=0.00
	Married	6(46.2%)	3(23.1%)	
	Widower	1(7.7%)	1(7.7%)	
Religion	Muslim	3(23.1%)	1(7.7%)	χ^2 =7.132 DF=2 P=0.012
	Christian	5(38.5%)	4(30.8%)	
Experience as doctor	<20 years	2(15.4%)	2(15.4%)	χ^2 =13.702 DF=2 P=0.00
	21-30 years	4(30.8%)	3(23.1%)	
	>30 Years	2(15.4%)	-	
Experience as urologist	<10 years	4(30.8%)	4(30.8%)	χ^2 =37.163 DF=2 P=0.00
	>10 years	4(30.8%)	1(7.7%)	

Association between patient's characteristics and use of standard protocol

Relationship between Socio-demographic characteristics of prostate cancer patients and whether urologists used Standard protocols and from study findings n=66, (42.2%) of patients aged between 40-49 years, n=46, (29.9%) aged between 50-59 years and n=24, (15.3%) of the patients aged above 60 years agreed that urologists used standard protocols.

In relation to education n=92, (58.9%) with secondary and n=66, (42.3%) with college education agreed that the urologist used standard protocols. Also n=102, (65.4%) Christians compared to n=17, (10.9%0 Muslims agreed that the urologist used standard protocols in prostate cancer management.

Most of the married n=87, (55.7%) support that urologist used standard protocols and in regards to income n=74, (47.4%) of the patients earning less than kshs 50, 000 support that the urologist uses standard protocols as shown in table 4.17.

Table 4.17: Association between patient's characteristics and use of standard protocol

Independent Variable	Category	Protocol used
Age	40-49yrs	66, (42.2)
	50-59 yrs	46, (29.9)
	> 60 yrs	24, (15.3)
Education	No educ	12, (7.69)
	Pry level	13, (8.3)
	Sec level	92, (58.9)
	College/university	66, (42.3)
Religion	Christian	102, (65.4)
	Muslim	17, (10.9)
Marital status	Single	14, (8.97)
	Married	87, (55.7)
	Widowed	6, (3.8)
Income levels	Less than ksh 50, 000	74, (47.4)
	ksh 50, 000-100, 000	41, (26.3)
	Above ksh 100, (000	15, (9.6)

4.5 Regression analysis

The study model adopted was follows;

$Y=b_0 + b_1X_1+ b_2X_2 +b_3X_3+ \varepsilon$

Where:

Y= Dependent variable (Urologist care management)

X= Independent variables;

X_1 = Urologist characteristics

X_2 = Availability and usage of protocols

X_3 = Socioeconomic factors

ε = Error term

This table is important. The Adjusted R Square value tells us that the prostate cancer management or 12.2% of variance in the prostate cancer management is as result of Urologist characteristics, availability and usage of protocols and socioeconomic factors. These results are significant as explained by the F-ratio of 3.630 at a p-value =.004. According to Hair et al (2006) if the coefficient of the independent variables are really not all zero then the F-ration should be significantly greater than 1 and hence can be stated that Urologist characteristics, availability and usage of protocols and socioeconomic factors significantly influences prostate cancer management but the level of its influences is very minimal at 12.2% and thus should be improved for best prostate care management to be realized. The independent variables can be fitted in the study model and hence the multiple regression equation $Y=b_0 + b_1X_1+ b_2X_2 +b_3 X_3 + \varepsilon$, can be explained as $\gamma =0.112 + 0.136x_1 +0.141\ x_2 +0.048x_3 + 0.027$

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.349[a]	.122	.088	.101163844

a. Predictors: (Constant), Urologist characteristics, availability and usage of protocols and socioeconomic factors

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.186	5	.037	3.630	.004[a]
	Residual	1.341	151	.010		
	Total	1.526	156			

a. Predictors: (Constant), Urologist characteristics, availability and usage of protocols and socioeconomic factors

b. Dependent Variable: Urologist care management

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.112	.027		4.096	.000
	Urologist characteristics	.136	.079	.330	1.714	.007
	Availability and usage of protocols	.141	.106	.158	1.335	.001
	Socioeconomic factors	.048	.064	.122	.747	.004

a. Dependent Variable: prostate cancer care

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion.

In this study out of 18 urologist only 13 participated in the real study and 156 patients, most of them had 1st degree 84.6% Mbchb with only 15.2% Mbbs. The patients were categorized by stage of the cancer they presented with Stage I, 44.9%, Stage II 19.2%, Stage III, 14.1% and Stage IV, were 21.8% it was also revealed that most of the respondents 37.2% of the patients aged above 60 years, 35.9% aged between 51-59 years and 26.9% aged between 41-49 years. With majority of them 64.1% having secondary level of education and most of them 64.7%) pay their bills out of their pockets with only 12.8% who paid through medical insurance. This was mainly because of their income which most of them57.1% who were earning <kshs 50,000.

5.1.1 Availability type and usage of standard protocol

All the urologist have adopted standard protocols in their care, 38.5% had MOH protocol, 38.5% had WHO protocol, 23.0% had ICI protocol which support that urologists have adhered to either of the protocols.it was further revealed that 83.3% of the patients in stage I were under watchful waiting or active surveillance, 54.5%) under radical prostatectomy, 37.2% under External-beam radiation therapy (EBRT). Those in stage II 37.2% were watchful waiting or active surveillance, 25.6% were under, radical prostatectomy, external-beam radiation therapy (EBRT) and hormonal therapy respectively. Also those in stage III, 13.5% were under external-beam radiation therapy (EBRT) with or without hormonal therapy, hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist), radical prostatectomy with or without EBRT and Watchful waiting or active surveillance respectively while those at stage IV 24.4% of the patients were under ; hormonal manipulations, bisphosphonates, external-beam radiation therapy (EBRT) with or without hormonal therapy, palliative

radiation therapy, Palliative surgery with transurethral resection of the prostate (TURP)and Watchful waiting or active surveillance.

Some studies have also investigated the effect of obesity on PSA, reporting lower PSA levels in obese men; however such studies are scarce, Gray et al.(2004). A recent study by Werny *et al* in (2011) investigated the association of adiposity with PSA, using BMI and waist circumference as measures of adipositz. The results were consistent with previous studies, with negative trends between PSA and the adiposity measures. Lower PSA values in obese men could have an impact of the sensitivity of the test when used for diagnosis, as tumours in such men may go undetected leading to poorer prognosis. More research on the link between PSA and obesity is required to fully understand the interaction.

PSA is a protein produced by the cells of the prostate gland. PSA is present in small quantities in the serum of men with healthy prostates, but is often elevated in the presence of prostate cancer and in other prostate disorders. Rising levels of PSA over time are associated with both localized and metastatic prostate cancer (Andriole *et al.*, 2009), this supports the reason why all patients have received PSA levels of diagnosis.

In developed countries, screening for PSA has led to early detection and management of the disease. However, in developing countries particularly in Africa, routine screening has remained low, leading to reduced detection rates, poor management and increased mortality from the disease (Ajape *et al.*, 2009). Recent studies in Ghana among 196 men visiting the outpatient Department of Komfo Anokye Teaching Hospital showed that 83.6% had elevated PSA levels and 95.5% had prostate cancer (Rebbeck *et al.*, 2013). Additional studies on 156 Nigerian men showed a lack of awareness on prostate cancer, prostate cancer screening and serum PSA test for screening (Ajape *et al.*, 2009). Studies in Kenya on 108 patients established associations between high levels of PSA and increased rates of prostate cancer in biopsy samples (Ngugi & Byakika, 2007). In addition, (Magoha & Ngumi, 2000) suggested that early diagnosis is pre-requisite for

effective therapy of prostate cancer. Moreover, the present screening techniques including DRE, PSA, transrectal ultrasound (TRUS) and random ultrasonically guided multiple prostatic biopsies can detect some potentially curable asymptomatic localized cancers (Zeigler-Johnson *et al.*, 2008). A review by (Ngugi & Magoha, 2007)) also indicated that increased detection of early prostate cancer is due to widespread use of PSA screening in the world.

5.1.2 Association of Urologist Characteristics with usage of Standard Clinical Protocols

The patients in relation to age all the urologist under all age categories undertook PSA and Physical examinations for their patients under all stages. Most of those aged between 40-50 have at least 7.7% of the patients with most of them in stage I of treatment. For those aged between 50-60 years they have 28.6% patients, with most of their patients 29.1% in stage I and under watchful waiting and surveillance. With thoseurologist over 60 years most of their patients 62.2% were in stage I but under Interstitial implantation of radioisotopes. In relation to their religion, the Christians urologists 69.2% had 74.4% patients most whom 76.2% were in stage I and under watchful waiting or active surveillance while 30.8% of the urologists were Muslims with 25.6% of patients and most of this patients 23.8% in stage I and watchful waiting or active surveillance.

It was also revealed that 15.4% of the urologists 8.5% of their patients under watchful waiting or active surveillance and in stage I of treatment, 69.2% of the urologist were married with 78.8% patients while 15.4% widowed and with only 13.5% patients with most of them having patients in stage I and under watchful waiting or active surveillance. Results further showed that 30.8% of the urologists have experience of less than 20 years with 26.9% patients, those with 21-30 years of experience as a doctor were 53.8% and had 62.2% of the patients and those with above 30 years of experience were 15.4%, with 10.9% of the patients, all of the urologist regardless of their experience have undertaken PSA and physical examination on their patients and majority of their patients were in stage I of treatment and under watchful waiting or active surveillance.

Relationship between urologist experience as urologist and protocols revealed that 61.5% of the urologists have less than 10 years of experience and 51.9% patients; most of the urologists 38.5% had ten years of experience and have 48.1% patients. Most the urologists have patients under watchful waiting or active surveillance which is stage I of treatment. About their income those urologist who earn kshs 200,000 and 300,000 were 53.8% and have 57.1% of the total patients, those who earn between ksh 300,000-500,000 were15.4% of the urologists and have 21.2% of the total number of patients patients while those who earn above kshs 500,000 were 30.8% of the urologists and have 21.8% of the total number of patients. It was also revealed that despite of their income the urologists patients most of them were in stage I of treatment which was watchful waiting or active surveillance except for those earning above kshs 500,00 where most of the patients 21.2% were under External-beam radiation therapy (EBRT).

5.1.3 Association of Patients Socio-economic and Care

The survey results revealed that most of the patients who were aged between 40-50 years 26.9% of the total number of patients with most of them 10.4%, those aged 50-60 years being 35.9% of the patients with 17.5% of this patients in stage I of treatment and most of those aged above 60 years were 35.9% of the patients and 18.4% of them being in stage I of treatment. It was also indicated that 28.8% of the patients were single with 13% of them in stage I of treatment, 55.8% of the patients were married with those married with 18.8% in stage I while only 15.4% of the patients widowed and 7.1% of them in stage II of treatment. This implies that most of the patients were in stage I of treatment and all of them had either PSA, DRE or Biopsy tests done.

Patient treatment decision making incorporates physician recommendations and estimated likelihood of cancer progression without treatment, as well as treatment-related convenience, costs, and potential for eradication and adverse effects). Patient's characteristics including race/ethnicity, age, education, marital status and household income.

The burden of cancer is increasing in Africa because of the aging and growth of the population as well as increased prevalence of risk factors associated with economic transition, including smoking, obesity, physical inactivity, and reproductive behaviors. According to United Nation's population estimates,2 the population of Africa between 2010 and 2030 is ed to increase by 50% overall (from 1.03 billion to 1.52 billion) and by 90% for those aged >60 years (from 55 million to 105 million), the age at which cancer most frequently occurs, Glynn et al (2010).

Age is one of the strongest risk factors for the disease. It is more common in men over the age of 65, representing approximately 85% of all cases diagnosed. It has a much lower incidence in men younger than 50 (less than 0.1% of cases) (58). The introduction of PSA testing in the early nineties caused the incidence of prostate cancer in men aged 50-59 years to rise to 50%, which was a dramatic increase. However, Evidence suggests that the PSA test does not have the required characteristics to be used as a widespread screening test for prostate cancer (Holmström 2009). If the PSA test is to be used as a screening tool, greater evidence is needed to establish cut-off values for 'negative' and 'positive' test results to ensure that patients do not undergo unnecessary invasive investigations and, similarly, are able to be referred for further investigations when warranted. A systematic review of diagnostic test accuracy synthesizing the current evidence would greatly inform the broader understanding of the PSA test, its characteristics and its value as a screening and diagnostic tool. Whilst the PSA test may be prostate-specific, it is not specific to prostate cancer. Therefore, continued research into alternative prostate-specific markers is required.

Previous prostate cancer histological studies following prostatectomy and ultrasound guided needle biopsy by (Ngugi & Byakika, 2007)) involving 108 patients aged 48-83 years at the Kenyatta national hospital, the Nairobi hospital and Upper Hill medical Centre illustrated that 76% of the patients had prostate hyperplasia and 26% presented

with prostate cancer. These findings suggest that prostate cancer is common in men above 40 years of age in Kenya.

Previous studies in United States indicated that patterns of change for all screening modalities for cancer differed by age, gender, racial and ethnic background, but prevalence of use within recommended time intervals, was consistently lower among groups with less education and hence lower knowledge levels (Breen, Wagener, Brown, Davis, & Ballard-Barbash, 2001). Accordingly, promoting dissemination of information on prostate cancer can improve perceptions on the disease, leading to enhanced uptake of screening for early detection, this support this findings because most of the patients at stage I treatment had secondary school education.

Once a patient has been diagnosed with a prostate tumour, the cancer must be staged to determine if it has spread beyond the prostate. Staging also provides a better insight into the risk of the disease spreading further so the correct treatment option is selected There are four stages; in stage I only a small part of the prostate is cancerous, most of the cells are normal and the gland feels normal. In stage II, a lump can be felt in the prostate to the examining finger and a larger part of the prostate is affected. In stage III, the tumour has spread beyond the prostate and in stage IV; it has spread to lymph nodes or nearby organs.

Radical prostatectomy surgery is the removal of the prostate gland and any surrounding cancerous tissue. This is usually a good treatment option for patients whose cancer has not yet spread outside the prostate (stages I and II) Stewart and Freedland (2010). It can be achieved by either open surgery or laparoscopic surgery. In open surgery, the surgeon will make a small incision either in the groin (perineal approach) or in the lower abdomen (retropubic approach). The retropubic approach is the most common method for treating prostate cancer; however the recovery time is longer compared with the perineal approach.

Radical prostatectomy is very effective in the treatment of early stage cancer. With the prostate removed and if the cancer has not spread, PSA levels can drop to zero. A recent randomized controlled trial by Bill-Axelson *et* al (2011*)* reported radical prostatectomy was associated with a reduction in the rate of death from prostate cancer, as well as a reduced risk of metastases compared to the watchful waiting or active surveillance group. However in some cases the tumour cannot be completely removed and disease can recur. Adverse effects of radical prostatectomy usually occur within 30 days of surgery and include erectile dysfunction and urinary incontinence. These effects can either be short (resolved within 90 days) or long term (continuing for up to 12 months after surgery). As it is major surgery, additional general surgery risks exist such as blood clots, reactions to anaesthesia, blood loss and infection of the wound.

Prostate cancer is accepted as an important health problem; however, uncertainty exists over the effectiveness of diagnostic tests and treatments available. Much debate exists about use of the PSA test and the implications of potential false-positive and false-negative results. Similarly, although various treatments for prostate cancer are available (for example watchful waiting, radical prostatectomy, hormone and radiotherapy), high quality evidence is still developing (Bill-Axelson 2011; Wilt 2012).

The second treatment option is radiotherapy. In conformal radiotherapy (CRT), the high energy x-rays are carefully shaped to match the shape of the prostate gland, focussing only on the affected area and protecting surrounding tissue. Intensity modulated radiotherapy (IMRT) allows radiation to be adjusted around the target to protect adjacent organs Syed et al. (2002).

For men affected by small low grade tumours, active surveillance is often a preferable initial treatment option. It involves the close monitoring of patients with the intention of avoiding unnecessary treatment until disease progression occurs or until the patient requests treatment Walsh (2004). Not all patients are able to live comfortably with an untreated tumour. A major disadvantage of the active surveillance strategy is the presence

of an undetected larger or higher grade tumour that might have been missed at the time of biopsy. In terms of adverse effects, patients undergoing active surveillance often develop erectile dysfunction and urinary obstruction at the same rate as age matched men without prostate cancer in the general population.

The education of patients was also found to prerequisite in care and the only 3.2% of them having no education, and all of this patients without education were under; Watchful waiting or active surveillance, Radical prostatectomy, External-beam radiation therapy (EBRT) and also Interstitial implantation of radioisotopes. Those with primary level of education were 14.7%, 64.1% secondary and 16.7% college and 1.3% university, most of this patients regardless of their education were in stage I of treatment and under watchful waiting or active surveillance. In regards to the income and care, those patients earning Less than ksh 50,000 were 57.1%, and most of them 21.4% were in stage I of treatment, those who were earning ksh 50,000-100,000 were 21.2% with most of them 31.6% in stage I of treatment while those earning Above ksh 100,000 were 21.8% and regardless of their income most of the patients were in stage I and majority of them were still under Watchful waiting or active surveillance.

5.2 Conclusion

The common clinical protocols in selected clinics in Nairobi County are the WHO, MOH and International protocols of management. It was revealed that there is a relationship between the patient age and that of the urologist; this could be because of other factors such as ease of conversation and culture. Religion was also found to correlate with patient seeking prostate cancer care, those of Christianity background preferred those of same religion with the same applying to their Muslim counterparts.

In relation to the doctors experience, the patients with higher income were likely were more likely to go for the urologist with many years of experience this was supported findings which indicated that it affected the patients urologist care and management.

In relation to urologist monthly income, it was indicated that patients were more likely to go for the urologist with minimal income which translates to affordable fees for them since their income determines their urology care. It was found that the urologist care was dictated by the patient household income which influences their urologist either those with high salary or those with minimal salary.

Patients with medical insurance cover were more likely to visit urologist with highest monthly income as compared to those who pay from their pockets or combination of both. This could be because their medical cover allows them to afford the highest urologist.

The income of the patient and the urologist was found to correlate those with minimal household income were more likely to visit the urologist with minimum monthly salary unlike those with high household income who can seek services of urologist who charge high fees.

Most of the prostate cancer patients were above age of 40 years, married, Christians and earn less than Kshs 50,000 and with average weight of 61.8kgs, with all the patients PSA levels at diagnosis and also physical exam done. Most of the patients were still under stage I, treatments and as the stages increases the number of patient’s decreases and the age of the patients’ increases with level of treatment.

5.3 Recommendations

This study was limited to patients seeking prostate cancer care at selected Urological clinics in Nairobi County and thus the following recommendations were made based on the study findings;

From the interviews with the doctors agreed that they have the WHO and MOH protocols but there were not fully adhered to and thus there is need to ensure that they protocols are followed during the prostate cancer management since they could improve the health the patient and management of cancer process

Factors such as the religion, experience, the monthly income and household income influences the patients seeking care in urology clinics and thus there is need to ensure that patients are capable of seeking this care without being hindered by this factors. This could be done through offering medical insurance to employees and subsidizing the costs of the urology clinics by government

The age, household income, education of the patients are some of the socio-demographic factors influencing their visit to urology clinics, therefore, there is need to carry out sensitization to inform people, advice the aged in the community to seek frequent medical check for prostate cancer and also government can ensure that patients from low income households are not charged the same as those who are employed to ensure equity and accessibility of the services in the urology clinics in the country.

Expand prostate cancer research to other Kenyan regions especially at county level to identify the unique factors influencing uptake of prostate cancer screening and care to formulate relevant and specific targeted interventions for the disease.

References

Ajape, A. A., Babata, A., & Abiola, O. O. (2009). *Knowledge of prostate cancer screening among native African urban population in Nigeria*. *Nig Q J Hosp Med, 19*(3), 145- 147.

Ajape, A. A., Ibrahim, K. O., Fakeye, J. A., & Abiola, O. O. (2010). *An overview of cancer of the prostate diagnosis and management in Nigeria*: *the experience in a Nigerian tertiary hospital.* *Ann Afr Med*, *9*(3), 113-117.

American Cancer Society (2009).*Cancer Facts and Figures 2009*. Atlanta: American CancerSociety.Availableonline:http://www.cancer.org/acs/groups/content/@nho/documents/document/500809.

Andriole, G. L., Crawford, E. D., Grubb, R. L., 3rd, Buys, S. S., Chia, D., Church, T. R., *et al.* (2009). *Mortality results from a randomized prostate-cancer screening trial*. *N Engl J Med, 360*(13), 1310-1319.

Bill-Axelson A, Holmberg L, Ruutu M, Garmo H, Stark JR, Busch C, et al. (2011). *Radical prostatectomy versus watchful waiting in early prostate cancer.* N Engl J Med. May 5;364(18):1708-17.

Chow E, Harris K, Fan G,(2007) :*Palliative radiotherapy trials for bone metastases*: a systematic review. Journal of Clinical Oncology 25 (11) : 1423-36 .

Crook JM, O'Callaghan CJ, Duncan G,(2012) .: *Intermittent androgen suppression for rising PSA level after radiotherapy*. N Engl J Med 367 (10): 895-903,

Devita, Hellman, and Rosenberg's Cancer(2013): *Principles and Practice of Oncology*, 8th ed., vol. 1, pp. 1392-1452. Philadelphia: Lippincott Williams and Wilkins.

Fizazi K, Carducci M, Smith M,(2011) :*Denosumab versus zoledronic acid for treatment of bone metastases in men with castration-resistant prostate cancer*: a randomised, double-blind study. Lancet 377 (9768): 813-22.

Glynn T, Seffrin JR, Brawley OW, Grey N, Ross H. (2010). *The globalization of tobacco use: 21 challenges for the 21st century*. CA Cancer J Clin. 2010;60:50-61.

Gray MA, Delahunt B, Fowles JR, Weinstein P, Cookes RR, Nacey JN.(2004). Demographic and clinical factors as determinants of serum levels of prostate specific antigen and its derivatives. Anticancer Res. May-Jun;24(3b):2069-72.

Holmström B, Johansson M, Bergh A, Stenman U-H, Hallmans G, Stattin P. (2009)Prostate specific antigen for early detection of prostate cancer: longitudinal study. *BMJ* 2009;339:b3537.

Kaasa S, Brenne E, Lund JA, (2006):*Prospective randomised multicenter trial on single fraction radiotherapy (8 Gy x 1) versus multiple fractions (3 Gy x 10) in the treatment of painful bone metastases*. RadiotherOncol 79 (3): 278-84.

Magoha, G. A., & Ngumi, Z. W. (2000). *Cancer of the penis at Kenyatta National Hospital*. *East Afr Med J, 77*(10), 526-530.

Ministry of Health (2011)*Kenya national cancer control strategy handbook*: Division of Reproductive health.

Ngugi PM, Magoha GA (2007) '*Management of early prostate cancer'*, East African Medical Journal 84 (9) S24-30

Ngugi, P. M., & Byakika, B. (2007). *Histology of specimens taken by prostatectomy and needle biopsy*. *East Afr Med J, 84*(8), 363-366. Ngugi, P. M., & Magoha, G. A. (2007). The management of early prostate cancer: a review. *East Afr Med J, 84*(9 Suppl), S24-30.

Rebbeck, T. R., Devesa, S. S., Chang, B. L., Bunker, C. H., Cheng, I., Cooney, K., *et al.* (2013). *Global patterns of prostate cancer incidence, aggressiveness, and mortality in men of African descent*. *Prostate Cancer, 2013*, 560857.

Ryan CJ, Smith MR, de Bono JS,(2013) :*Abiraterone in metastatic prostate cancer without previous chemotherapy*. N Engl J Med 368 (2): 138-48.

Saad F, Gleason DM, Murray R,(2004) :*Long-term efficacy of zoledronic acid for the prevention of skeletal complications in patients with metastatic hormone-refractory prostate cancer*. J Natl Cancer Inst 96 (11): 879-82.

Stewart SB, Freedland SJ (2010). *Influence of obesity on the incidence and treatment of genitourinary malignancies*. Urol Oncol. Dec 11.

Syed AM Puthawala A, Austin P, Cherlow J, Perley J, Tansey L, et al. (2002). *Temporary iridium-192 implant in the management of carcinoma of the prostate*. *Cancer.* May 15;69(10):2515-24.

U.S. Preventive Services Task Force (2008).*Screening for Prostate Cancer: Clinical Summary of a U.S. Preventive Services Task Force Recommendation*. Rockville, MD: Agency for Healthcare Research and Quality. Available online: http://www.ahrq.gov/clinic/uspstf08/prostate/prostaters.htm.

Walsh PC, Mostwin JL (2004). *Radical prostatectomy and cystoprostatectomy with preservation of potency. Results using a new nerve-sparing technique*. Br J Urol. Dec;56(6):694-7.

Wasike R.&W,Magoha GA (2007) '*Descriptive case series of patients presenting with prostate cancerand their management*at KNH Nairobi; 84 (9) S31-35

Werny DM, Thompson T, Saraiya M, Freedman D, Kottiri BJ, German RR, et al. (2011) *Obesity is negatively associated with prostate-specific antigen in U.S. men, 2001 2004. aCancer Epidemiol Biomarkers Prev*. Jan;16(1):70-6.

Wilt T, Brawer M, Jones K, Barry M, Aronson W, Fox S, et al(2012).Radical prostatectomy versus observation for localized prostate cancer. *The New England Journal of Medicine* 2012; 367:203–13.

APPENDICES

Appendix I: Work Plan for the study

A C T I V I T Y	Nov 13	Dec 13	D e c 1 4	April 15	July 15
PROJECT WRITING					
PROJECT DEFENSE					
DATA COLLECTION					
DATA ANALYSIS					
REPORT WRITTING					
THESIS DEFENSE					

Appendices II: Budget

Activity	**Items**	**Cost (Ksh)**
Consolidation of literature ,designing and developing research project and research instruments	Library research,printing of research project and research instruments	6500
Data collectors	daily allowances	**15,000**
Finalizing instruments	160 copies	**10,000**
Data analysis	1 statistician	**30,000**
Report writing	Professional editing	**10,500**
Total	….	**72,000**

Appendix III: Consent Form

Introduction

Am a masters student at Kenyatta University, and I am doing a research on care of prostate cancer patients in selected Urology clinics in Nairobi County. I am going to give you information and invite you to be part of this research.

There may be some words that you do not understand. Please ask me to stop as we go through the information and I will take time to explain. If you have questions later, you can ask me.

Purpose of the research

Prostate cancer is a malignant neoplasm of the prostate gland in the male reproductive system. It is increasingly becoming an important reproductive health burden in men globally and particularly in Kenya. . The reason I am doing this research is to find out the determinants of care in prostate cancer management.

Type of Research Intervention

This research will involve filling in a questionnaire only.

Participant selection

I am inviting all adults' males attending urology clinics with prostate cancer to participate in the research.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. Whether you choose to participate or not, all the services you receive at this clinic will continue and nothing will change. If you choose not to participate in this research, you will be offered the treatment that is routinely offered in this clinic for prostate cancer. You may change your mind later and stop participating even if you agreed earlier.

Procedures and Protocol

There will be no additional test that will be done as a result of participating and the research will not influence the treatment options that you are currently on. You will only be required to answer a few questions in the questionnaire and I will check your file for values of the test already done if any.

Risks and Benefits

There is no documented risk of participating in this study and there may not be any benefit for you but your participation is likely to help us find the answer to the research question. There may not be any benefit to the society at this stage of the research, but future generations are likely to benefit.

Confidentiality

With this research, something out of the ordinary is being done in our community. It is possible that if others in the community are aware that you are participating, they may ask you questions. We will not be sharing the identity of those participating in the research.

The information that we collect from this research will be kept confidential. Information about you that will be collected during the research will be used for research purposes only and no-one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researcher will know what your number is and will destroy the questionnaires after report writing.

Right to Refuse or Withdraw

You do not have to take part in this research if you do not wish to do so and refusing to participate will not affect your treatment at this clinic in any way. You will still have all the benefits that you would otherwise have at this clinic. You may stop participating in the research at any time that you wish without losing any of your rights as a patient here. Your treatment at this clinic will not be affected in any way.

Who to Contact

This project has been reviewed and approved by Kenyatta University Ethics Review committee, which is a committee whose task it is to make sure that research participants are protected from harm. If you wish to find about more about the K.U Ethics Review Committee, contact ethics@ku.ac.ke

Declaration

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Participants signature……..

Appendix IV: Tool of Data Collection

Patient code…… urology clinic code……..

INSTRUCTIONS **Serial No.:**

_____

Please tick (✓) in the boxes representing the most appropriate response. Comment can also be made in appropriate spaces provided.

SECTION I

1. How old are you? [ ] 40-50 [ ] 50 -60 [ ] 60 and above[ ]
2. What is your marital status?

   Single [ ] Married [ ] Widower [ ]

   Divorced [ ] Separated [ ]
3. What is your Religion?

   Christian [ ] Muslim [ ] Buddhist [ ]

   Others……
4. What is your highest level of education?

   None [ ] Primary [ ] Secondary [ ]

   College [ ] University [ ]
5. How do you pay for your health care?

   Medical insurance cover [ ] self out of pocket [ ] Both [ ]
6. What is your current household income per month in ksh?

Less than ksh 50,000 [ ] ksh 50,000-100,000 [ ]

Above ksh 100,000 [ ]

SECTION II

Bio-physiological measurements

1. Weight in Kgs ? [ ]
2. PSA levels at diagnosis done YES [ ] NO [ ]
3. Physical exam done YES [ ] NO [ ]
4. Tumor stage [ ]

SECTION III

Treatment modalities

1. **What treatment are you on? (tick where appropriate)**

STAGE I

- Watchful waiting or active surveillance. [ ]
- Radical prostatectomy. [ ]
- External-beam radiation therapy (EBRT). [ ]
- Interstitial implantation of radioisotopes [ ]

STAGE II

- Watchful waiting or active surveillance. [ ]
- Radical prostatectomy. [ ]
- External-beam radiation therapy (EBRT) [ ]

- Hormonal therapy. [ ]

STAGE III

- External-beam radiation therapy (EBRT) with or without hormonal therapy. [ ]
- Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist). [ ]
- Radical prostatectomy with or without EBRT. [ ]
- Watchful waiting or active surveillance [ ]

STAGE IV.

- Hormonal manipulations. [ ]
- Bisphosphonates. [ ]
- External-beam radiation therapy (EBRT) with or without hormonal therapy. [ ]
- Palliative radiation therapy. [ ]
- Palliative surgery with transurethral resection of the prostate (TURP). [ ]
- Watchful waiting or active surveillance. [ ]

5. Is the treatment affordable YES [ ] NO [ ]

6. Do you get all these treatment modalities in the same facility?

   YES [ ] NO [ ]

Appendix V: Urologist questionnaire

1. What is your age? [ ]
2. Experience in years [ ]
3. Have you undertaken any continuing professional development (CPD) activity in the last 12 months? YES [ ] NO [ ]
4. Why did you undertake this activity? Please tick all the boxes that apply.

   Personal interest [ ]

   Identified on a Personal Development Plan (PDP) [ ]

   Linked to a service objective [ ]
5. Do you partner with an oncologist in the management of prostate cancer patients? YES [ ] NO [ ]
7. Do you have any prostate cancer management protocol ?

   YES [ ] NO [ ]
6. If yes which one? WHO Guidelines [ ] MOH [ ] International cancer Institute [ ]
7. What is your level of income per month in ksh?

   Ksh 200,000-300,000 [ ] ksh 300,000-500,000 [ ]

   Above ksh 500,000 [ ]

Appendix 5: Map of Nairobi County

Appendix VI: Findings in Tables

Table 4.3: Usage of Protocols

Urologist	Patients	Patients stages	Protocols/ Diagnosis/ Treatment/ Follow up	Response
Urologist A	No of Patients 28 (17.9%)	**STAGES** Stage I 24 (15.4%) Stage II 4 (2.6%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **FOLLOW UP** Referred Followed up to oncologists	MOH 28, (17.9%) 28,(17.9%) 24, (18.5%) 14, (9.0%) 14, (9.0%) 9, (5.8%) 14, (9.0%) 14, (9.0%) 14, (9.0%) 9, (5.8%) 4, (14.28%) 4, (14.28%)

Urologist B	No of Patients 11 (7.1%)	Stage I 2, (1.3%) Stage III 6, (3.8%) Stage IV 3, (1.9%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostectomy without EBRT Watchful waiting or active surveillance **FOLLOW UP** Referred Followed up to oncologists	WHO 11, (7.1%) 11, (7.1%) 1(0.6%) 1(0.6%) 6, (3.8%) 6, (3.8%) 6, (3.8%) 2, (18.18%) 2, (18.18%)
Urologist C	No of Patients 7, (4.5%)	Stage I 6, (3.8%) Stage IV 1, (0.6%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage IV**	WHO 7, (4.5%) 7, (4.5%) 5, (3.8%) 5, (3.2%) 5, (3.2%)

			Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **FOLLOW UP** Referred Followed up to oncologists	4, (2.6%) 24, (18.5%) 14, (9.0%) 1, (14.28%) 1, (14.28%)
Urologist D	No of Patients 18, (11.5%)	Stage I n = 12, (7.7%) Stage II 4, (2.6%) Stage III 1 (0.6%) Stage IV 1, (0.6%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostectomy without EBRT Watchful waiting or active surveillance	WHO 18, (11.5%) 18, (11.5%) 14, (10.8%) 12, (7.7%) 12, (7.7%) 9, (5.8%) 1, (0.6%) 1, (0.6%) 1, (0.6%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 2, (1.3%)

			Stage IV	
			Hormonal manipulation	2, (1.3%)
			Bisphosphonates	2, (1.3%)
			External; radiation EBRT	2, (1.3%)
			Palliative therapy	2(1.3%)
			Palliative surgery	2, (1.3%)
			Watchful waiting or active surveillance	2, (1.3%)
			FOLLOW UP	
			Referred	2, (1.3%)
			Followed up to oncologists	2, (1.3%)
Urologist E	No of Patients 12, (7.7%)	Stage III 5, (3.2%)	**Protocols**	ICI
			DIAGNOSIS	
		Stage IV 7, (4.5%)	PSA;	12, (7.7%)
			Physical exam;	12, (7.7%)
			TREATMENT	
			Stage III	
			EBRT with or without hormonal therapy ;	5(3.2%)
			LH-RH;	5, (3.2%)
			Radical prostectomy without EBRT	5, (3.2%)
			Watchful waiting or active surveillance	5, (3.2%)
			Stage IV	
			Homonal manipulation	8, (5.1%)
			Bisphosphonates	7, (4.5%)
			External; radiation EBRT	7, (4.5%)
			Palliative therapy	7, (4.5%)
			Palliative surgery	7, (4.5%)
			Watchful waiting or active surveillance	7, (4.5%)
			FOLLOW UP	

			Referred Followed up to oncologists	1, (8.33%) 1, (8.33%)
Urologist F	No of Patients 10 (6.4%)	Stage I 9(5.8%) Stage II 1(0.6%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **FOLLOW UP** Referred Followed up to oncologists	ICI 10, (6.4%) 10, (6.4%) 8(6.2%) 8(5.1%) 8(5.1%) 6(3.8%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 0, (0.00%) None none
Urologist G	No of Patients 11 (7.1%)	Stage I 5, (3.2%) Stage II 6, (3.8%)	**Protocols** **DIAGNOSIS** PSA; Physical exam;	MOH 1 (7.1%) 11, (7.1%)

			TREATMENT **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **FOLLOW UP** Referred Followed up to oncologists	 6(4.6%) 5(3.2%) 5(3.2%) 3(1.9%) 6, (3.8%) 6, (3.8%) 6, (3.8%) 0, (0.00%) 2, (18.18%) 2, (18.18%)
Urologist H	No of Patients 10 (6.4%)	Stage III 4 (2.6%) Stage IV 6(3.8%)	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostectomy without EBRT Watchful waiting or active surveillance **Stage IV** Homonal manipulation Bisphosphonates External; radiation EBRT Palliative therapy	ICI 10, (6.4%) 10, (6.4%) 4, (2.6%) 4, (2.6%) 4, (2.6%) 4, (2.6%) 7,(4.5%) 6, (3.8%) 6, (3.8%)

			Palliative surgery Watchful waiting or active surveillance **FOLLOW UP** Referred Followed up to oncologists	6, (3.8%) 6, (3.8%) 6, (3.8%) 2, (20.0%) 2, (20.0%)
Urologist I	No of Patients 5 (3.2%)	Stage I 3 (1.9%) Stage II 2(1.3%)	**Protocols** **DIAGNOSIS** **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **FOLLOW UP** Referred Followed up to oncologists	MOH PSA; 5, (3.2%) Physical exam; 5, (3.2%) 4, (3.1%) 3, (1.9%) 3, (1.9%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 0, (0.00%) 2, (40%) 2, (40%)
Urologist J	No of Patients 8 (5.1%)	Stage II 1(0.6%) Stage III 2(1.3%) Stage IV 5(3.2%	**Protocols** **DIAGNOSIS** PSA; Physical exam;	WHO 8, (5.1%) 8, (5.1%)

			TREATMENT **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostatectomy without EBRT Watchful waiting or active surveillance **Stage IV** Hormonal manipulation Bisphosphonates External; radiation EBRT Palliative therapy Palliative surgery Watchful waiting or active surveillance **FOLLOW UP** Referred Followed up to oncologists	 1, (0.6%) 1, (0.6%) 1, (0.6%) 0, (0.00%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 2, (1.3%) 0, (0.00%) 0, (0.00%) 0, (0.00%) 5, (3.8%) 5, (3.8%) 5, (3.8%) 2, (25%) 1, (12.50%)
Urologist K	No of Patients 9 (5.8%)	Stage III 1 (0.6%) Stage IV 8(5.1%	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostatectomy without EBRT	MOH 9, (5.8%) 9, (5.8%) 1, (0.6%) 1, (0.6%) 1, (0.6%)

			Watchful waiting or active surveillance	1, (0.6%)
			Stage IV	
			Hormonal manipulation	5, (3.2%)
			Bisphosphonates	5, (3.2%)
			External; radiation EBRT Palliative therapy Palliative surgery	5, (3.2%)
			Watchful waiting or active surveillance	6, (3.8%)
			FOLLOW UP	
			Referred	3, (3.3%)
			Followed up to oncologists	2 (22.2%)
Urologist L	No of Patients 9(5.8%)	Stage I 2(1.3%) Stage II 4(2.6%)	**Protocols**	= MOH
			DIAGNOSIS	
			PSA;	9, (5.8%)
			Physical exam;	9, (5.8%)
			TREATMENT	
			Stage I	
			Watchful Waiting or active surveillance ;	
			Radical Prostatectomy;	4, (3.1%)
			EBRT;	3, (1.9%)
			Intestinal implantation	3, (1.9%)
				2, (1.3%)
			Stage II	
			Watchful Waiting or active surveillance ;	3, (1.9%)
			Radical Prostatectomy;	3, (1.9%)
			EBRT;	3, (1.9%)
			Hormonal therapy	0, (0.00%)
			FOLLOW UP	
			Referred	2, (22.2%)
			Followed up to oncologists	2, (22.2%)

Urologist M	No of Patients 18(11.5%)	Stage I 7(4.5%) Stage II 8 (5.1%) Stage III 3(1.9%	**Protocols** **DIAGNOSIS** PSA; Physical exam; **TREATMENT** **Stage I** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Intestinal implantation **Stage II** Watchful Waiting or active surveillance ; Radical Prostatectomy; EBRT; Hormonal therapy **Stage III** EBRT with or without hormonal therapy ; LH-RH; Radical prostatectomy without EBRT Watchful waiting or active surveillance **FOLLOW UP** Referred Followed up to oncologists	MOH 18, (11.5%) 18, (11.5%) 8, (6.2%) 8, (6.2%) 8, (6.2%) 5,(3.2%) 7, (4.5%) 7, (4.5%) 7, (4.5%) 0, (0.00%) 3, (1.9%) 3, (1.9%) 3, (1.9%) 3, (1.9%) 4, (22.22%) 2, (11.11%)

The responses were presented in number (n) and proportions percentages (%)

Table 4.5: Age of Urologist and Protocols

Urologist		Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square Test
Age	**No.**	**No of Patients**	**STAGES**		**DIAGNOSIS**		**Protocols**		
40-50	2(14.3)	n=12(7.7%)	I	8(5.2)	PSA	12 (7.7)	Watchful waiting or active surveillance	11(8.5)	
					physical exam	12 (7.7)	Radical prostatectomy	8(5.1)	
							External-beam radiation therapy (EBRT)		
			II	3(1.9)			Interstitial implantation of radioisotopes	8(5.1)	X^2=13.532 DF=6 P=.035
							Watchful waiting or active surveillance	3(1.9)	
			IV	1(0.6)			Radical prostatectomy	9(5.8)	
							External-beam radiation therapy (EBRT)	3(1.9)	

50 -60	4(28.6)	47(30.1)	I	19(12.3)	PSA	47 (30.1%)	Watchful waiting or active surveillance	38(29.2)	
					physical exam	47 (30.1%)	Radical prostatectomy	32(20.5)	
			II	6(3.9)			External-beam radiation therapy (EBRT)	20(12.8)	
							Interstitial implantation of radioisotopes	15(9.6)	
							Watchful waiting or active surveillance	6(3.8)	
							Radical prostatectomy	6(3.8)	
							External-beam radiation therapy (EBRT)	6(3.8)	
			III	6(3.9)			External-beam radiation therapy (EBRT) with or without hormonal therapy	6(3.8)	
			IV	15(9.7)			Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	6(3.8)	
							Radical prostatectomy with or without EBRT	6(3.8)	
							Watchful waiting or active surveillance	6(3.8)	
							Hormonal manipulations	16(10.3)	
							Bisphosphonates	14(9.0)	
							External-beam radiation therapy (EBRT) with or without hormonal therapy	14(9.0)	

60 and above	7(50)	97(62.2)	I II III IV	29(18.9) 31(20.1) 15(9.7) 21(13.6)	PSA physical exam	97 (62.2) 97 (62.2)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Watchful waiting or active surveillance Radical prostatectomy with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam	81(62.3) 45(28.8) 30(19.2) 97(62.2) 31(19.9) 31(19.9) 31(19.9) 14(9.0) 15(9.6) 15(9.6) 15(9.6) 15(9.6) 22(14.1)	

Table 4.8: Association of urologist Experience as a doctor with usage of standard clinical protocols

Urologist		Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square Test
Experience as doctor	No.	No of Patients	STAGES		DIAGNOSIS		Protocols		

<20 years	4(30.8)	42(26.9)	I II III IV	20(13) 7(4.5) 5(3.2) 10(6.5)	PSA Physical Exam	42(26.9) 42(26.9)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Hormonal manipulations Bisphosphonates Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	36(27.7) 28(17.9) 20(12.8) 15(9.6) 7(4.5) 7(4.5) 7(4.5) 5(3.2) 5(3.2) 5(3.2) 10(6.4) 9(5.8) 9(5.8) 9(5.8) 9(5.8)	X2=80.158 DF=4 P=.000

21-30 years	7(53.8)	97(62.2)	I	36(23.4)	PSA Physical Exam	97(62.2) 97(62.2)	Watchful waiting or active surveillance Radical prostatectomy	80(61.5) 47(30.1)	
			II	32(20.8)			External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes	38(24.4)	
			III	13(8.4)			Watchful waiting or active surveillance Radical prostatectomy	25(16) 32(20.5)	
			IV	15(9.7)			External-beam radiation therapy (EBRT) Hormonal therapy	32(20.5)	
							External-beam radiation therapy (EBRT) with or without hormonal therapy	32(20.5)	
							Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	14(9.0)	
							Radical prostatectomy with or without EBRT	13(8.3)	
							Hormonal manipulations	13(8.3)	
							Bisphosphonates	13(8.3)	
							Palliative radiation therapy	16(10.3)	
							Palliative surgery with transurethral resection of the prostate (TURP).	15(9.6)	
							Watchful waiting or active surveillance	15(9.6)	

>30 Years	2(15.4)	17(10.9)	II	1(0.6)	PSA	17(10.9)	Watchful waiting or active surveillance	14(10.8)	
			III	3(1.9)	Physical Exam	17(10.9)	Radical prostatectomy	10(6.4)	
							Watchful waiting or active surveillance	1(0.6)	
							Radical prostatectomy	1(0.6)	
			IV	12(7.8)			External-beam radiation therapy (EBRT)	1(0.6)	
							External-beam radiation therapy (EBRT) with or without hormonal therapy	3(1.9)	
							Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	13(8.3)	
							Radical prostatectomy with or without EBRT	13(8.3)	
							Hormonal manipulations	12(7.7)	
							Bisphosphonates	11(7.1)	
							Palliative radiation therapy	11(7.1)	
							Palliative surgery with transurethral resection of the prostate (TURP).	11(7.1)	
							Watchful waiting or active surveillance	10(6.4)	

Table 4.9: Association of urologist Experience as Urologist with usage of standard clinical protocols

Urologist		Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square Test
Experience as Urologist	No.	No of Patients	STAGES		DIAGNOSIS		Protocols		
<10 years	8(61.5)	81(51.9)	I II III IV	32(20.8) 15(9.7) 13(8.4) 21(13.6)	PSA Physical Exam	81(51.9) 75(48.1)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Watchful waiting or active surveillance	66(50.8) 48(30.8) 33(21.2) 24(115.4) 15(9.6) 15(9.6) 15(9.6) 13(8.3) 13(8.3) 13(8.3) 13(8.3)	X2=33.319 DF=2 P=.000

							Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	22(14.1) 20(12.8) 20(12.8) 20(12.8) 20(12.8) 20(12.8)	
>10 years	5(38.5)	75(48.1)	I II III IV	24(15.6) 25(16.2) 8(5.2) 16(10.4)	PSA Physical Exam	81(51.9) 75(48.1)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or	64(49.2) 37(23.7) 25(16) 16(10.3) 25(16) 25(16) 25(16) 14(9) 8(5.1) 8(5.1)	X2=4.483 DF=1 P=.034

							without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	8(5.1) 8(5.1) 16(10.3) 15(9.6) 15(9.6) 15(9.6) 13(8.3) 13(8.3)	

Table 4.10: Association of urologist Income with usage of standard clinical protocols

Urologist		Patients	Patients stages	Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response		Response	Chi-square Test
Income	**No.**	**No of Patients**	**STAGES**		**Protocols**		**DIAGNOSIS**		
Ksh 200,000-300,000	7(53.8)	89(57.1)	I	33(21.4)	Watchful waiting or active surveillance	72(55.4)	PSA	89(57.1)	X2=44.144 DF=2 P=.000
					Radical prostatectomy	52(33.3)	Physical Exam	89(57.1)	
					External-beam radiation therapy (EBRT).	32(20.5)			
			II	23(14.9)	Interstitial implantation of radioisotopes	27(17.3)			
					Watchful waiting or active surveillance	24(15.4)			
					Radical prostatectomy	24(15.4)			
					External-beam radiation therapy (EBRT)	24(15.4)			
			III	11(7.1)	Hormonal therapy	7(4.5)			
					External-beam radiation therapy (EBRT) with or without hormonal therapy	12(7.7)			
					Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	12(7.7)			
			IV	20(13)	Radical prostatectomy with or without EBRT	12(7.7)			
					Watchful waiting or active surveillance	12(7.7)			
					Hormonal manipulations	20(12.8)			
					Bisphosphonates	17(10.9)			
					External-beam radiation therapy (EBRT) with or without hormonal therapy	17(10.9)			
					Palliative radiation therapy	17(10.9)			
					Palliative surgery with transurethral resection of the prostate (TURP).	17(10.9)			
					Watchful waiting or active surveillance				
ksh 300,000-500,000	2(15.4)	33(21.2)	I	21(13.6)	Watchful waiting or active surveillance	31(23.8)	PSA	33(21.2)	X2=4.483 DF=1 P=.034
					Radical prostatectomy.	33(21.2)	Physical Exam	33(21.2)	
					External-beam radiation therapy (EBRT).	24(15.4)			

			II	8(5.2)	Interstitial implantation of radioisotopes	11(7.1)			
					Watchful waiting or active surveillance	7(4.5)			
					Radical prostatectomy	7(4.5)			
					External-beam radiation therapy (EBRT)	7(4.5)			
			III	1(0.6)	Hormonal therapy	3(1.9)			
					Hormonal manipulations	2(1.3)			
					Bisphosphonates	2(1.3)			
					External-beam radiation therapy (EBRT) with or without hormonal therapy	2(1.3)			
			IV	3(1.9)	Palliative radiation therapy	2(1.3)			
					Palliative surgery with transurethral resection of the prostate (TURP).	2(1.3)			
					Watchful waiting or active surveillance	2(1.3)			
Above ksh 500,000	4(30.8)	34(21.8)	I	2(1.3)	Watchful waiting or active surveillance	27(20.8)	PSA Physical Exam	34(21.8) 34(21.8)	X2=33.319 DF=2 P=.000
					Radical prostatectomy	34(21.8)			
					External-beam radiation therapy (EBRT).	2(1.3)			
			II	9(5.8)	Interstitial implantation of radioisotopes	2(1.3)			
					Watchful waiting or active surveillance	9(5.8)			
					Radical prostatectomy	9(5.8)			
					External-beam radiation therapy (EBRT)	9(5.8)			
					Hormonal therapy	4(2.6)			
					External-beam radiation therapy (EBRT) with or without hormonal therapy	9(5.8)			
			III	9(5.8)	Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	9(5.8)			
					Radical prostatectomy with or without EBRT	9(5.8)			
			IV	14(9.1)	Watchful waiting or active surveillance	9(5.8)			
					Hormonal manipulations	16(10.3)			
					Bisphosphonates				

					External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	16(10.3) 16(10.3) 16(10.3) 16(10.3) 16(10.3)			

Table 4.12: Association of Patients age with standard clinical protocols

Patients	Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square test
Age	No of Patients	STAGES		DIAGNOSIS		Protocols		

40-50	42(26.9)	I II III IV	16(10.4) 8(5.2) 7(4.5) 11(7.1)	PSA DRE Biopsy	32(20.5) 10(6.4) 27(17.3)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	38(29.2) 22 (14.1) 17 (10.9) 11(7.1) 8 (5.1) 8 (5.1) 8 (5.1) 190.6) 6(3.8) 6(3.8) 6(3.8) 6(3.8) 13(8.3) 13(8.3) 13(8.3) 13(8.3) 12(7.7) 12(7.7)	X2 =10.720 DF=6 P=.007

50 -60	56(35.9)	I II III IV	27(17.5) 11(7.1) 6(3.9) 11(7.1)	PSA DRE Biopsy	56(35.9) 38(24.4) 46(29.5)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	52 (40.0) 37(23.7) 28 (17.9) 20 (12.8) 11 (7.1) 11 (7.1) 11 (7.1) 6(3.8) 6(3.8) 6(3.8) 6(3.8) 11(7.1) 9(5.8) 9(5.8) 9(5.8) 9(5.8) 9(5.8)	
60 and above	58(37.2)	I II	13(8.4) 21(13.6)	PSA DRE Biopsy	58(37.2) 40(25.6) 49(31.4)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes	40 (30.8) 26 (16.7) 13(8.3) 9(5.8)	

		III IV	8(5.2) 15(9.7)			Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	21(13.5) 21(13.5) 21(13.5) 13(8.3) 9(5.8) 9(5.8) 9(5.8) 14(9.0) 13(8.3) 13(8.3) 13(8.3) 12(7.7) 12(7.7) 12(7.7)	

Table 4.14: Association of Patients Education with clinical protocols

Patients	Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square test
Education	**No of Patients**	**STAGES**		**DIAGNOSIS**		**Protocols**		
None	5(3.2)	I	5(3.2)	PSA DRE Biopsy	5(3.2) 4(2.6) 3(1.2)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes	5(3.2) 5(3.2) 5(3.2) 4(2.6)	$\chi 2$=44.606 DF=4 P=.000

Primary	23(14.7)	I	7(4.5)	PSA	23(14.7)	Watchful waiting or active surveillance	22(16.9)	
				DRE	14(9)			
				Biopsy	16(10.3)	Radical prostatectomy	13(8.3)	
		II	6(3.9)			External-beam radiation therapy (EBRT).	8(5.1)	
		III	1(0.6)			Interstitial implantation of radioisotopes	4(2.6)	
						Watchful waiting or active surveillance	6(3.8)	
						Radical prostatectomy	6(3.8)	
						External-beam radiation therapy (EBRT)	6(3.8)	
		IV	8(5.2)			External-beam radiation therapy (EBRT) with or without hormonal therapy	1(0.6)	
						Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	1(0.6)	
						Radical prostatectomy with or without EBRT	1(0.6)	
						Watchful waiting or active surveillance	1(0.6)	
						Hormonal manipulations	5(3.2)	
						Bisphosphonates	5(3.2)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	5(3.2)	
						Palliative radiation therapy	5(3.2)	
						Palliative surgery with transurethral resection of the prostate (TURP).	5(3.2)	

Secondary	100(64.1)	I	29(18.8)	PSA	100(64.1)	Watchful waiting or active surveillance	76(58.9)	
				DRE	71(45.5)			
				Biopsy	78(50)	Radical prostatectomy	44(28.2)	
		II	30(19.5)			External-beam radiation therapy (EBRT).	29(18.6)	
						Interstitial implantation of radioisotopes	19(12.2)	
		III	17(11)			Watchful waiting or active surveillance	29(18.6)	
						Radical prostatectomy	29(18.6)	
						External-beam radiation therapy (EBRT)	29(18.6)	
						Hormonal therapy	14(9.0)	
		IV	24(15.6)			External-beam radiation therapy (EBRT) with or without hormonal therapy	18(11.5)	
						Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	18(11.5)	
						Radical prostatectomy with or without EBRT	18(11.5)	
						Watchful waiting or active surveillance	18(11.5)	
						Hormonal manipulations	5(3.2)	
						Bisphosphonates	26(16.7)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	26(16.7)	
						Palliative radiation therapy	26(16.7)	
						Palliative surgery with transurethral resection of the	26(16.7)	

College	26(16.7)	I	13(8.2)	PSA	26(16.7)	Watchful waiting or active surveillance	25(19.2)	
				DRE	19(12.2)			
				Biopsy	23(14.7)	Radical prostatectomy	21(13.5)	
		II	4(2.6)			External-beam radiation therapy (EBRT).	14(9.0)	
						Interstitial implantation of radioisotopes	11(7.1)	
		III	3(1.9)			Watchful waiting or active surveillance	5(3.2)	
						Radical prostatectomy	5(3.2)	
						External-beam radiation therapy (EBRT)	5(3.2)	
		IV	5(3.2)			External-beam radiation therapy (EBRT) with or without hormonal therapy	2(1.3)	
						Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	2(1.3)	
						Radical prostatectomy with or without EBRT	2(1.3)	
						Watchful waiting or active surveillance	7(4.5)	
						Hormonal manipulations	4(2.6)	
						Bisphosphonates		
						External-beam radiation therapy (EBRT) with or without hormonal therapy	4(2.6)	
						Palliative radiation therapy	4(2.6)	
						Palliative surgery with transurethral resection of the prostate (TURP).	4(2.6)	
						Watchful waiting	4(2.6)	

University	2(1.3)	I	2(1.3)		2(1.3) 2(1.3) 2(1.3)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes	2(1.5) 2(1.3) 2(1.3) 2(1.3)	

Table 4.4: Association of Patients Marital Status with standard clinical protocols

	Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	
Marital	No of Patients	STAGES		DIAGNOSIS		Protocols		Chi-square Test
Single	45(28.8)	I	20(13.0)	PSA	45(28.8)	Watchful waiting or active surveillance	38(29.2)	X2=10.938 D.F=6 P=.002
				DRE	35(22.4)			
				Biopsy	33(21.2)	Radical prostatectomy	34(21.8)	
		II	6(3.9)			External-beam radiation therapy (EBRT).	21(13.5)	
						Interstitial implantation of radioisotopes	13(8.3)	
						Watchful waiting or active surveillance	6(3.8)	
						Radical prostatectomy	6(3.8)	
		III	6(3.9)			External-beam radiation therapy (EBRT)	6(3.8)	
		IV	13(8.4)			External-beam radiation therapy (EBRT) with or without hormonal therapy	6(3.8)	
						Hormonal manipulations (orchiectomy or		

						luteinizing hormone-releasing hormone [LH-RH] agonist)	6(3.8)	
						Radical prostatectomy with or without EBRT	6(3.8)	
						Watchful waiting or active surveillance	6(3.8)	
						Hormonal manipulations	12(7.7)	
						Bisphosphonates	11(7.1)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	11(7.1)	
						Palliative radiation therapy	11(7.1)	
						Palliative surgery with transurethral resection of the prostate (TURP).	9(5.8)	
						Watchful waiting or active surveillance	9(5.8)	
Married	87(55.8)	I	29(18.8)	PSA	87(55.8)	Watchful waiting or active surveillance	68(52.3)	X2=9.852 DF=2 P=.007
				DRE	60(38.5)	Radical prostatectomy	43(27.6)	
		II	23(14.9)	Biopsy	67(42.9)	External-beam radiation therapy (EBRT).	29(18.6)	
						Interstitial implantation of radioisotopes	27(17.3)	

		III	11(7.1)			Watchful waiting or active surveillance	23(14.7)	
						Radical prostatectomy	23(14.7)	
						External-beam radiation therapy (EBRT)	23(14.7)	
		IV	22(14.3)			Hormonal therapy	9(5.8)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	12(7.7)	
						Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	12(7.7)	
						Radical prostatectomy with or without EBRT	12(7.7)	
						Watchful waiting or active surveillance	12(7.7)	
						Hormonal manipulations	24(15.4)	
						Bisphosphonates	22(14.1)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	22(14.1)	
						Palliative	22(14.1)	

						radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	 22(14.1) 22(14.1)	
Widower	24(15.4)	I II III IV	7(4.5) 11(7.1) 4(2.6) 2(1.3)	PSA DRE Biopsy	24(15.4) 15(9.6) 22(14.1)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy	24(18.5) 8(5.1) 8(5.1) 11(7.1) 11(7.1) 11(7.1) 5(3.2) 3(1.9) 3(1.9) 3(1.9)	X2=15.736 DF=2 P=.000

						with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	3(1.9) 2(1.3) 2(1.3) 2(1.3) 2(1.3) 2(1.3) 2(1.3)	

Table 4.15: Association of Patients Payment Method with clinical protocols

Patients	Patients	Patients stages	Response		Response	Protocols/ Diagnosis/ Treatment/ Follow up	Response	Chi-square test
Income	**No of Patients**	**STAGES**		**DIAGNOSIS**		**Protocols**		
Less than ksh 50,000	88(57.1)	I	33(21.4)	PSA	89(57.1)	Watchful waiting or active surveillance	72(55.4)	$\chi 2$=6.085 DF=2 P=.048
				DRE	65(41.7)	Radical prostatectomy	52(33.3)	
				Biopsy	66(42.3)	External-beam radiation therapy (EBRT).	32(20.5)	
		II	23(14.9)			Interstitial implantation of radioisotopes	27(17.3)	
						Watchful waiting or active surveillance	24(15.4)	
		III	11(7.1)			Radical prostatectomy	24(15.4)	
						External-beam radiation therapy (EBRT)	24(15.4)	
						Hormonal therapy	7(4.5)	
		IV	20(13)			External-beam radiation therapy (EBRT) with or without hormonal therapy	12(7.7)	
						Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist)	12(7.7)	
						Radical prostatectomy with or without EBRT	12(7.7)	
						Watchful waiting or active surveillance	12(7.7)	
						Hormonal manipulations	20(12.8)	
						Bisphosphonates	17(10.9)	
						External-beam		

						radiation therapy (EBRT) with or without hormonal therapy	17(10.9)	
						Palliative radiation therapy	17(10.9)	
						Palliative surgery with transurethral resection of the prostate (TURP).	17(10.9)	
						Watchful waiting or active surveillance	17(10.9)	
ksh 50,000-100,000	33(21.2)	I	21(13.6)	PSA	33(21.2)	Watchful waiting or active surveillance	31(23.8)	$\chi 2$=33.808 DF=6 P=.000
				DRE	22(14.1)	Radical prostatectomy	25(16)	
				Biopsy	31(19.9)	External-beam radiation therapy (EBRT).	24(15.4)	
		II	8(5.2)			Interstitial implantation of radioisotopes	11(7.1)	
		III	1(0.6)			Watchful waiting or active surveillance	7(4.5)	
						Radical prostatectomy	7(4.5)	
		IV	3(1.9)			External-beam radiation therapy (EBRT)	7(4.5)	
						Hormonal therapy	3(1.9)	
						Hormonal manipulations	2(1.3)	
						Bisphosphonates	2(1.3)	
						External-beam radiation therapy (EBRT) with or without hormonal therapy	2(1.3)	
						Palliative radiation therapy	2(1.3)	
						Palliative surgery with transurethral resection of the prostate (TURP).	2(1.3)	
						Watchful waiting or	2(1.3)	

						active surveillance		
Above ksh 100,000	34(21.8)	I II III IV	2(1.3) 9(5.8) 9(5.8) 14(9.1)	PSA DRE Biopsy	34(21.8) 23(14.7) 25(16)	Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT). Interstitial implantation of radioisotopes Watchful waiting or active surveillance Radical prostatectomy External-beam radiation therapy (EBRT) Hormonal therapy External-beam radiation therapy (EBRT) with or without hormonal therapy Hormonal manipulations (orchiectomy or luteinizing hormone-releasing hormone [LH-RH] agonist) Radical prostatectomy with or without EBRT Watchful waiting or active surveillance Hormonal manipulations Bisphosphonates External-beam radiation therapy (EBRT) with or without hormonal therapy Palliative radiation therapy	27(20.8) 8(5.1) 2(1.3) 2(1.3) 9(5.8) 9(5.8) 9(5.8) 4(2.6) 9(5.8) 9(5.8) 9(5.8) 9(5.8) 16(10.3) 16(10.3) 16(10.3) 16(10.3)	χ^2=32.170 DF=2 P=.000

						Palliative surgery with transurethral resection of the prostate (TURP). Watchful waiting or active surveillance	14(9.0) 14(9.0)	