WILLINGNESS TO PAY FOR THE TREATMENT OF ENLARGED PROSTATE

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WILLINGNESS TO PAY FOR THE TREATMENT OF ENLARGED PROSTATE IN URORA COMMUNITY OF BENIN CITY, EDO STATE, NIGERIA.

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CERTIFICATION

This is to certify that this project work was carried out by **ASEMOTA ELOGHOSA PRECIOUS** in the Department of Clinical Pharmacy and Pharmacy Practice, Faculty of Pharmacy, University of Benin, Benin City, under the supervision of Prof Tony Waka Udezi, in partial fulfillment for the PharmD degree of the University.

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DEDICATION

This project is dedicated to Almighty God who gave me the strength and wisdom to do this study.

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ABSTRACT

Enlarged prostate also known as Benign Prostatic Hyperplasia (BPH) is a common cause of Lower Urinary Tract Symptoms (LUTS) such as frequent urination and difficulty in urination among others in ageing men. This study assessed the willingness to pay (WTP) for treatment of Benign Prostatic Hyperplasia among men in Urora community, Benin City. A descriptive cross-sectional study was conducted among 500 adult males aged 18 years and above using a structured questionnaire. The questionnaire was divided into has two sections. Section A contained demographic data, while Section B contained symptom experience, three treatment options for managing enlarged prostate as well as the amounts respondents were willing to pay for each option ranging from ₦200 to ₦30,000 and their preferred choice of treatment. Data was analyzed using Microsoft Excel and Graphpad Instat to obtain inferential statistics. The findings showed that the total average WTP values across all treatment options ranged between ₦10,000 and ₦11,000, with alpha blockers having the highest mean WTP value and being the most preferred treatment option. Factors such as income level, caring for a person with BPH or prior awareness of the disease and symptom severity significantly influenced respondents' willingness to pay. This study showed that economic status and awareness plays major roles in determining WTP for BPH treatment and recommends public health education and financial support mechanisms to improve access to BPH care in the community.

CHAPTER ONE

INTRODUCTION

1.0 Background of study

Benign Prostatic Hyperplasia (BPH) is characterized by the non-malignant enlargement of the prostate. It is a health issue that becomes more common as men age. It is also called enlarged prostate. The prostate is a small gland that helps make semen. It is found below the bladder. And it often gets bigger as men age over time. It can cause Lower Urinary Tract Symptoms (LUTS) such as frequent urination, difficulty starting or stopping urination and a weak urine system. Several risk factors include age, genetics, diabetes, diet, localized inflammation, obesity and metabolic syndrome [1]. Treatment options ranges from pharmacological therapies (examples include alpha blockers and 5-alpha reductase inhibitors), special bathroom techniques and surgical intervention.

Benign Prostatic Hyperplasia (BPH) significantly reduces quality of life, impairs productivity and generates direct medical costs. According to Global Burden of Disease (GBD) 2019 findings, BPH showed the largest increase (110.56%) in disability-adjusted life years (DALYs) from 1990 to 2019. Additionally, according to the global cancer statistics 2022, prostate cancer ranks as the second most common cancer and the 5th leading cause of cancer mortality among men. There is significant increase in BPH incidence with advancing age, with the highest rates observed in men aged 50-59 and 60-80 years in southern Nigeria according to Esomonu et al. (2024) [2]. Histological evidence is rarely found in men younger than 40 years, but prevalence increases markedly with advancing age. Studies shows that approximately 50% of men in their 60s and up to 80-90% of men over 80 years have histological features of BPH. Globally, it is estimated that

more than 210 million men are affected. [3]. Awareness about BPH is very low especially in rural areas in Nigeria, where attitude towards health may be influenced by cultural beliefs that result in delay of seeking medical attention, cost, ignorance, educational level, socioeconomic status and access or availability of health services and care [4].

Willingness to pay (WTP) is the maximum price an individual is willing to pay for a product or services. It is a key metric in health economics that quantifies the monetary values individuals assign to health interventions. It provides insight on how specific populations value healthcare services and their preferences especially in Nigeria where Out-of-pocket spending is the dominant method for paying services especially health care. Out of pocket expenditure refers to when individuals make direct payments from their own funds for goods and services. This might lead to financial limitations especially in low-income communities as it may affect willingness to pay for treatment of chronic conditions like BPH which requires long term use of medications (such as alpha-blockers and 5-alpha-reductase inhibitors) or surgeries such as transurethral resection of the prostate (TURP). Understanding WTP can strengthen inclusion of BPH management into public health insurance schemes such as the National Health Insurance Schemes (NHIS). This could reduce financial and economic burden on individuals as well as prevent exacerbation of condition or progression to complications (such as Urinary Tract Infections, acute urinary retention, bladder tones and renal failure) due to delayed medical care in BPH.

This study explores willingness to pay WTP for Benign Prostatic Hyperplasia (BPH) treatment by men in Urora area, Benin city, Edo state. The findings from this study seeks to contribute in knowledge of cost effectiveness, health economics and factors affecting WTP among men as well as guide policies on effective and affordable prostate management or care. This research

aims to provide evidence-based information concerning various possible factors or barriers to prostate management in men. Understanding men's willingness to pay (WTP) for BPH diagnosis and treatment is therefore vital for planning affordable services and financing mechanisms [4].

1.1 Problem Statement

Despite the increasing prevalence economic impacts of BPH, there is limited, up-to-date evidence from Low- and Middle-Income Country (LMIC) settings (including Nigeria) on how much men are willing and able to pay for BPH evaluation and different treatment options. This gap makes it difficult for policy makers, health insurers and providers to design financing strategies, set patient fees or choose which interventions to prioritize.

1.2 Justification for Study

The justification for investigating Willingness to Pay (WTP) for Benign Prostatic Hyperplasia (BPH) management comes from the rapidly increasing economic constraints of the disease especially in Low-and Middle-Income Countries (LMICs) like Nigeria. Benign Prostatic Hyperplasia (BPH) is expensive to treat in countries like Nigeria where patients mostly pay out-of-pocket (OOP) because insurance coverage is limited. In Ghana and Nigeria, the individual costs for BPH medications range from US$300-500 per year. Additionally, the cost for a prostatectomy is estimated to be US$1100 [4], which could lead to financial hardship in low-income settings. This study may help to guide cost effective policies thereby reducing out-of-pocket (OOP) expenses, reducing financial hardship and advancing health equity [5]. Secondly, the findings can guide stakeholders and government authorities in designing community-based health financing schemes and improve awareness through programs, fairs or outreach on

enlarged prostate. Thirdly, data from this study can help improve strategies for integrating BPH management into primary health systems and insurance schemes. Furthermore, this research will serve as a baseline study for future economic evaluations and health policy formulation on men's health in Edo State and other parts of Nigeria. It will also help in prioritizing resource allocation, especially in rural communities where prostate-related morbidity is under-reported. Finally, to contribute to the body of knowledge on willingness to pay for health care treatment and interventions in Nigeria.

By focusing on Urora community which is a semi-urban area with diverse socioeconomic characteristics, this study aims to bridge the knowledge gap on the affordability and perceived importance of enlarged prostate treatment among Nigerian men. Understanding how much men are willing to pay for treatment will help in improving interventions that are both affordable and acceptable, thereby reducing the burden of complications and improving quality of life

1.3 Aim and objectives of the study

1. To assess the total average WTP amounts for the various treatment options (which are no-drug treatment, alpha blockers and 5-alpha reductase inhibitors).

2. To determine how demographic and socioeconomic factors (age, income, educational level etc.) affect WTP among the men in Urora area.

3. To determine preferred treatment for enlarged prostate.

4. To provide evidence-based recommendations for Benign Prostatic Hyperplasia (BPH) drug treatments, if subsidy will be needed or not.

1.4 Significance of the Study

This study holds significance for public health and policy in Nigeria, Edo state. This study aims to reveal the demand and values of enlarged prostate treatment In Urora area. These findings can guide policy makers in deciding whether prostrate related services should be integrated into primary health care centers. It also helps in economic and financial planning by providing report on how much men are willing to pay for each enlarged prostate treatment by determining how much men are willing to pay for treatment, policymakers can estimate feasible levels of cost-sharing or subsidy and resource allocation can be improved for BPH management. By identifying which demographic and socioeconomic groups are less willing to pay, health care workers can ensure that vulnerable groups are not exempted from primary health care due to financial barriers thereby facilitating health equity and preventing health disparities This study can also help health care providers develop more effective strategies in BPH treatment and raising awareness for men to understand the crucial need of treating enlarged prostate.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction to Benign Prostatic Hyperplasia (BPH)

Benign prostatic hyperplasia (BPH) refers to non-malignant enlargement of the prostate gland which is the most common disease in elderly men, especially those aged above 50 years. The prostate is a walnut-shaped gland in males which produces fluid, along with sperm from the testicles and fluids from other glands, to create semen. [2]. The structure of the human prostate can be divided into three different zones; the central zone, the peripheral zone and the transitional zone. BPH involves the stromal and epithelial elements of the prostate arising in the periurethral and transition zones of the glands. The enlargement of the prostate may case restriction of the flow of urine in the bladder.

Benign prostatic hyperplasia (BPH) is one of the most prevalent and costly benign neoplasms in men. It is a common condition affecting male patients who may suffer from Lower Urinary Tract Symptoms (LUTS) such as increased frequency of urination, nocturia, and increased urgency [2]. These symptoms exponentially diminish health-related quality of life and can result in exacerbations and complications such as acute urinary retention, frequent urinary tract infections, bladder stones, and in severe cases, renal insufficiency [6]. Long term untreated disease result in development of chronic high-pressure retention or permanent damages to the bladder detrusor muscle [1]. According to Cassell et al. (2024), histological research indicated that the prevalence BPH at autopsy increases with age, reaching 90% in men between the ages of 81 to 90 years. The

prevalence of LUTSs rises from 44% in men between the ages of 40 and 59 years to 70% in men over 80 years [4].

A large number of urological admissions and out-patient consultation are due to BPH cases. In Low-and Middle-Income Countries (LMICs) like Nigeria, late check-up and delay is common, with a lot of patients seeking medical care when complications such as urinary retention develop. This delay could be due to lack of awareness, sociocultural conceptions, financial limitations and poor access to healthcare services and facilities [2]. In some communities where cultural factors play a role in willingness to pay for treatment, urological conditions are associated with stigmatization. This causes men to avoid medical care until symptoms worsens resulting in delay of treatment and management thereby leading to complications. There is limited information regarding the burden of BPH in LMICs especially in Sub-Sahara Africa, where health care resources are limited and ability to manage chronic conditions like BPH are constrained [4].

From watchful waiting for mild cases to pharmacological treatment and surgical interventions for moderate to severe cases, the management of BPH has changed significantly over time. However, the cost of treating BPH is still considerably high which may affect accessibility to health care services as well as greatly influence one's ability and willingness to pay for those services, especially in countries like Nigeria where the paying for medical care through out-of-pocket is the norm.

2.1 Symptoms of Benign Prostatic Hyperplasia (BPH)

Common symptoms of BPH includes:

1. Increased frequency of urination.

2. Nocturia (urinating more often at night).
3. Difficulty in urination.
4. Weak urine stream or a urine stream that starts then stops.
5. Dribbling at end of urination.
6. Inability to fully empty bladder.
7. Incomplete bladder emptying.

2.2 Etiology of Benign Prostatic Hyperplasia (BPH)

The etiology of Benign Prostatic Hyperplasia (BPH) refers to the underlying causes and mechanisms responsible for the development of the condition. Although the exact cause of BPH remains uncertain, several theories and contributing factors have been proposed to explain its pathogenesis.

BPH is primarily considered a disease of aging, as its occurrence and progression are closely linked with increasing age. According to Xu et al. (2024), BPH is an age-dependent prostatic disorder, meaning that as men grow older, the likelihood of developing this condition increases significantly. This association suggests that age-related physiological and hormonal changes play a fundamental role in initiating and sustaining prostatic enlargement [7].

One of the central mechanisms implicated in the development of BPH is the alteration in cellular homeostasis within the prostate gland. Under normal circumstances, there is a balance exists between prostatic cellular proliferation and programmed cell death (apoptosis). However, when this equilibrium is disrupted, excessive proliferation of epithelial and stromal cells occurs,

leading to prostatic enlargement. Michael et al. (2024) explained that the loss of homeostatic control between cell growth and cell death results in the gradual accumulation of prostatic tissue, particularly in the periurethral zone, which contributes to urinary obstruction and related symptoms [1].

Another mechanism which contributes significantly to the etiology of BPH are metabolic and systemic factors. Conditions such as obesity, insulin resistance, and hyperinsulinemia have been associated with increased prostate growth through complex metabolic-inflammatory pathways and altered growth factor signaling. These metabolic disturbances may promote chronic inflammation and oxidative stress, which in turn stimulate prostatic tissue remodeling and hyperplasia. The growing prevalence of metabolic syndrome globally may therefore explain the rising incidence of BPH, especially among middle-aged and elderly men.

Hormonal imbalance, particularly the interplay between androgens and estrogens, also plays a crucial role in the pathogenesis of BPH. As men age, serum testosterone levels tend to decline while estrogen levels remain relatively constant, resulting in an increased estrogen-to-androgen ratio. This hormonal shift influences stromal–epithelial interactions and growth signaling within the prostate. Xu et al. (2024) noted that elevated estrogenic activity may enhance the expression of growth factors and receptors that promote cellular proliferation, thereby contributing to prostatic enlargement [7].

These interrelated factors collectively create a biological environment conducive to prostatic growth and enlargement, ultimately leading to the clinical manifestations of BPH observed in older men.

2.3 Pathology

Pathology refers to the structural and functional changes in tissues that occur as a result of disease processes, as well as the mechanisms responsible for their progression. In the case of Benign Prostatic Hyperplasia (BPH), the pathological changes involve a gradual and progressive enlargement of the prostate gland due to excessive cellular proliferation. BPH is characterized by nodular hyperplasia of both the glandular epithelium and the stromal cells, particularly within the transition zone of the prostate [7]. As these nodules enlarge, they compress the surrounding prostatic tissue and the urethra, leading to Bladder Outlet Obstruction (BOO). This obstruction impairs normal urine flow, causing lower urinary tract symptoms such as hesitancy, weak stream, and incomplete bladder emptying.

The pathological process of BPH can be understood by examining two key components: the dynamic and static aspects of obstruction. The dynamic component refers to the functional obstruction that results from increased tone of the smooth muscle fibers within the prostate and bladder neck. This muscle tone is primarily regulated by the sympathetic nervous system through α-adrenergic receptors. When there is increased α-adrenergic activity, the smooth muscle surrounding the urethra contracts more tightly, thereby narrowing the urethral lumen and increasing resistance to urinary flow [1]. This mechanism is reversible and forms the basis for the use of α-adrenergic antagonists (alpha-blockers) in the medical management of BPH to relieve urinary symptoms.

On the other hand, the static component is related to the structural or mechanical obstruction that occurs as the prostate gland enlarges. The proliferation of glandular and stromal elements leads to physical compression of the urethra and distortion of the bladder outlet. As the prostate

continues to grow, the periurethral tissues exert pressure on the urethral canal, impeding urinary flow and causing bladder outlet obstruction [1]. Unlike the dynamic component, this form of obstruction is due to permanent anatomical changes and often requires medical or surgical intervention to restore normal urine flow.

Another essential factor in the pathology of BPH is the central role of sex steroid hormones, particularly androgens and estrogens, in modulating prostatic growth. Androgens, especially dihydrotestosterone (DHT), are known to stimulate prostatic cell proliferation and differentiation. The enzyme 5α-reductase converts testosterone to DHT within the prostate, and inhibition of this enzyme has been shown to reduce prostate size and alleviate symptoms. The proven therapeutic effect of 5α-reductase inhibitors in clinical practice underscores the importance of androgenic stimulation in the pathogenesis of BPH [8]. Estrogens, although less dominant, also play a permissive role by influencing stromal–epithelial interactions and regulating growth factors involved in prostatic hyperplasia.

BPH is marked by the proliferation of both stromal and epithelial cells, leading to the formation of new glandular buds and branches. These changes result in the development of well-circumscribed nodules within the transition zone of the prostate. Over time, these nodules coalesce and expand, compressing the urethral canal and altering the overall shape and consistency of the gland [9]. The increased cellular proliferation, coupled with reduced apoptosis, leads to an accumulation of tissue mass that perpetuates the obstructive process.

2.4 Predisposition

The development of Benign Prostatic Hyperplasia (BPH) is influenced by a combination of biological, genetic, and lifestyle-related risk factors. Although the exact cause of BPH remains unclear, several factors have been consistently identified to increase the likelihood of its occurrence and progression in men.

One major risk factor for BPH is age. Younger men below 40 years of age, rarely have prostate enlargement. However, as men grow older, the chances of developing BPH increase significantly. The Mayo Clinic notes that symptoms of prostate enlargement are more common in men over 40 [10]. This is mainly because of changes that happen with age, such as a drop in testosterone levels and an increase in another hormone called dihydrotestosterone (DHT). These hormonal changes make the prostate grow gradually [8]. Also, as the body ages, old prostate cells do not die off as quickly as before, leading to the buildup of extra tissue in the gland.

Family history is another factor that increases risk. Men whose close relatives have had prostate problems are more likely to develop BPH themselves. This shows that genetics can play a role. Some men may inherit traits that make their prostate more sensitive to hormones or more likely to grow over time [10].

Certain health problems like diabetes and heart disease also increase the risk of BPH [10]. These conditions can reduce blood flow to the prostate and cause inflammation, which may lead to abnormal cell growth. In people with diabetes, the body often produces too much insulin, which can stimulate the prostate to grow. Similarly, heart disease can affect the body's hormone and blood circulation systems, both of which influence prostate health.

A person's lifestyle can also contribute to BPH. Eating unhealthy foods, not exercising regularly, and habits like smoking or drinking too much alcohol can increase the risk of prostate enlargement [1]. These lifestyle choices can cause weight gain, inflammation, and poor blood flow, all of which affect the prostate. On the other hand, staying active, eating a balanced diet, and maintaining a healthy weight can help protect against BPH.

Another factor is metabolic syndrome, which includes conditions such as high blood pressure, high cholesterol, insulin resistance and obesity, has been linked with BPH. Men with metabolic syndrome are more likely to develop BPH because these conditions cause hormonal and metabolic imbalances in the body. Research suggests that they also increase inflammation and trigger the release of growth factors that make the prostate grow larger [1].

2.5 Epidemiology

Benign prostatic hyperplasia (BPH) is a common age-related condition in men. Studies across different regions report high prevalence rates, ranging from 16% to over 70% in some areas. Esomonu et al. (2024) did a study on prevalence of BPH and prostate cancer among suburban residents in southern Nigeria. The study reported a prevalence of 16.67% for BPH in males attending tertiary health facilities [2]. Ojewola et al, (2017) reported an overall prevalence of LUTS of 57.4% and the overall prevalence of 23.7% done in a cross-sectional study in South western Nigeria rural setting [11]. Another study reported by Cassell et al. (2024) showed that men who are between the ages of 65 and 74 years bear the greatest burden of BPH globally, accounting for 42% of cases among men who are 40 and older [4]. A community-based survey of 615 men in Accra showed overall BPH prevalence as 62.3%, with the highest rates in men who are between the ages of 60 to 69 years at 68.3% and the lowest in men who are between the

ages of 50 to 59 at 58.9%. Late presentation and check-up are key factors which causes delay in seeking medical care until complications occur, which was reported in 30-50% of Nigerian BPH patients in hospital setting. [12].

Globally, it is estimated that about 210 million men are affected from the condition especially in aging populations and developing regions [3]. In the United States, studies have shown men who are between the ages 60-69 years have 70% BPH prevalence and about 80% in those over 70 years. Other US-population based studies have shown 56% of men reporting BPH symptoms [1]. Another study showed the total incidence of moderate to severe LUTS caused by BPH increases by 12% in men between the ages of 40-79 years annually. In Europe, studies report LUTS prevalence of 14-30% among men over 50 years. [13].

The high prevalence of BPH is caused by factors such as aging population, sedentary lifestyles, dietary shifts and family history (genetics). There is low level of awareness and understanding among the general population and health care providers. This may lead to delayed diagnosis and treatment, progression of symptoms, complications and decrease in quality of life for affected individuals [4]

2.6 Treatment and Prevention

The aim of BPH treatment is to provide relief from Lower urinary tract symptoms (LUTS), prevent the progression of disease, prevent complications and improve quality of life for the patient. The treatment options include; lifestyle modifications, pharmacological therapy, minimal invasive therapy and surgical treatment. The choice of treatment depends on severity of the

symptoms, size of the prostrate, comorbidities, age of the patient, patient preferences and many more.

1. Watchful waiting: this a treatment option for men with mild LUTS or men mot bothered by their symptoms. This also has tendencies to reduce progression of symptoms through self-management like education, positive reassurance, periodic monitoring, lifestyle modifications, and management of comorbidities [13]. Example of lifestyle modifications include; reducing caffeine intake, weight loss, reducing fluid intake in the evening etc.

2. Pharmacological therapy: Drug therapy is the major treatment used in men with moderate to severe LUTS. Common classes include:

Alpha blockers: these drugs work by relaxing the smooth muscles of the bladder neck and prostate improving urinary flow. Examples include tamsulosin (0.4mg daily), alfuzosin, doxazosin, silodosin and terazosin. It is usually given to patients to provide relief within 3 days. Side effects include dizziness, low blood pressure and commonly retrograde ejaculation (when semen goes into the bladder instead of out of the penis).

5α-reductase inhibitors: examples include Finasteride (5mg daily) and dutasteride. These medicines shrink the prostate by inhibiting the conversion of testosterone to Dihydrotestosterone (DHT) reducing prostatic tissue volume. The drug might take up to six months to be effective (to see improvement). They can cause sexual side effects like (decreased libido, decreased volume of ejaculation, gynecomastia etc.)

Combination therapy: A combination therapy of an alpha blocker and a 5α-reductase inhibitor provides a rapid relief and long-term prevention of progression of disease. This combination

therapy has been proven to significantly reduce acute urinary retention, reduce risk of developing complications and need for surgery.

Phosphodiesterase-5 (PDE5) inhibitors: An example of this drug is tadalafil. It can be used to treat erectile dysfunction by increasing cyclic guanosine monophosphate (cGMP). It has also been proven to be used in treating symptoms of BPH. It is advised to avoid use with alpha blockers other than tamsulosin (0.4mg once daily). The 2021 AUA management guideline for BPH do no recommend combination therapy due to increased side effects. [1].

Antimuscarinics: These drugs work by competitively blocking acetylcholine (Ach) from binding to muscarinic receptors. This prevents acetylcholine from activating the parasympathetic systems "rest and digest" functions. Medications like solifenacin and oxybutynin inhibit involuntary bladder contractions by blocking muscarinic receptors in the bladder, increasing bladder capacity and reducing urgency of urination. They can be used as monotherapy if there is good urinary flow. It is also used in combination with alpha blockers to provide rapid relief and reduce risk of urinary retention.

3. Minimally invasive therapies: These therapies are preferred by some patients who desire a low-risk surgical option or to avoid the need for taking medications.

Transurethral microwave thermotherapy (TUMT): A special catheter which possess microwave energy is passed through the urethra into the prostate area to shrink the prostate and ease the flow of urine. It uses thermal energy to ablate prostatic tissue. Results or improvements may take some time before being noticed. It is a generally safe procedure with very few side effects [10].

Ablation: this is also known as water-jet hydro-dissection or ablation. The advantages of the ablation procedure include a postoperative TURP defect with very low rates of incontinence, retrograde ejaculation, or erectile dysfunction compared to other surgeries. The main disadvantages of ablation therapy are the expensive and costly equipment needed to perform the procedure and the lack of any significant prostatic tissue retrieved afterward. [1].

Water vapor thermal infusion: A device is placed in the urethra. It turns water into steam which wears away excess prostate tissue and diminishes prostate size over time. it is considered safe and effective for most patients with BPH and is considerably less costly. It is less likely to cause sexual side effects compared to others.

Prostatic urethral lift: This uses special tags to compress the sides of obstructing prostate lobes. This can improve flow of urine and fewer sexual side effects compared to other treatments.

4. Surgical treatment: This is used in severe cases of LUTS. It is done by patients who don't get enough relief from drugs, have issues with drug adherence, urinary retention, have kidney problems etc.

Transurethral resection of the prostate (TURP): This is considered the "gold standard" surgical treatment for BPH. It focuses on decreasing the prostate to improve urine flow. The major advantage of TURP surgery is that the surgery completely removes the blocking tissue, no matter the size or shape. After TURP, a catheter is used to drain the bladder for a while.

Laser therapy (Holmium and Thulium laser enucleation of the prostate): This makes use of high energy laser to destroy prostate tissue that are overgrown. It is made for larger prostate (>75 to 100 gm) that are difficult to be managed by other procedures. It also has a lower transfusion

rate with no increase in complications compared to TURP. However, limitations include the need for specialized equipment and training, making it less readily available.

Open simple prostatectomy: This is designed for prostate that are very large (>100 gm). To remove the prostate tissue, cuts are made at the lower stomach area. A disadvantage is that there is need for blood donation due to the surgery being linked to higher risk of blood loss.

2.7. Willingness to pay

Willingness to pay (WTP) refers to the maximum amount an individual or a consumer is ready to pay for goods and services. It is used in health economics to determine the value an individual places on healthcare therapies, services or outcome. It refers to how much one is willing to spend to achieve or maintain quality of life or better health. WTP is significantly important in perceiving and understanding the preferences of the patient, financial cost or affordability and benefits of healthcare services especially in Nigeria where out-of-pocket expenditure is the norm. Willingness to pay for treatment can be negatively influenced by low income and unemployment, limited awareness and knowledge about the condition, and lack of health insurance coverage, in Low- and Middle- income countries like Nigeria.

2.8. Importance of WTP in BPH Management

Benign Prostatic Hyperplasia (BPH) is a known urologic and chronic condition which involves long term management and costly procedures. WTP study is important in BPH management especially in developing countries where out-of-pocket spending is the norm. Understanding how much patients are willing to pay for treatment helps healthcare providers and policymakers make

better decisions in determining if subsidy should be made for BPH treatment. It allows them to design interventions that are both effective and affordable, reducing the financial burden on patients. WTP studies also give insight into how patients value BPH healthcare services and treatments, which can help set fair and reasonable prices for medical care. In addition, this information can guide the development of health insurance schemes and policies aimed at improving access to care for individuals living with BPH.

2.9. Determinants of Willingness to Pay

Several factors can influence a patient's willingness to pay (WTP) for the management of Benign Prostatic Hyperplasia (BPH). One of the most important is socioeconomic status, which includes income and level of education. According to Farabi et al. (2023), men with higher income and better education tend to show greater willingness to pay for treatment because they are more financially capable and often have better understanding of the condition. Meanwhile, individuals with lower income may see treatment as costly and may therefore be less willing to pay [14].

Awareness also plays a key role. Men who are well-informed about BPH including its symptoms, complications, and available treatments, are generally more willing to invest in proper care compared to those who know little about the disease [15]. Similarly, employment status has a positive effect on WTP, as employed individuals are mostly financially stable and more likely to prioritize their health [14].

Another important factor is disease severity. Patients who experience more serious symptoms often have a stronger desire to seek treatment and are therefore more willing to pay in order to relieve discomfort and improve their quality of life [15]. Likewise, attitude and knowledge about

BPH can influence decisions. Patients with positive attitudes and good knowledge of the disease are more open to treatment and more willing to pay for it [14].

The presence of health insurance can also affect willingness to pay. Those covered by insurance usually spend less out of pocket, which reduces their financial burden and can either increase or reduce their perceived need to pay for care directly [2]. The type of treatment offered, whether preventive, pharmacological, or surgical can further influence decisions. Some patients may prefer non-invasive treatments, while others are more willing to pay for surgical options that promise faster relief or long-term improvement [1].

Treatment effectiveness and potential side effects are also major determinants of WTP. Patients are more likely to pay for treatments that have a high success rate and minimal adverse effects [1]. Additionally, past experiences with previous treatments or other chronic illnesses can shape attitudes toward paying for BPH care; those who have faced negative experiences before may be more eager to pay for effective solutions [14].

Finally, cultural beliefs can have a significant impact. In some communities, myths or traditional ideologies about prostate diseases may discourage men from seeking or paying for conventional medical care. Such beliefs can lower willingness to pay for modern treatments, even when they are effective [4].

2.10. Implications for healthcare policy

To create cost-effective prostate health policies and programs, especially in settings where government funding is limited, understanding Willingness to Pay (WTP) is essential. WTP studies provide valuable information that can guide decisions on how to make healthcare

services more accessible and affordable for patients. They help in the design of health insurance schemes by showing how much financial support or donor subsidy may be required to ensure long-term sustainability.

Understanding WTP also helps in addressing insurance gaps, particularly among rural populations who may have lower awareness or ability to pay for healthcare coverage. By increasing awareness and improving access to insurance schemes, more people can benefit from treatment without facing serious financial hardship. Another key benefit of WTP analysis is that it supports financial sustainability through the possible inclusion of BPH management in the National Health Insurance Scheme (NHIS). This would help reduce the high costs patients currently face when paying directly for treatment.

In addition, recognizing how cost affects a patient's decision to seek treatment helps in addressing financial barriers that prevent timely medical care. Policymakers can use this information to design policies that minimize out-of-pocket spending on essential health services and interventions. This ensures that treatment choices are made based on clinical needs rather than financial limitations.

Finally, by integrating the management of BPH into primary and public healthcare services, early detection and proper management of the disease can be improved. This approach not only reduces the overall burden of BPH on individuals and the healthcare system but also helps prevent complications, improving the quality of life for affected men.

CHAPTER THREE

METHODOLOGY

3.0. SETTING

The study was conducted at Urora community in Benin city situated at Ikpoba-Okha local Government Area of Edo State.

3.1. INSTRUMENT

The questionnaire used for the study has two sections. Section A contains demographic data such as age, income per month, marital status, occupation, educational level, area lived, health insurance, religion and tribe. It also asks questions concerning awareness, knowledge and experience with enlarged prostate. Section B consists of how often the respondents experience some symptoms of enlarged prostate. It also consists of three treatment options for managing enlarged prostate as well as the amounts respondents were willing to pay. The least amount was ₦200 while the highest amount in the questionnaire was ₦30,000. The respondents were required to indicate the amount they were willing to pay for each treatment option as well as their preferred choice of treatment. A copy of the instrument is at the Appendix.

3.2. SAMPLE SIZE

The recommended sample size for the study was determined to be 377 with the aid of a sample size calculator (Raosoft) at a margin of error (which is the amount of error that can be tolerated)

of 5% with a confident interval of 95%. However, to account for attrition, a sample of 500 was collected for this study.

3.3. DATA COLLECTION

The respondents in this study consists of men of varying age groups. Data was collected only from individuals who had given consent to participate after the aim and contents of the study was explained to them to minimize errors and enhance accuracy of responses. Participants were primarily recruited from community settings such as churches (where majority of the data was collected from), street vendors and other accessible locations.

3.4. DATA ANALYSIS

The questionnaire responses were coded and entered into Microsoft excel. The data was filtered so frequencies and percentages could be noted and calculated. The mean and standard deviation of each filtered data were derived and documented. Inferential statistical analysis was conducted via Graphpad instat software where student t-test and one way analysis of variance (ANOVA) was used to test for difference between groups. Statistical significance difference is determined if P-Value is <0.05 for this study.

CHAPTER FOUR

RESULTS AND INTERPRETATION

4.0. RESULTS

4.1. Demographic and Socio-economic data

This section presents the findings of the study, highlighting the variables with their respective frequencies and percentages. Out of the 500 questionnaires distributed, the largest proportion of respondents (150;30%) were between the ages of 18 to 24 years. In terms of income, men (males) earning ₦30,000 to ₦69,999 accounted for a higher proportion of respondents (110;22%). 254 of the participants are married (50.8%), majority of the respondents are self-employed (152;30.4%)/ 398 (79.6%) of the respondents has post-secondary education. A large proportion of respondents reside in urban areas (358;71.6%). Majority, which is 420 (84%) of the respondents, claimed to have heard of Benign Prostatic Hyperplasia (BPH), 52 (10.4%) claimed to have experienced it. 111 out of the 500 respondents have cared for or seen people with Benign Prostatic Hyperplasia (BPH). Majority of the respondents (286;57.2%) claimed to have never experienced symptoms of Benign Prostatic Hyperplasia (BPH).

Table 4.1: Demographic and Socioeconomic Data

VARIABLE	FREQUENCY	PRECENTAGE (%)
AGE		
18-24	150	30.0
25-34	100	20.0
34-44	73	14.6
45-54	82	16.4
55+	95	19.0
INCOME		
≤30,000	107	21.4
30,001-69,999	110	22.0
70,000-109,999	97	19.4
110,000-149,999	58	11.6
150,000-189,999	59	11.8
190,000-299,999	26	5.2
230,000-269,999	17	3.4
≥270,000	26	5.2
MARITAL STATUS		
MARRIED	254	50.8
SINGLE	240	48.0
OTHERS	6	1.2
OCCUPATION		
STUDENT	148	29.6
GOVERNMENT WORKER	73	14.6
SELF-EMPLOYED	152	30.4
UNEMPLOYED	39	7.8
PRIVATE SECTOR WORKER	63	12.6
RETIRED	25	5.0
EDUCATIONAL LEVEL		
NIL	11	2.2
PRIMARY	9	1.8
SECONDARY	82	16.4
POST SECONDARY	398	79.6
AREA OF RESIDENCE		
URBAN	358	71.6
SEMI-URBAN	81	16.2
RURAL	61	12.2
CHILDREN		
YES	255	51.0
NO	245	49.0

Table 4.1: Demographic and Socioeconomic Data Continued

VARIABLE	FREQUENCY	PRECENTAGE (%)
INSURANCE		
YES	118	23.6
NO	382	76.4
HEARD		
NO	80	16
YES	420	84
AWARE		
NO	170	34
YES	330	66
EXPERIENCE		
NO	448	89.6
YES	52	10.4
CARE/SEEN		
NO	389	77.8
YES	111	22.2
RELIGION		
CHRISTIANITY	492	98.4
ISLAM	4	0.8
AFRICAN TRADITION	4	0.8
SYMPTOMS		
NEVER	286	57.2
SOMETIMES	133	26.6
NOT SURE	48	9.6
OFTEN	30	6
VERY OFTEN	3	0.6

4.2. Willingness to pay for medications

Table 2 below shows the general willingness of the study participants to pay for no drug treatment, alpha blockers and 5-alpha reductase inhibitors in treatment of Benign Prostatic Hyperplasia. The study participants were willing to pay more for alpha blockers, followed by no drug treatment then 5-alpha reductase inhibitors. There is no significant difference between the three treatments (P-Value>0.05).

Table 4.2: Willingness to pay (WTP) for Benign Prostatic Hyperplasia

OPTIONS	MEAN WTP	STANDARD DEVIATION ±
No drug treatment	10904.8	9595.71
Alpha blockers	11159.6	10218.5
5-Alpha reductase inhibitor	10113.2	9696.554
P-values	0.2153	

4.3. Relationship between Age and WTP

Table 3 presents the relationship between age and willingness to pay for treatment of BPH. The data collected revealed that participants younger than 35 years had the highest WTP for no drug treatment and alpha blockers. Whereas those aged 45-54 years showed a greater willingness to pay for 5-alpha reductase inhibitor. However, the difference is not statistically significant (P-Value>0.05).

Table 4.3: Relationship between age and WTP

Mean WTP±SD

Age(years)	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
18-24	150	12630.66± 9572.642	12404± 10217.89	10098.66± 9704.395	0.0487
25-34	100	10520± 9595.229	12020± 10256.91	10336± 9756.303	0.4178
35-44	73	9715.06± 9538.693	9479.45± 10188.75	9950.68± 9646.813	0.9587
45-54	82	9912.19± 9577.678	10441.46± 10218.5	10360.97± 9696.554	0.9334
≥55	95	10355.78± 9601.343	10200± 10226.31	9812.63± 9714.287	0.9263
P-Value		0.1203	0.1905	0.9945	

4.4. Relationship between Income and WTP

Table 4 presents the relationship between income and WTP. The results indicate that participants earning ₦230,000-269,999 demonstrated the highest WTP for no drug treatment, alpha blockers and 5-alpha reductase inhibitors, whereas those earning ≤30,000 had the lowest WTP. There was significant difference in willingness to pay for no drug treatment (P-Value = 0.0002), alpha blockers (P-Value = 0.0069) and 5-alpha reductase inhibitors (P-Value = 0.0075).

Table 4.4: Relationship between Income and WTP

Mean WTP±SD

Income (naira)	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
≤30,000	107	8530.84 ± 9600.291	8426.16 ± 10232.88	7476.63 ± 9716.529	0.6898
30,001-69,999	110	9530.90 ± 9622.29	10627.27 ±10244.59	10376.36 ±9735.72	0.6893
70,000-109,999	97	9608.25 ± 9622.296	10309.27 ± 10233.97	9292.78 ± 9721.259	0.7636
110,000-149,999	58	13265.51 ± 9587.761	13734.48 ± 10240.32	11979.31 ± 9731.884	0.6117
150,000-189,999	59	14291.52 ± 9509.728	12220.33 ± 10224.09	10271.18 ± 9694.38	0.0870
190,000-299,999	26	14107.69 ± 9588.772	14676.92 ± 10265.67	12323.07 ± 9756.4	0.6703
230,000-269,999	17	15411 ± 9505.72	14588.23 ± 10418.55	15858.82 ± 9799.034	0.9308
≥270,000	26	12223.07 ± 9594.641	13923.07± 10254.74	12423.07 ± 9749.142	0.7948
P-Value		0.0002	0.0069	0.0075	

4.5. Relationship between Marital Status and WTP

Table 5 presents the relationship between marital status and willingness to pay (WTP). The results indicate that married participants demonstrated the highest WTP. However, the differences were not statistically significant (P-Value>0.05).

Table 4.5: Relationship between Marital Status and WTP

Mean WTP±SD

Marital Status	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Values
MARRIED	254	11142.51 ± 9601.343	11118.11 ± 10226.31	10915.74 ± 9714.287	0.9603
SINGLE	240	10689.16 ± 9572.642	11270.83 ± 10217.89	9250 ± 9704.395	0.0689
OTHERS	6	9466.66 ± 9835.867	8466.66 ±10560.71	10666.66 ± 9759.744	0.9309
P-Value		0.814	0.7991	0.1622	

4.6. Relationship between Occupation and WTP

Table 6 presents Relationship between Occupation and Willingness to Pay (WTP). The findings indicate that government workers and students demonstrated the highest WTP. A statistically significant difference was observed among students for no drug treatment, alpha blockers and 5-alpha reductase inhibitors (p value=0.0306). Furthermore, significant differences were found across occupations for no drug treatment (p value=0.0139) and 5-alpha reductase inhibitors (p value=0.0365).

Table 4.6: Relationship between Occupation and WTP

Mean WTP±SD

Occupation	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
STUDENT	148	12482.43 ± 9574.131	12389.18 ± 10227.25	9809.45 ± 9714.934	0.0306
GOVERNMENT WORKER	73	12471.23 ± 9585.857	12756.16 ± 10241.95	13191.78 ± 9740.184	0.9059
SELF-EMPLOYED	152	10042.10 ± 9600.345	10835.52 ± 10223.71	10059.21 ± 9704.531	0.7258
UNEMPLOYED	39	10923.07 ± 9485.032	10374.35 ± 10261.2	10600 ± 9674.255	0.9697
PRIVATE SECTOR WORKER	63	7679.36± 9538.251	8419.04± 10204.81	8003.17± 9680.065	0.9140
RETIRED	25	10336± 9576.042	9320± 10210.1	7808± 9655.011	0.6588
P-Value		0.0139	0.0884	0.0365	

4.7. Relationship between Educational level and WTP

Table 7 presents Relationship between Educational level and Willingness to Pay (WTP). Participants with post-secondary education demonstrated the highest WTP for no drug treatment and alpha blockers, while those with no formal education showed the highest WTP for 5-alpha reductase inhibitors. Those with only primary education had the lowest WTP for no drug treatment, alpha blockers and 5-alpha reductase inhibitors. There was no significant difference (P-Value>0.05).

Table 4.7: Relationship between Educational level and WTP

Mean WTP±SD

Educational level	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
NIL	11	11200± 9593.156	11181.81± 10252.86	12672.72± 9751	0.9209
PRIMARY	9	4666.66± 9506.284	5155.55± 10346.28	4777.77± 9736.72	0.9940
SECONDARY	82	8441.46± 9595.71	8978.04± 10218.5	8556.09± 9696.554	0.9346
POST SECONDARY	398	11540.34± 9601.343	11740.39± 10226.31	10483.91± 9714.287	0.1547
P-Value		0.0125	0.0446	0.1052	

4.8. Relationship between Area of Residence and WTP

Table 8 shows the relationship between Area of Residence and WTP. There is significant difference in all areas for no drug treatment (p value= <0.0001) and alpha blockers (p value=0.0011). Those who stay in rural communities had the highest WTP in all three treatment options.

Table 4.8: Relationship between Area of Residence and WTP

Mean WTP±SD

Area	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
URBAN	358	10261.45± 9595.71	10092.73± 10218.5	9533.51± 9696.554	0.5848
SEMI-URBAN	81	10261.45± 9594.887	13750.61± 10250.27	11651.85± 9746.204	0.0789
RURAL	61	11245.90± 9488.084	13980.32± 10201.26	11472.13± 9690.386	<0.0001
P-Value		<0.0001	0.0011	0.1059	

4.9. Relationship between those who have heard and WTP

Table 9 shows Relationship between those who have heard have had the highest WTP for no-drug treatment, alpha blockers and 5-alpha reductase inhibitors compared to those who haven't heard of BPH. There is no significant difference in the treatment (P-Value>0.05).

Table 4.9: Relationship between those who have heard and WTP

Mean WTP±SD

Heard	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	80	9315± 9504.565	11325± 10248.84	9525± 9676.661	0.3645
Yes	420	11207.61± 9595.71	11116.66± 10218.5	10225.23± 9696.554	0.2790
P-Value		0.1060	0.8674	0.5540	

4.10. Relationship between those who are aware and WTP

Table 10 shows that those who are aware have the highest WTP for no-drug treatment, alpha blockers and 5-alpha reductase inhibitors compared to those who aren't aware of BPH. There is significant difference between no drug treatment (p value = 0.0013) and alpha blockers (p value = 0.0276).

Table 4.10: Relationship between those who are aware and WTP

Mean WTP±SD

Aware	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	170	8969.41± 9577.37	9752.91± 10208.14	9610.51± 9695.656	0.7362
Yes	330	11901.81± 9595.71	11884.24± 10218.5	10372.12± 9696.554	0.0728
P-Value		0.0013	0.0276	0.4058	

4.11. Relationship between those who have experience and WTP

Table 11 shows that those who had experience has the highest willingness to pay (WTP) for no-drug treatment, alpha blockers and 5-alpha reductase inhibitors. There was no significant difference statistically (P-Value>0.05).

Table 4.11: Relationship between those who have experience and WTP

Mean WTP±SD

Experience	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	448	10746.42± 9595.71	11127.23± 10218.5	9971.87± 9696.554	0.2016
Yes	52	12269.23± 9562.11	11438.46± 10216.59	11330.77± 9690.983	0.8677
P-Value		0.2791	0.8354	0.3392	

4.12. Relationship between those who have Cared for or seen and WTP

Table 12 shows that there is significant difference in no-drug treatment (p value=0.0044), alpha blockers (p value = 0.0158) and 5-alpha reductase inhibitors (p value = 0.0072). The table also shows that those who have cared for or seen individuals with enlarged prostate have the highest WTP for all three treatments.

Table 4.12: Relationship between those who have Cared for or seen and WTP

Mean WTP±SD

Care	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	389	10225.01± 9595.71	10561.44± 10218.5	9487.91± 9696.554	0.2983
Yes	111	13181.98± 9610.932	13225.85± 10236.48	12304.50± 9723.708	0.7348
P-Value		0.0044	0.0158	0.0072	

4.13. Relationship between those who have Children and WTP

Table 13 shows that people who have children have no significant difference in the willingness to pay for all the options (P-Value>0.05), See table

Table 4.13: Relationship between those who have Children and WTP

Mean WTP±SD

Children	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	245	11234.28± 9572.642	11767.34± 10217.89	9755.91± 9704.395	0.0646
Yes	255	10588.23± 9601.343	10575.68± 10226.31	10456.47± 9714.287	0.9862
P-Value		0.4517	0.1931	0.4203	

4.14. Relationship between those who have Insurance and WTP

Table 14 shows the willingness to pay in relation to those who have insurance. The table indicates that those who have insurance have higher WTP for no-drug treatment, alpha blockers and 5-alpha reductase inhibitors compared to those who do not have insurance. There is significant difference for no-drug treatment for Benign Prostatic Hyperplasia (P-Value = 0.0061).

Table 4.14: Relationship between those who have Insurance and WTP

Mean WTP±SD

Insurance	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
No	382	10247.64± 9605.254	10700± 10228.62	9739.79± 9705.915	0.4034
Yes	118	13032.20± 9601.343	12647.45± 10226.31	11323.03± 9714.287	0.3773
P-Value		0.0061	0.0712	0.1221	

4.15. Relationship between Religion and WTP

In table 15, the result showed no significant difference (P-Value>0.05) across Christians, Muslims and traditionalists willingness to pay for Benign Prostatic Hyperplasia treatment with no-drug treatment, alpha blockers and 5-alpha reductase inhibitors.

Table 4.15: Relationship between Religion and WTP

Mean WTP±SD

Religion	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
Christianity	492	10895.93± 9595.71	11080.08± 10218.5	10119.10± 9696.554	0.2670
Islam	4	9500± 9557.11	17750± 10493.91	6950± 9895.577	0.3249
Traditional	4	13400± 9732.667	14350± 10716.92	12550± 9817.65	0.9688
P-Value		0.8368	0.3540	0.7126	

4.16. Relationship between Symptoms and WTP

Table 16 shows that there is significant difference (P-Value <0.05) in willingness to pay for Benign Prostatic Hyperplasia (BPH) treatment with alpha blockers (P-Value =0.0218) and 5-alpha reductase inhibitors (P-Value = 0.0024).

Table 4.16: Relationship between Symptoms and WTP

Mean WTP±SD

Symptoms	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-Value
Never	286	10192.30± 9599.276	10247.55± 10236.93	9097.20± 9723.59	0.2902
Sometimes	133	11502.25± 9572.742	11539.84± 10202.92	10493.23± 9687.62	0.6157
Not sure	48	11316.66± 9578.663	11904.16± 10232.48	10950± 9723.032	0.8918
Often	30	13680± 9475.596	16326.66± 10312	15920± 9705.349	0.5352
Very often	3	18000± 8655.721	17666.66± 10013.13	18666.66± 9553.468	0.9913
P-Value		0.1762	0.0218	0.0024	

4.17 Relationship between Prefer and WTP

Table 17 shows willingness to pay to preference in treatment options. The table indicates that there is significant difference (P-Value <0.05) in willingness to pay for Benign Prostatic Hyperplasia (BPH) treatment with alpha blockers (P-Value = <0.0001) and 5-alpha reductase inhibitors (P-Value = <0.0001).

Table 4.17: Relationship between Prefer and WTP

Mean WTP±SD

Prefer	n	No drug treatment	Alpha blockers	5-alpha reductase inhibitor	P-value
Option 1	188	11728.72± 9601.343	9118.08± 10226.31	8077.65± 9714.287	0.0011
Option 2	200	10977± 9571.168	14244± 10202.56	10001± 9689.85	<0.0001
Option 3	111	9470.27± 9581.011	9154.95± 10218.31	13848.64± 9702.513	0.0004
P-Value		0.1444	<0.0001	<0.0001	

CHAPTER FIVE

DISCUSSION AND CONCLUSION

5.0. DISCUSSION

From the results shown in the previous chapter, the amounts each respondent were willing to pay for each treatment varied by socio-economic and demographic factors such as age, income, occupation, education, awareness, clinical symptoms, experience and knowledge of Benign Prostatic Hyperplasia (BPH). The total average amount for Benign Prostatic Hyperplasia treatment with no-drug treatment, alpha blockers and 5-alpha reductase inhibitors was about ₦10,000 as shown in table 2 of previous chapter. These findings align with previous studies. For example, Umeh et al. (2022) reported an average WTP of US$6.01 for population-based screening in Anambra state with residence and knowledge of the disease being the major predictors [15]. This is shown in the present study as awareness and knowledge being a strong predictor of WTP.

In Table 3 which showed the relationship between age and WTP, those who were between the ages of 18-24 years of age showed the highest willingness to pay for non-drug treatment and alpha blockers. Respondents who are middle aged (between the ages of 35-44 and 45-54 years of age) were willing to pay more for 5-alpha reductase inhibitors. This may suggest that younger men prefer preventive and quick relief therapy while older men may prefer curative therapy. This is in line with a previous study which showed that younger adults demonstrate a better attitude towards their health [15]. Another study showed that men who are older may be less willing to pay for health care services due to factors such as accumulated debts, being the major source of

income in a household, dwindling financial resources, treating other diseases and rise in medical expenses. [18].

Table 4 shows increase in WTP corresponding with increase in income. Those earning ₦230,000-269,999 had the highest WTP in all treatment options while those earning ≤₦30,000 showed the lowest. This proves that income level is a major determinant in influencing willingness to pay for treatment. This is consistent with a study which showed that having high income and a good financial status has a high chance of giving positive response to willingness to pay for treatment. [14]. Another study also showed that the ability to pay for disease treatments in Low-and Middle-income Countries like Nigeria improves with higher income [17].

In table 6 which showed relationship between occupation and WTP, students and government workers demonstrated the highest WTP values. Students' higher WTP could be due to awareness and health information, little or less demanding household obligations and understanding the importance of maintaining quality of life [14]. These findings from the present study correlates with a study by Adeyemi et al. (2016) which found that formal employment may be associated with high healthcare spending and willingness to try some therapies [5].

Table 7 which demonstrated the relationship between education and WTP, showed that men with post-secondary education demonstrated the highest WTP for all treatment options, while the lowest WTP was demonstrated by respondents who had only primary education. This means that individuals with higher educational level are willing to pay more for treatment indicating that education has positive response on WTP. These findings correlate with a study observed by Farabi et al. (2020) who explained that men with higher educational level may have a better understanding on maintaining or improving quality of life or may be aware of how the disease

may affect their quality of life [14]. It can be inferred that education is a major factor in improving willingness to pay for treatment.

In table 8 which showed the relationship between area of residence and WTP, respondents who stayed in rural areas showed the highest willingness to pay for all treatment options as p-values for non-drug treatment and alpha blockers were < 0.0001 and 0.0011 respectively. This unexpected trend may be due to limited access to tertiary health care settings leading to high value on availability of treatment. A study observed by Okyere et al. (2021) showed similar rural-urban differences [17].

In table 10 and 11 which demonstrated the relationship between awareness as well as experience with WTP, respondents who were aware of the disease and those who had prior experience had the highest WTP across all treatment options. Likewise, there was significant WTP for all treatment options by respondents who had care for or seen individuals with BPH (p-value < 0.05) in table 12. It can be inferred from the results that awareness and experience are major determinants in WTP. This correlates with a similar study observed by Farabi et al. (2020) who observed that experiencing a disease or having a family history of a disease has significant effects on WTP and encourages individuals to have better attitudes towards their health. This means that people are willing to spend more in order to prevent a disease or maintain quality of health if they had experience with the disease [14]. This highlights the importance of awareness campaigns and public health education.

In table 14 which showed relationship between health insurance and WTP, there was significantly higher WTP for no drug treatment by respondents with health insurance (p-value = 0.0061). This implies that improved readiness to pay and affordability may be due to reduced out-of-pocket costs by insurance schemes. Therefore, there is need to create awareness and

expand insurance schemes to reduce financial hardship as out-of-pocket costs are a source of financial burdens especially on those with chronic conditions such as BPH [18].

In table 16 which showed relationship between symptoms and WTP, those who experienced symptoms often or very often had the highest WTP values for all treatment options. These findings imply that symptom severity corresponds to increase in WTP. In many communities, there is stigma associated with urological conditions causing men to avoid seeking medical help leading to severity and exacerbation of symptoms [4]. The more severe the symptoms, the more one is willing to pay for treatment. This is in line with a similar study where symptom relief and improvement in quality of life were major factors influencing willingness to pay for treatment [20].

Table 17 which demonstrated relationship between preference and WTP showed that respondents were willing to pay higher for their preferred choice of treatment and pharmacological treatments are perceived to be effective or convenient. This indicates the need for pharmaceutical care and patient centered care for BPH treatment in Nigeria.

The results from this study correlates with different previous studies where income, education and awareness (socio-economic variables and knowledge) were major factors influencing willingness to pay for BPH treatment and healthcare payment decisions [15].

5.1. CONCLUSION

The total average willingness to pay (WTP) amount for this study was ₦10,904.8 for No drug treatment, ₦11,159.6 for Alpha blockers and ₦10,113.2 for 5-Alpha reductase inhibitors, with

alpha blockers having the highest average amount of WTP. It could be inferred that the preferred choice of treatment for Benign Prostatic Hyperplasia (BPH) is Alpha blockers. This study also shows that in Urora community, demographic and socioeconomic factors such as Awareness, income, severity of symptom and Preference affects men's willingness to pay for Benign Prostatic Hyperplasia. These implies the significance of public health education, public health campaigns and outreaches, early detection and prostatic screening, expanding insurance coverage and financial support mechanisms such as subsidy, in improving BPH treatment and care.

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APPENDIX

- BPH - Benign Prostatic Hyperplasia
- cGMP - cyclic guanosine monophosphate
- DALYs - Disability-Adjusted Life Years
- DHT - Dihydrotestosterone
- GBD - Global Burden of Disease
- LMICs - Low- and Middle-Income Countries
- LUTS - Lower Urinary Tract Symptoms
- NHIS – National Health Insurance Scheme
- OOP - Out-Of-Pocket
- PDE-5I - Phosphodiesterase-5 Inhibitor
- TUMT - Transurethral microwave thermotherapy
- TURP - Transurethral resection of the prostate
- WTP - Willingness to pay

Research on Enlarged Prostrate

Please respond to the questions below. This is strictly for research and results will not be used for any other purpose. Tick the correct box or write your answer in the appropriate spaces provided. Please, do not leave any questions unanswered.

SECTION A:

Age (yrs): 18-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55+ ☐

Income/allowance per month (₦): ≤30,000 ☐ 30,001-69,999 70,000-109,999 ☐

110,000-149,999 ☐ 150,000-189,999 190,000-229,999 230,000-269,999 ☐

≥270,000 ☐

Marital Status: Married ☐ Single ☐ Others (e.g., divorced, windowed, separated etc) ☐

Occupation: Student ☐ Government worker ☐ Self-employed Unemployed ☐
Private sector worker ☐ Retired ☐

Educational level: Nil ☐ Primary ☐ Secondary Post-Secondary ☐

Describe the area you live: Urban Semi-Urban Rural ☐

Have you heard of enlarged prostate or prostate cancer? ……

Do you know anything about it? ……**…**

Have you ever had any prostrate related problem? ……..

Have you ever seen or taken care of someone who had prostrate related problems? ……

Do you have children? ……..

Do you have health insurance? ……

State your religion…….. **State your tribe**……..

SECTION B:
Just imagine the situation below:

You are now experiencing changes in your urinary habits. You now feel like urinating more frequently than before, even during the night. Starting to urinate is more difficult than before and require extra effort. The flow may be irregular, stopping and starting unexpectedly, and you might release a few remaining drops after finishing. Additionally, you might feel like your bladder isn't fully empty. Urgent and sudden need to urinate can arise. How often does the above happen to you?

Never ☐ sometimes ☐ not sure ☐ often ☐ very often ☐

There are three options available to you for the management of the urinary symptoms above.
Read each carefully and tick the box indicating how much you are willing to pay for each option per month in Nigerian Naira(₦).

Option 1: No drug treatment. There is a 40% chance of getting better but will require going to the hospital regularly for checkup and using a special bathroom technique while maintaining hydration. However, there is a probability of 60% that you will need medicine or surgery later. Tick how much you are willing to spend on this option?

200 ☐ 400 ☐ 600 ☐ 800 ☐ 1600 ☐ 3200 ☐ 4000 ☐ 5000 ☐ 6000 ☐ 7000 ☐
8000 ☐ 9000 ☐ 10000 ☐ 11000 ☐ 12000 ☐ 13000 ☐ 14000 ☐ 15000 ☐
16000 ☐ 17000 ☐ 18000 ☐ 19000 ☐ 20000 ☐ 21000 ☐ 22000 ☐ 23000 ☐
24000 ☐ 25000 ☐ 26000 ☐ 27000 ☐ 28000 ☐ 29000 ☐ 30000 ☐

Option 2: This medicine does not shrink the prostate but may provide better symptom relief than other medicines. Most men see symptom improvement within 2 to 3 weeks. It can also slightly lower high blood pressure. Possible side effects include weakness, fatigue, dizziness, a slight decrease in blood pressure, headaches, and a stuffy nose. Tick how much you are willing to spend on this option?

200 ☐ 400 ☐ 600 ☐ 800 ☐ 1600 ☐ 3200 ☐ 4000 ☐ 5000 ☐ 6000 ☐ 7000 ☐
8000 ☐ 9000 ☐ 10000 ☐ 11000 ☐ 12000 ☐ 13000 ☐ 14000 ☐ 15000 ☐
16000 ☐ 17000 ☐ 18000 ☐ 19000 ☐ 20000 ☐ 21000 ☐ 22000 ☐ 23000 ☐
24000 ☐ 25000 ☐ 26000 ☐ 27000 ☐ 28000 ☐ 29000 ☐ 30000 ☐

Option 3: This medication may shrink the prostate by 25% for some men but might not relieve symptoms effectively. Most men see improvement in symptoms within about 6 months to one year. It can reduce the risk of needing a catheter or surgery for blocked urine flow. Side effects may include reduced sex drive, less semen during ejaculation, and trouble getting an erection. Tick how much you are willing to spend on this option?

200 ☐ 400 ☐ 600 ☐ 800 ☐ 1600 ☐ 3200 ☐ 4000 ☐ 5000 ☐ 6000 ☐ 7000 ☐

8000 ☐ 9000 ☐ 10000 ☐ 11000 ☐ 12000 ☐ 13000 ☐ 14000 ☐ 15000 ☐

16000 ☐ 17000 ☐ 18000 ☐ 19000 ☐ 20000 ☐ 21000 ☐ 22000 ☐ 23000 ☐

24000 ☐ 25000 ☐ 26000 ☐ 27000 ☐ 28000 ☐ 29000 ☐ 30000 ☐

Which of the above options do you prefer?

Option 1 ☐ **Option 2** ☐ **Option 3** ☐

Thank you for your time.