SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

ECONOMIC BURDEN OF BENIGN PROSTATIC HYPERPLASIA TO PATIENTS AT THE TRUST SPECIALIST HOSPITAL IN GREATER ACCRA REGION.

BY

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DECLARATION

I, Doreen Efua Adu-Gyamfi, hereby declare that apart from the references made to other people's work which have been duly acknowledged, all other information produced from this work is mine. I further declare that neither has this work been presented in full or in part for the award of any degree in this university or elsewhere.

..... Date: 10/10/17

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DEDICATION

This work is dedicated to my husband, Mr. Kwaku Kusi Amoatin and my entire family for their love, fervent prayers and moral support.

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LIST OF ABBREVIATION

AUR	Acute urinary retention
BPH	Benign prostatic hyperplasia
DALY	Disability adjusted life years
DRE	Digital rectal examination
ED	Erectile dysfunction
ENT	Ear, Nose and Throat
GHS	Ghana Health Service
GHS	Ghana cedis
IPSS	International prostate symptom score
JSS	Junior Secondary School
LUTS	Lower urinary tract symptoms
MOH	Ministry of Health
MPH	Master of Public health
NZ	New Zealand
PI	Principal Investigator
QOL	Quality of life
RAs	Research assistants
SPH	School of Public Health
SSNIT	Social Security and National Insurance Trust

SSS	Senior secondary school
TTHCL	The Trust Hospital Company limited
US$	United States Dollar
UTIs	Urinary tract infections

ABSTRACT

Background: Benign prostatic hyperplasia (BPH) is one of the most common benign disease of men with about 40% of men aged 50 years and above and 90% aged 80 years and above. During the aging process of men, the prostate grows, often causing troubling symptoms. Even though BPH has been regarded as part of the aging process, the cost of managing the disease in Ghana to patients and family is unclear.

Objective: To determine the economic burden of benign prostatic hyperplasia to patients at the Trust Specialist Hospital in Greater Accra Region

Methods: A cross sectional descriptive design was adopted for this study. This involved the collection of data from men aged 40 years and above who visited the urology clinic at the Trust Specialist Hospital in Greater Accra Region. A semi-structured questionnaire comprising both open and close ended questions was used to collect data from 165 respondents. Standard cost of illness methods were employed in determining the cost incurred by BPH patients. Direct costs were estimated from medical related and non-medical related such as transportation, food and other costs respectively. Indirect cost was estimated by valuing productivity losses to patients due to BPH. Consequences of BPH on patients relative to pain, emotional suffering, discomfort and functional limitation were evaluated using the Likert scale for the description of intangible cost.

Results: The total cost of benign prostatic hyperplasia estimated was GHS 114,028.81 (US$ 26,153.40), with direct and indirect cost constituting 99.5% and 0.5% of the total cost. The average monthly cost incurred per patient was estimated as GHS 697.12 (US$ 159.89), accounting for 25.4% of average monthly income of

patients. About 78% and 22% of patients had low and moderate intangible cost as a result of BPH.

Conclusion: The cost incurred by patients in in relation to the treatment of BPH is high with respect to patients' monthly income. Therefore there is the need for policy and decision makers to consider a policy that enhances early detection of BPH in medical practice to help improve management of BPH and decrease costs.

CHAPTER ONE

INTRODUCTION

1.1 Background

Lower urinary tract symptoms (LUTS), which comprise of reduced urinary flow, nocturia, urgency, dribbling and incomplete voiding, are mostly common in elderly men. LUTS may be linked with conditions such as diabetes mellitus, neurological disease and urinary tract infections (UTIs). The most common precipitating factor of LUTS is benign prostate enlargement (Speakman, Kirby, Doyle, & Ioannou, 2015).

Benign prostatic hyperplasia (BPH) affects men in their middle ages. BPH is the most common benign tumour in men in the United States and also the most typical ailment that decreases the quality of life (QOL) in men which causes LUTS (Son & Park, 2015).

It has been estimated that the actual cost of management and treatment of BPH comprises of three components. Direct costs (the resources used for the prevention and treatment of the illness and associated diseases), indirect costs (loss of productivity due to absence of affected patients from work) and lastly, intangible costs (psychological costs such as pain, suffering and discomfort caused by the disease). Vuichoud & Loughlin (2015) estimated that the annual treatment cost of BPH is approximately $4 billion in the United States. Even though BPH is regarded as a disease of older men, the costs of treating BPH begin to amass with men aged 40years and above.

Lower urinary tract symptoms is normally associated with benign prostatic hyperplasia (BPH). The burden of BPH on healthcare system and society may

increase due to the ageing population (Speakman et al., 2015). Men who have severe LUTS have a 63% increased risk of falling at least twice within one year compared with men with no symptoms. Falls which occur in older men are associated with morbidities which include pain and fractures (Parsons, 2010).

1.2 Problem Statement

Benign prostatic hyperplasia occurs in about 15% to 60% of men who are aged more than 40 years and its prevalence increases with age (Wang, Guo, Zhang, Tian, & Zhang, 2015). Although BPH is not fatal, it is linked with serious morbidities which include increased risks of falls, depression and diminished health related quality of life. BPH when left untreated leads to complications such as acute urinary retention (AUR), renal insufficiency and failure, urinary tract infections and bladder stones (Wang et al., 2015). Annual healthcare costs of benign prostatic hyperplasia have been estimated as placing a considerable burden on the patients, families and the society. Currently in Ghana, studies that have been done in the area of prostate disorders are mostly to estimate the prevalence of BPH (Kenneth et al., 2016; Obu, 2014). Conversely, no hospital-based study has been done so far to estimate the economic burden of BPH in Ghana.

The most common prostate problem in the aging Ghanaian male is BPH and is a main cause of lower urinary tract symptoms presented by most men. As the population of Ghana ages, the prevalence of BPH is likely to increase (Obu, 2014). Total cost associated with the treatment of BPH is approximately US $3.9 billion in the United States and £180 million in the United Kingdom. Major expenses for diagnosis and treatment associated with BPH constitute an important global public health concern (Wang et al., 2015). The economic burden of prostate diseases may be attributed to

several causes which include poverty, lack of access to appropriate health facilities, cost of management of prostate diseases, lack of adequate knowledge about prostate diseases, cultural and religious beliefs and lack of routine medical check-ups. The aim of this study is to estimate the direct, indirect and intangible costs associated with benign prostatic hyperplasia among males aged 40 years and older who visit the Trust Specialist Hospital urology clinic in Greater Accra Region.

1.3 Study objectives

1.3.1 General objective

The general objective of the study is to determine the economic burden of benign prostatic hyperplasia to patients at the Trust Specialist Hospital in Greater Accra region.

1.3.2 Specific objectives

1. To determine direct costs of benign prostatic hyperplasia to patients
2. To determine indirect costs of benign prostatic hyperplasia to patients
3. To determine intangible costs of benign prostatic hyperplasia to patients

1.4 Research Questions

The overarching research question that is driving the study aims to find out economic burden of benign prostatic hyperplasia to patients. To describe a clear picture of the general question, the study seeks to answer the following specific questions:

I. What are the direct costs of benign prostatic hyperplasia to patients at Trust Specialist Hospital?

II. What are the indirect costs of benign prostatic hyperplasia to patients at Trust Specialist Hospital?

III. What are the intangible costs of benign prostatic hyperplasia to patients at Trust Specialist Hospital?

1.5 Justification of study

As the population of Ghana is gradually aging, the prevalence of BPH is likely to increase (Obu, 2014). Due to the fact that BPH is a chronic condition which normally occurs in men 40 years and above who are mostly in their productive years, it poses a huge economic burden on patients, their families and the society as a whole. Findings from this study may therefore provide data on the cost of illness of BPH and thus can serve as the basis for early detection and management to reduce cost. Additionally, the study findings may guide public health educational programs on BPH which can assist in the development of appropriate public health interventions in the management of BPH. Furthermore, findings from this study may help inform practice on the need to enhance policy formulation and implementation, to educate service providers and the public on the importance of prostate health. Finally, this study may provide useful information for further research for both researchers and students on this topic especially in Ghana.

1.6 Conceptual framework

The economic burden of BPH can be discussed under three main categories; these are the direct, indirect and intangible costs as shown in Figure1. Patients at the Trust Specialist Hospital expend direct, indirect and intangible cost in the treatment and management of BPH. The total cost expended by patients at the hospital describes the economic burden of BPH on patients. The burden of the costs could be driven by cost of drugs or diagnostics or consultation and this could affect directly the individual and

the household. WHO establishes that health care expenditure that exceeds 40% of household budget is burdensome. The direct costs can further be categorised as medical and non-medical costs. Direct medical costs capture all the clinical costs incurred directly by the patients. Clinical costs include physician (urologist) visits due to BPH, hospital admissions due to BPH, diagnostic tests which includes laboratory tests, X-rays, scans and medications. The direct non-medical costs are transportation costs due to physician visits incurred by patients as well those accompanying patients. Other miscellaneous costs such as feeding costs are payments for food and drinks while seeking treatment.

The indirect costs are costs not directly incurred by patient. Indirect costs refer to loss of productivity, which includes costs of absenteeism (time missed from work due to BPH) and reduced productivity while at work due to BPH. It also includes waiting time at the hospital. Intangible costs describe costs which cannot be expressed directly in monetary value. These are normally referred to as psychological costs. It includes anger, stress, suffering, discomfort and pain due to BPH borne by patients. These discomforts could further lead higher economic burden as it may lead to more medication or diagnostics

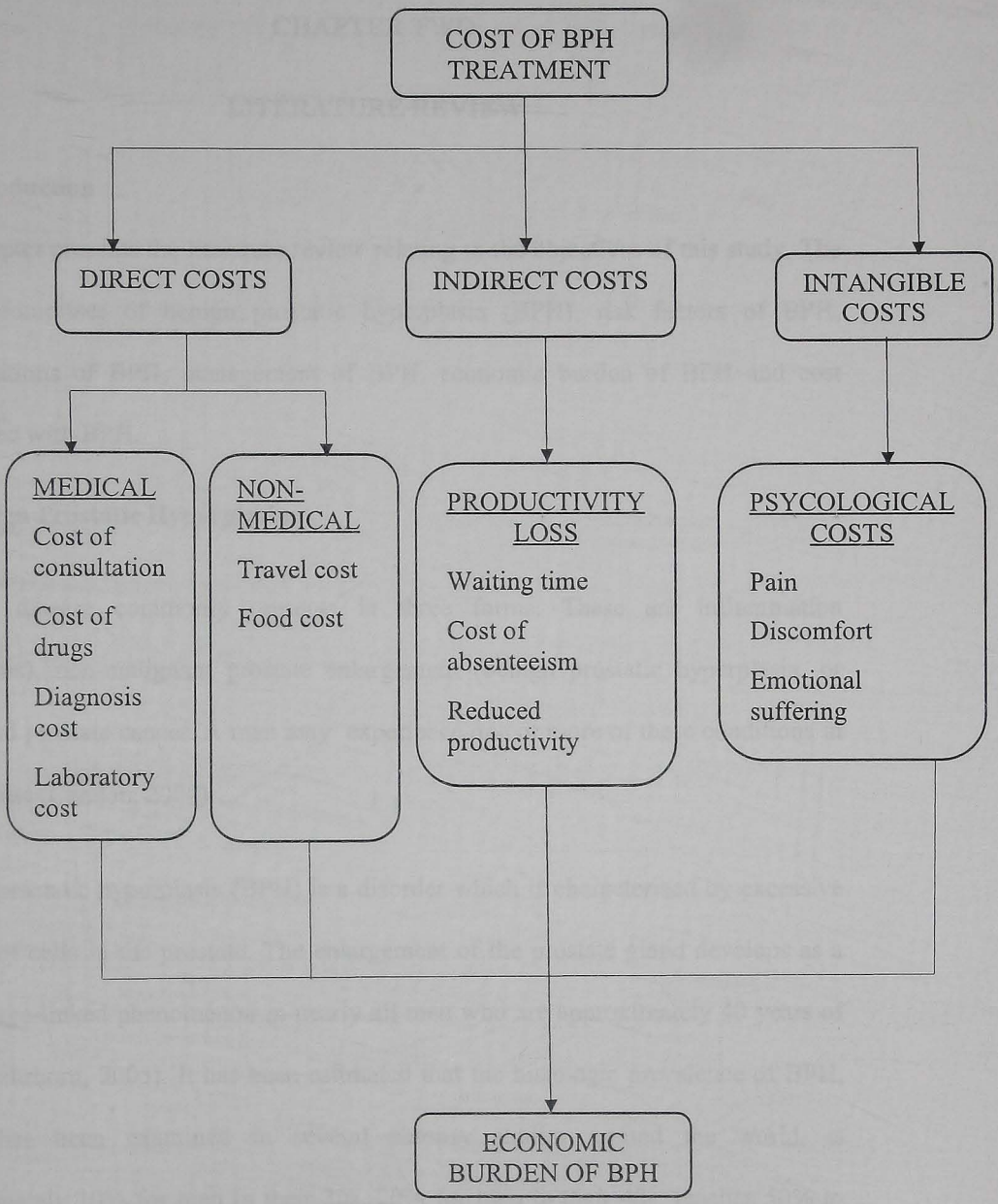

Figure 1: Conceptual framework of economic burden of prostate disease in patients at Trust Specialist Hospital

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review relating to the objectives of this study. The review comprises of benign prostatic hyperplasia (BPH), risk factors of BPH, complications of BPH, management of BPH, economic burden of BPH and cost associated with BPH.

2.2 Benign Prostatic Hyperplasia

Prostate disease commonly presents in three forms. These are inflammation (prostatitis), non-malignant prostate enlargement (benign prostatic hyperplasia, or BPH) and prostate cancer. A man may experience one or more of these conditions in his lifetime (Carlson, 2004).

Benign prostatic hyperplasia (BPH) is a disorder which is characterized by excessive growth of cells in the prostate. The enlargement of the prostate gland develops as a strictly age-linked phenomenon in nearly all men who are approximately 40 years of age (Roehrborn, 2005). It has been estimated that the histologic prevalence of BPH, which has been examined in several autopsy studies around the world, is approximately 10% for men in their 30s, 20% for men in their 40s, reaches 50% to 60% for men in their 60s, and is 80% to 90% for men in their 70s and 80s (Roehrborn, 2005).

Lower urinary tract symptoms (LUTS) of benign prostatic hyperplasia (BPH) are common clinical presentation in elderly men. LUTS characterize a group of chronic urinary disorders that occurs among 15% to 60% of men aged 40 years and over. The

typical symptoms associated with LUTS consist of frequency in urination, urgency in urination, nocturia, difficulty initiating urination, sense of incomplete bladder emptying, decreased force of stream, and interruption of stream (Parsons, 2010).

However, LUTS are not specific to only one disease, they may also be existent in many other ailments such as cardiac failures, urinary tract infections, diabetes, bladder neck cancer, and neurological diseases including Parkinson disease (Kenneth et al., 2016).

Universally, the most common urological disorder which affects about 15-60% of men aged 40 and above is benign prostatic hyperplasia (BPH) (Rencz et al., 2015). Hospital-based studies done in Nigeria and Ethiopia reported a prevalence of 88% and 84.4% respectively. Medical BPH is a term identical with LUTS in the presence of prostate enlargement detected normally on digital rectal examination (DRE) (Kenneth et al., 2016).

2.3 Risk Factors of BPH

Studies Hoke & Mcwilliams (2008), Obu (2014), Parsons (2010),Vuichoud & Loughlin

(2015), have identified risk factors of BPH to include; demographic factors such as gender, age and race. It is clear that the male sex (with functioning testes present at the time of puberty) and aging are paramount to the development of BPH. The prevalence of BPH increases with age and is about 47% higher amongst black men. Genetic factors such as family history and sex hormones synthesis (testosterone), is also a risk factor associated with BPH. Early signs of BPH are suggestive of familial disease. Higher levels of dihydrotestosterone (DHT), a metabolite of testosterone has

been associated with the development of BPH Chokkalingam et al.(2012),Gyasi-sarpong et al.(2012), Obu (2014). Lifestyle factors such as sedentary lifestyles, obesity, high dietary consumption of polyunsaturated fats as well as diets with high levels of beef products, increases the risk of BPH Bruskewitz, Foster, Mcnally, Chan, & Zuckerman (2010), Obu (2014),Rohrmann, Platz, & Giovannucci (2005), Vuichoud & Loughlin (2015). Medical factors which include systemic hypertension increase the risk of LUTS by 76%. Elevated fasting blood glucose also increases the risk of BPH. Glucose regulation is hypothesized to influence prostate growth. Elevated insulin levels are associated with increased prostate volume.

2.4. Complications of BPH

The signs and symptoms associated with BPH according to Obu (2014), Rohrmann et al.(2005), Vuichoud & Loughlin (2015) are pointed out as weak or slow urinary stream, feeling of incomplete bladder emptying, difficulty starting urination, frequent urination, urgency to urinate, getting up frequently at night to urinate, urinary stream that starts and stops, straining to urinate and continued dribbling of urine.

BPH is a progressive disease, which when left untreated may lead to serious morbidities which include an increased risk of falls, depression and diminished health-related quality of life, based on qualities such as sleep, decreased activities in daily life and sexual activities (Speakman et al., 2015). When BPH is left untreated, may lead to enlarged prostate volume and reduction in maximum urinary flow rate. These may further lead to complications such as acute urinary retention (AUR), renal insufficiency and failure, urinary tract infection, and bladder stones (Wang et al., 2015).

2.5. Management of BPH

The management of BPH involves two main aims: to reduce the problem of the symptoms and to prevent or delay the advancement of BPH related symptoms. There are diverse levels of treatments which exist for BPH symptoms and its consequences. These include, watchful waiting, surgery and medication (Vuichoud & Loughlin, 2015). Treatment options for BPH are normally guided by severity of BPH symptoms (IPSS score), existing signs of complicated LUTS (gross haematuria, recurrent urinary tract infection), how much the symptoms are bothering the patient and lastly patient preference (Miller & Miller, 2011). Doctors usually consider the presence of age-associated comorbidities such as diabetes, metabolic syndrome or erectile dysfunction (ED) and the potential for a given treatment to negatively affect these disorders. Patients who present with bothersome symptoms may be predominantly treated either medically or surgically (Vuichoud & Loughlin, 2015).

Medical treatment is a common prime preference in patients with mild or moderate voiding symptoms. There are six classes of drugs that are presently available to manage symptomatic LUTS associated with BPH: alpha blockers, 5-alpha reductase inhibitors, phosphodiesterase type 5 inhibitors, antimuscarinics, beta-3 adrenoreceptor agonists and a variety of complementary and alternative medicines (Vuichoud & Loughlin, 2015).

2.6 Economic Burden of BPH

The WHO Global Burden of Disease study in 2012 estimated BPH to be responsible for about 5.5 million disability-adjusted life years (DALY) worldwide (Rencz et al., 2015). With the increasing life expectancy, the rate of BPH is steadily rising and

society ages, BPH is leading to rising health care costs (Rencz et al., 2015). BPH is ranked the fifth most prevalent non-cancer related disorder amongst men and thus accounts for the seventh highest one year disease specific medical costs (Hollingsworth & Wei, 2006).

The main risk factor for developing BPH is aging and is a major public health and public policy concern, mainly in the fields of social security, pension-systems, and financing and provision of healthcare services (Kovács, 2015). According to Kovács (2015), age-linked diseases which includes BPH are key cost drivers of healthcare financing. Financing the rising demand for healthcare owing to BPH treatment is a major challenge for societies and economies. In the United Kingdom, BPH is estimated from hospital statistics from 2007-2008, represents the fifth most expensive disease accounting for an estimated expenditure of about £1.16 billion each year (Fitzpatrick & Prostate, 2010). In the United States, studies reported total medical expenses with BPH were estimated to be $776 million in the United States in the year of 2000.Another study in New Zealand also estimated the annual cost of treating BPH was about $8.73 million (Chung, Tzeng, Lin, Huang, & Chung, 2016). Medical expenditures for treating BPH represent tremendous financial burdens on healthcare delivery systems.

Even though BPH is not a grave condition, it can affect quality of life (QOL) of patients to varying grades. As demonstrated in several studies, LUTS associated with BPH was linked to worsening of all dimensions of general health. Evidence exists that BPH progressively decreases a patient's self-confidence (Emberton & Martorana, 2006).

According to Emberton & Martorana (2006), findings from the studies indicated that men were bothered by a combination of symptom severity, psychological distress, negative evaluations of BPH, and beliefs about the reaction of others. The impact of the burden BPH goes beyond the patient as it transcends to partners as well. According to Speakman et al.(2015), partners of men with BPH also have significant morbidity due to their husband's or partner's condition. A study in Greece, in which the male partner had been diagnosed with BPH, found that 18% of partners had minor sleep disruption and 10% reported severe sleep disruption. Additionally, impairment of sexual activity as well as impact on social life had detrimental effects on their relationships.

The exact cost of management and treatment of BPH comprises of three main components. First of all, direct cost which constitutes medications, diagnosis, consultations, diagnostic tests and hospital admissions. Indirect cost comprises of productivity losses whereas intangible costs consist of pain, discomfort and suffering (Vuichoud & Loughlin, 2015). Saigal & Joyce (2005), Taub & Wei (2006),Vuichoud & Loughlin (2015) additionally explained that cost of illness identify three main categories of costs: (a) direct costs, for which payments are made, (b) indirect costs, for which resources are lost, and (c) intangible costs, which describe the setbacks of an illness such as pain, fear, discomfort or depression. However, most costs of illness studies that have been done in relation to BPH mostly constitute direct and indirect costs.

2.7 Direct cost

A study by Fitzpatrick & Prostate (2010), estimated that in 1990 the direct cost of treating BPH in the United Kingdom in primary and secondary care was estimated to

be between £59–77 million. Direct costs according to Scott & Scott (1993), Taub & Wei (2006), Vuichoud & Loughlin (2015),cover expenses for hospital care, physician and other professional services, drugs, diagnoses, imaging (scan and X-rays),procedures and laboratory tests.

Scott & Scott (1993), estimated that the direct cost of treatment of BPH in New Zealand was estimated at (NZ$) 16 million. Similarly, Taub & Wei (2006) from their study estimated that from 1996 to 1998, the average annual spending on BPH medications was $194 million. In the same study, physician office costs for BPH increased by 12.4%, from 291.2 million dollars in 1992 to 327.5 million dollars in 1998.

Another study by Son & Park (2015),which was a retrospective study using the Korean public health insurance database. Patients who were diagnosed as benign prostatic hyperplasia (BPH) from 2004 to 2008 were used in the study. The study showed that the direct cost of BPH in Korea was $66 million.

Another study by Rencz et al. (2015) conducted in Hungary, on cost of illness on medically treated benign prostatic hyperplasia. A cross-sectional multicentre study design was used and was carried out between June and October 2014. A total of six medical centres were used in this study. Patients who have been diagnosed with BPH who had never undergone prostate surgery were enrolled in the study. The direct cost of BPH was treatment in Hungary at the national level amounted to €56.8 million which corresponds to 0.78 % of the total health expenditure in 2013.

2.7.1. Indirect cost of BPH

Rencz et al. (2015) estimated that indirect costs are solely dominated by the loss of productivity. It seems that absenteeism was the main cost driver of the indirect costs. The study estimated an average loss of €120 per patient due to the reduced work productivity caused by urinary symptoms of BPH.

According to Saigal & Joyce (2005), estimations from national employment data suggested that there are more than 2.2 million 45 to 64-year old men in the labour force who may be receiving treatment for LUTS related to BPH in a given year. Men treated with BPH had valued health care cost of $3.4 billion and 2 million lost workdays. If each day of lost work were to cost an employer $250, the indirect cost borne by employers would be approximately $500 million.

Another study by Scott & Scott (1993) estimated the indirect costs in both the private and public sectors in New Zealand. The loss of production for men of working aged less than 65 years of age was estimated at two weeks inclusive of surgery for surgical patients, and one week for patients who were admitted. Loss of production was valued by multiplying the number of days of output forgone by the average male gross weekly earnings. The total indirect costs were estimated at $4 million.

2.7.2. Intangible cost of BPH

Not all economic costs can be measured by monetary values. Some costs are measured based on the subjectivity indicated by individuals and these are also perceived as financial costs. However, very little has been done in relation to intangible cost with respect to BPH.

According Kortt & Bootman (1996), the main burden associated with BPH is the intangible costs borne by patients. Conversely, it is not reflected in the overall aggregate consumption of health care resources. However, most studies on cost of illness of BPH seldom include intangible costs as most studies focused mostly on direct and indirect costs.

2.8. Conclusion

From the reviewed literature, it is apparent that the economic burden of benign prostate hyperplasia is huge and cannot be overlooked. The impact of BPH on both patients and their households in developed countries has been found to be enormous. The cost of managing BPH in developed countries like the United States, United Kingdom, and Hungary among others amounts to millions of dollars annually. Unfortunately there is very little published research done on BPH in Africa especially Ghana and even more scanty information of costing of BPH. Considering the debilitating effect BPH has on finances, it is likely to pose a huge economic burden on patients, their families and the society as a whole.

CHAPTER THREE

METHODS

3.1 Introduction

The chapter outlines the procedure adopted in carrying out the study. The chapter covers the study area, study design, study variables, study population, sample size, sampling procedure, data collection techniques, quality control, data processing and analysis, ethical clearance or considerations, description of subjects, potential risk and benefits and finally data usage and storage.

3.2 Study Design

The study design was a cross sectional descriptive study.

3.3 Study Area

The Trust Specialist Hospital is located in Osu, Kuku Hill in the Klottey Korley constituency of the Greater Accra Region, Ghana. The hospital was established in 1992 as a non-profitmaking health facility to provide healthcare to Social Security and National Insurance Trust (SSNIT) staff and their dependents. The facility was later upgraded into a full-time hospital to spread out its services to the general public.

The Trust Hospital was incorporated in November, 2010 as The Trust Hospital Company Limited (TTHCL). Currently TTHCL has three main (3) Hospitals; The Trust Hospital, The Trust Specialist Hospital and The Trust Mother and Child Hospital and six (6) Satellite Clinics.

The Trust Specialist Hospital which is located at Osu Kuku Hill, is a subsidiary of The Trust Hospital Company Limited. It became operational in September 2012. The major departments at this facility are Ophthalmology, Ear, Nose and

Throat (ENT), Dental, Urology, Laboratory, Pharmacy and Physiotherapy. There are two Theatres at this facility. The staff strength of Trust Hospital Company Limited is about 500. Medical records of patients are done both manually and electronically. The annual attendance report of the Trust Specialist Hospital for 2015 and 2016 was 31,231 and 37,712 respectively.

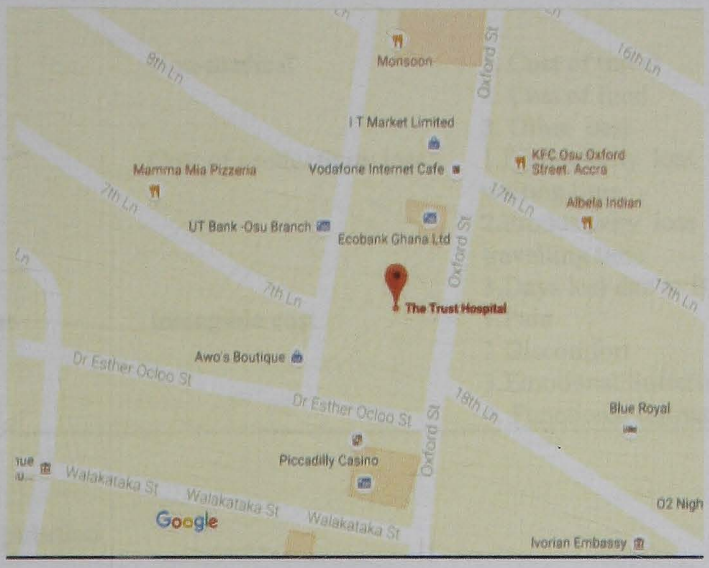

Figure 2: Map of the Study Area

3.4 Study Variables

The variables in this study are direct cost, indirect cost and intangible cost. The average cost was found for each description. It encompassed the type of cost and the explanation of costs that was estimated for the period of the study. Furthermore, the table describes the components of the cost incurred by BPH patients, which were added up to obtain the direct and indirect costs. The intangible cost was also described. The table below describes the measurement of the variables.

Table 1: Operational Definition and Measurement of the Variables

Type of cost	Category of cost	Description (Average cost)
Direct cost	Medical cost	1.Cost of consultation 2.Cost of medication 3.Cost of diagnostics 4.Cost of hospitalizations
	Non-medical	1. Cost of travel 2. Cost of food 3. Other cost
Indirect cost	Cost of productivity loss	1.Productivity loss due to waiting time 2.Productivity loss due to travelling time 3.Days lost due to BPH
Intangible cost	Intangible cost	1.Pain 2.Discomfort 3.Emotional Suffering 4. Functional limitation

3.5 Study Population

The study population comprised of men aged 40 years and above that visited the urology clinic of the Trust Specialist Hospital during the period of the study.

3.6 Sample Size Determination

Using sample size formula by Yamane 1967,

$$n_{\circ} = \frac{N}{1 + N(e)^2} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

n: sample size

N: the population size =785

e: precision, 5% (0.05)

Inputting the above into equation (1), the minimum sample size required for this study was given by

$$n_{\circ} = \frac{785}{1+785(0.05)^2} = 264.5 \approx 265$$

Using the finite population corrector;

$$n = \frac{n_{\circ}}{1 + \frac{(n_{\circ} - 1)}{N}}$$

$$n = \frac{265}{1 + \frac{(265 - 1)}{785}} = 198.2 \approx 198$$

3.7 Sampling Procedure

Purposive sampling was used to select respondents. This sampling procedure was employed because patients that visited the urology clinic presented other urology conditions apart from benign prostatic hyperplasia. Patients' folders retrieved from the urology records were reviewed to select those who have been diagnosed with BPH. Those who were selected were further asked if they wanted to participate in the study. Data was collected until the data collection period was exhausted. Those who participated in the study were 165 out of the estimated 198 for the sample size, representing 83.3% of those who participated in the study. Although purposive sampling comes with a weakness of bias on the part of the researcher, it is however useful in situations where there is limited time to reach targeted sample quickly. In addition, it also has the strength of enabling the selection of respondents that are vital to answering the research questions.

3.8 Inclusion and Exclusion Criteria

3.8.1. Inclusion criteria are as follows:

I. All patients diagnosed with benign prostatic hyperplasia (BPH)

II. Patients must be aged 40 years and above.

3.8.2 Exclusion Criteria are as follows:

I. All men aged below 40 years

II. Male patients diagnosed of other prostate disorders apart from BPH

III. Male patients who are too ill to respond to questions

3.9 Study Tool

A semi-structured questionnaire comprising both open and close ended questions was the tool used to collect data from respondents. The questionnaire was divided into sections. Section 1 focused on the socio-demographic information from the respondents, whiles the subsequent sections contained questions aimed at addressing the main objective of the study.

3.10 Quality Control

Research assistants with basic knowledge of BPH were engaged and trained prior to administering of the questionnaires. All completed questionnaires were validated weekly before data entry. All uncompleted questionnaires were not captured. After the data entry process, the dataset was cleaned before analysis was done.

Two research assistants, with knowledge on the research topic who could read and write English and understood some of the local dialect (Twi, Ga, Ewe and Hausa) were recruited and trained for a period of two days. The first day of the training

involved explanation of the questionnaire, seeking informed consent from the study participants and ethics. Each question on the questionnaire was thoroughly explained to research assistants in order to help them properly explain the questions to the study participants when there was the need for further clarification. They were further trained to conform to the ethical guidelines of the study.

The second day of the training involved administering of the questionnaires at the pre-testing stage. This was done to ensure that the questionnaires were well understood and administered properly. The questionnaire was pre-tested at the out patients department of the Trust Hospital on patients who have urological conditions. The test revealed anticipated problems such as patients' inability to understand questions asked as well as repetition of some of the questions. The questionnaire was then restructured to reflect the intended meaning of the questions asked for patients to easily understand. This further gave the research assistants a better understanding of the questionnaire and also the appropriate response needed for each question asked.

3.11 Data Collection Stage

Data was collected on weekly basis because the urology clinic at the Trust Hospital was two days in a week (Mondays and Wednesdays). Completed questionnaires were checked to ensure that all questions were adequately answered.

3.12 Data Entry and Processing

Completed questionnaires were coded within 24 hours of the data collection days. Data was then double checked before entry was done using Microsoft Excel 2013.

3.13 Data Analysis

The socio-demographic characteristics of the patients were described using frequency and percentages to find the distribution. This was done by importing the data from Microsoft Excel 2013 into Stata14. All cost estimated were cost incurred by the patients for a period of one month preceding the study. Microsoft Excel 2013 was used in the analysis.

3.13.1 Estimation of Direct cost

Total direct cost was estimated by summing up all actual cost incurred directly by patients on medical expenses during their last visit to the hospital. Direct cost was further categorized into medical related and non-medical related cost. Direct medical related cost included all hospital services cost such as consultation, medications, hospitalisations and diagnostic tests (laboratory tests, scans, x-rays). The direct non-medical related cost included transportation cost to and from the hospital by the patient, food cost incurred by patient during treatment period of one month and other cost such as telephone calls made to physician and nurse during care were all summed up. The sum of medical related and non-medical related cost gave the total direct cost.

Direct medical related cost was estimated as follows:

Cost of medicines: This was calculated by summing up all costs incurred by patients on medications during the last visit to the hospital.

Cost of consultation: This was calculated by summing up all costs incurred by patients as treatment cost of consultation to urology clinic during the last visit to the hospital.

Cost of diagnostics: This was calculated by summing up all costs incurred by patients on all diagnostic tests (laboratory tests, scans, x-rays) during the last visit to the hospital.

Cost of hospitalisations: This was calculated by summing up the costs incurred by patients as treatment cost of hospitalisation (admissions) due to BPH.

The total direct medical cost was obtained by summing the total cost of medicines, consultation, diagnostics and hospitalisations.

Direct non-medical related cost was estimated as follows:

Travel cost: This was calculated by adding all the costs incurred by patients in seeking treatment at the Trust Specialist Hospital for a period of one month.

Cost of food for patient during treatment: This was calculated by summing the costs spent on food incurred by patients during treatment period of one month.

Other cost: This was calculated by summing up all other cost which included telephone calls made to physician and nurse during treatment for a period of one month.

The over-all direct non-medical related cost was calculated by adding up the travel cost, cost of food for patient during treatment and other cost.

Total direct cost was calculated by summing the total direct medical related cost and the total non-medical related cost. The average cost of each variable in the direct cost was found as well as the percentage to find the distribution of the total cost.

3.13.2 Estimation of Indirect cost

Indirect cost was estimated using the human capital approach which measures output loses through loss of productivity for a period of one month. The productivity days lost due to absenteeism and inability to work due to BPH was estimated by using the daily minimum wage of GHS 8.80 (US$ 2.02) per day for working class patients. For the pensioners, their productivity loss was not valued because they have no market value. The study acknowledges that assigning no market value to pensioners may be an understatement of the true indirect cost. Travel time was calculated by summing the total number of hours spent by travelling to and from the hospital. Productivity loss due to waiting is the value sum of the hours spent waiting for treatment at the hospital (i.e. from the time patient arrived at the hospital to the time the patient took their medication and finally left the hospital). The productivity loss due to BPH to patients is the value sum of the productive hours lost to the patient. The various variables were then converted into monetary value by using the daily minimum wage of GHS8.80 (US$ 2.02) for patients who were in the working class. The over-all indirect cost was estimated by summing the total cost of travel time, waiting time and days lost due to BPH. The total number of days lost to working class patients was also obtained. The results of the processed data were presented in tables and charts to give a visual representation of the findings of the study. The total estimated cost was then converted to United States Dollars (US$) using an exchange rate of GHS 4.36 (the

rate at the time the study was conducted) to be able to compare results with other international studies. Total cost was estimated by summing up both direct and indirect costs. The mean total cost was also estimated.

3.13.3 Estimation of Intangible cost

Intangible costs were estimated using the Likert scale to measure the effect of BPH on patients and their households. For this study, the Likert scale used had five dimensions namely, 1) Not at all; 2) A little; 3) Moderately; 4) Quite a bit; and 5) Extremely in the domains of the intangible costs made of pain, emotional suffering, discomfort and functional limitation. The scores for each domain of the intangible costs were then used to describe that domain. The summation of the domains of intangible costs was scored and re-classified.

Table 2: Likert Scale and Estimation of Score

NUMBER	DOMAIN	DIMENSION	SCORE RANGE
1	Pain	1.Not at all 2.A little 3.Moderate 4.Quite a bit 5.Extremely	Scores range was estimated by multiplying the number of questions under this domain by the number of dimensions
2	Emotional suffering	1.Not at all 2.A little 3.Moderate 4.Quite a bit 5.Extremely	Scores range was estimated by multiplying the number of questions under this domain by the number of dimensions
3	Discomfort	1.Not at all 2.A little 3.Moderate 4.Quite a bit 5.Extremely	Scores range was estimated by multiplying the number of questions under this domain by the number of dimensions
4	Functional limitation	1.Not at all 2.A little	Scores range was estimated by multiplying the number of

	3.Moderate 4.Quite a bit 5.Extremely	questions under this domain by the number of dimensions
Total		Summation of total score
Range		Lowest- Highest range

Composite Intangible Score

The composite score was obtained by summing up the dimensions in each domain and multiplying by the number of questions. The composite score was then reclassified into Low, Moderate and High intangible cost with the corresponding ranges using the descriptive statistics tertile approach as shown in Table 3.

Table 3: Composite Intangible Score Ranges

Number	Score	Dimension	Range
1	5-13	Low	1/3
2	14-27	Moderate	2/3
3	28-40	High	3/3

3.14 Ethical Considerations

The following ethical issues were addressed in this research:

Ethical Clearance and Institutional Permission

Before the commencement of data collection, as a requirement to conduct research on a health facility, ethical clearance was sought from the Ghana Health Service Ethics review committee.

A letter of introduction from the School of Public (SPH) was sent to the management of The Trust Specialist Hospital to inform and to seek permission to use the hospital for the study.

Study Subjects

Though human subjects were involved in this study, the study did not involve the use of biological samples such as body fluids from participants.

Informed Consent

All participants of the research were well informed about the purpose of the study. An appropriately designed consent form was provided for all participants before admission into the study (See appendices I and II).

3.14.1 Potential Risks or Benefits

Both the study population and the society stand to benefit from the study. The study population had knowledge on their monthly expenditure on their BPH condition. The estimation of economic burden of benign prostatic hyperplasia in patients can be used as a platform for sensitizing policy makers and opinion leaders. Subsequently, programs can be instituted to promote men's health, education on benign prostatic hyperplasia to help in early detection and treatment so as to help reduce treatment costs. The study posed no potential risk to the individuals under study, the facility or the general public.

3.14.2 Anonymity and Confidentiality

Information obtained was used purely for the purpose of research thus anonymity and confidentiality was strictly adhered to as names of study participants were not used for any public report. Questionnaires were designed such that it will not include the name of participants; likewise, information gathered from a participant was not disclosed to another participant.

3.14.3 Voluntary Withdrawal

Permission was sought from participants by giving each participant a written consent form seeking their consent to participate in the study for which each participant was required to append their signature, before information was taken from them. Participants consent to participate in the study was purely voluntary. Under no obligation was a participant forced or coerced to partake in the study against his or her will and study participants had the right or liberty to withdraw from the study at any point in time.

3.14.4 Compensation

No compensation in the form of gift or payment was made to any study participant. The contributions of participants were appreciated and the benefit of partaking in the study was explained to them.

3.14.5 Data Storage and Usage

Serial numbers as well as codes were put on each questionnaire and data entered within 24hours. Printed questionnaires were locked in a safe locker while the soft copies of data were stored on a pen drive, external hard drive as well as on a CD – ROM. Both hard and soft copy data are to be kept by the principal investigator for a period of 3-4 years to allow for publication after which data will be destroyed by

burning the printed questionnaires and deleting all soft copy data previously stored from devices.

3.14.6 Declaration of Conflict of Interest

I therefore declare that, I have no personal concern with regards to the study. The study is purely for academic purpose and for public health importance.

3.14.7 Funding information

The study was self – financed

3.14.8 Assumptions

The assumptions that were made in this study are that;

I. The prevailing national minimum wage in the country is reflective of the average income earned per day by the working class patients.

II. All patients accompanied by relatives due to their condition were made to answer questionnaires only if patients were not in the position to answer questions.

3.14.9 Limitations

The estimated sample size of 198 could not be reached due to the short duration of the data collection period as well as the days the urology clinic at the hospital were held (Mondays and Wednesdays). The total number of days lost as well as time spent with regards to BPH, transport and waiting time for urology services was based on the recall of respondents which might not be accurate and exact. Most patients were not willing to take part in the study.

CHAPTER FOUR

RESULTS

4.1 Socio-Demographic Characteristics of Respondents

A total number of 198 questionnaires were administered to men attending the urology clinic of the Trust Specialist Hospital and presenting with benign prostatic hyperplasia (BPH) with 165 respondents consenting to be part of the study representing 83.3% response rate.

Table 4 presents the demographic characteristics of patients used in the study. As shown in the table, 40% (66) were between 60-69 years, whilst the least of 3% (5) were ≥80years. The reported mean age was 63 years. Majority of the respondents interviewed were married representing 90.9% (150) and 1.8% (3) were divorced.

About 63% (104) of the participants had attained tertiary education and 0.6% (1) had primary school education. Furthermore, it was revealed that 61.8% (102) of respondents were pensioners while 38.2% (63) were still in active employment. Out of the 38.2% (63) that were in active employment, majority were private sector workers representing 58.7% (37) whilst minority of those employed were 3.2% (2) representing teachers and traders (Table 4).

About 50.9% (84) of the respondents earned below GHS 2,000.00 (US$ 458.72) per month with a mean number of dependants of 3, whilst 0.6% (1) earned between GHS 6,001.00-8,000.00 (US$ 1,376.37-1834.86) with a mean number of dependants of 2. The average income was estimated to be GHS 2,743.01 (US$ 629.13). A higher proportion of respondents representing 63% (104) had their employers paying for their treatment whilst 28.5% (47) paid out of pocket (Table 4).

Table 4: Socio-Demographic Characteristics of Patients

	Number(n=165)	Percentage (%)	Mean number of dependants
Age(years)			
40-49	7	4.3	
50-69	55	33.3	
60-69	66	40	
70-79	32	19.4	
80+	5	3	
Marital status			
Married	150	90.9	
Divorced	3	1.8	
Widowed	12	7.3	
Educational status			
Primary	1	0.6	
Middle/JSS*	31	18.8	
Secondary/SSS*	39	17.6	
Tertiary	104	63	
Employment status			
Pension	102	61.8	
Employed	63	38.2	
Employment type			
Trader	2	3.2	
Civil servant	22	34.9	
Private sector	37	58.7	
Teacher	2	3.2	
Income status GHS			
Below 2,000.00	84	50.9	3
2,001.00-4,000.00	42	25.5	2
4,001.00-6,000.00	36	21.8	4
6,001.00-8,000.00	1	0.6	2
8,001.00+	2	1.2	5
Payment option for treatment			
Out of pocket	47	28.5	
Private insurance	14	8.5	
Employer	104	63	

*JSS means Junior Secondary School

*SSS means Senior Secondary School

4.2 Direct cost to patient

Table 5 shows the direct cost of BPH to patients. The total direct cost to the patient per month was estimated as GHS 113,414.00 (US$ 26,012.39) making up 99.5% of the total cost for treatment of benign prostatic hyperplasia (BPH) to patients. The average direct cost per patient was GHS 687.36 (US$ 157.65).

4.2.1 Direct medical related cost

The direct medical related cost for BPH treatment per patient for a month was estimated as GHS 515.15 (US$ 118.15) whilst the overall direct medical related cost of BPH of the study population was estimated as GHS 84,999.00 (US$ 19, 495.18) making up 74.5% of the total direct medical cost to patient for the treatment of BPH in this study (Table 5). The cost of medicines accounted for the highest component of 26.5%, which was estimated as GHS 183.32 (US$ 42.02) per patient for a month and an estimated total of GHS 30,247.00 (US$ 6,937.39) for the entire study population (Table 5). Consultation cost was 22.2%, which was estimated as GHS 153.41 (US$ 35.18) per patient for a month and an estimated total of GHS 25,312.00 (US$ 5,805.50) for all respondents (Table 5). Diagnostics cost was estimated at a total of GHS 23,440.00 (US$ 5, 376.15) for all patients who were part of this study representing 20.6% and an estimated GHS 142.06 (US$ 32.58) per patient for a month. Hospitalisation (Admission) cost accounting for 5.3% of the total direct cost and was estimated as GHS 6,000.00 (US$ 1,376.15) (Table 5).The estimated annual total direct medical related cost was GHS 1,019,988.00 (US$ 233,942.16) for all patients whereas the estimated annual direct medical related cost per patient was GHS 6,181.80 (US$ 1,417.18).

4.2.2 Direct non-medical related cost

The non-medical related cost for treating BPH a month was estimated as a total of GHS 28,415.00 (US$ 6,517.20) for the entire study population whilst of the non-medical related cost per patient for a month was estimated as GHS 172.21 (US$ 39.50) in treating BPH (Table 5). The cost components consisted of travel cost, food cost and other costs. The food cost was the major cost component with an estimated amount of GHS 22,160.00 (US$ 5,082.57) representing 19.4% which was the estimated amount for the all the study participants. The food cost per patient was estimated as GHS 134.30 (US$ 30.80) for a month (Table 5).The least cost component was other costs which was estimated at an amount of GHS 215.00 (US$ 49.31) representing 0.2% which was the total estimated amount for the patients whereas GHS 1.30 (US$ 0.30) was the estimated amount per patient for a month (Table 5). The estimated annual overall direct non-medical related cost was GHS 340,980.00 (US$ 78,206.40) for all patients whilst the estimated overall direct non-medical related cost was GHS 2,066.52 (US$ 474.00).

Table 5: Cost of BPH to Patient

Cost Component	Cost		Average cost		Percentage (%)
	GHS	US$*	GHS	USD	
Direct cost					
Medical related cost					
Consultation	25,312.00	5,805.50	153.41	35.18	22.2
Medicine	30,247.00	6,937.39	183.32	42.04	26.5
Diagnostics	23,440.00	5,376.15	142.06	32.58	20.6
Hospitalisation (Admission)	6,000.00	1,376.15	36.36	8.34	5.3
Sub Total	84,999.00	19,495.18	515.15	118.15	74.5
Non-medical related cost					
Travel Cost	6,040.00	1,385.32	36.61	8.40	5.3
Food Cost	22,160.00	5,082.57	134.30	30.80	19.4
Other Cost	215.00	49.31	1.30	0.30	0.2
Sub Total Cost	28,415.00	6,517.20	172.21	39.50	25
Total Direct cost	**113,414.00**	**26,012.39**	**687.36**	**157.65**	**99.5**
Indirect cost					
Valued productive days lost to work	554.40	127.16	8.80	2.02	0.5
Valued waiting time	27.07	6.21	0.43	0.10	0.0
Valued travelling time	33.34	7.65	0.53	0.12	0.0
Total Indirect cost	**614.81**	**141.01**	**9.76**	**2.24**	**0.5**
TOTAL COST	**114,028.81**	**26,153.40**	**697.12**	**159.89**	**100.0**

*USD exchange rate used was equivalent to GHS 4.36 Source: www.bog.gov.gh
*National minimum wage per day for the year 2017 was used to value the productivity days lost to patients

4.3 Indirect cost to Patient

Total indirect cost of treatment of BPH to patients at the Trust Specialist Hospital was estimated as GHS 614.81 (US$ 141.01) with an average of GHS 9.76 (US$ 2.24). The indirect cost to patient represents 0.5% of the total cost of treatment of BPH to patient. The working class respondents formed the group with the highest productivity loss, with days lost to work estimated as GHS 554.40 (US$ 127.16) representing 63

days loss to work per month for those in active employment. Productivity loss due to travelling time was estimated as GHS 33.34 (US$ 7.65) whereas productivity loss due to waiting time was estimated as GHS 27.07 (US$ 6.21) (Table 5). The estimated annual total indirect cost was estimated as GHS 7,377.72 (US$ 1,692.12) for all patients whereas the annual total indirect cost per patient was GHS 117.12 (US$ 26.88).

Table 6: Productivity Loss to Patients

Employment Status	Days lost to work(hours)	Waiting time (hours)	Travelling time(hours)	Total hours
Employed	1512	73.8	90.9	1676.7
Pensioners	0	111.8	144.2	256

4.3.1 Total Productivity Days Lost to Patients

The total number of hours lost to patients who were in active employment as a result of seeking treatment for BPH was 1676.7 hours for a month (Table 6). The average number of days lost for an employed patient was 1day in a month.4.4

4.4 Total cost of BPH to Patients

The total cost of BPH treatment to patients was estimated to be GHS 114,028.81 (USD$ 26,153.40). Direct cost accounted for a higher proportion of the total cost representing 99.5% of the total cost whilst indirect cost accounted for 0.5% of the total cost (Figure 3).

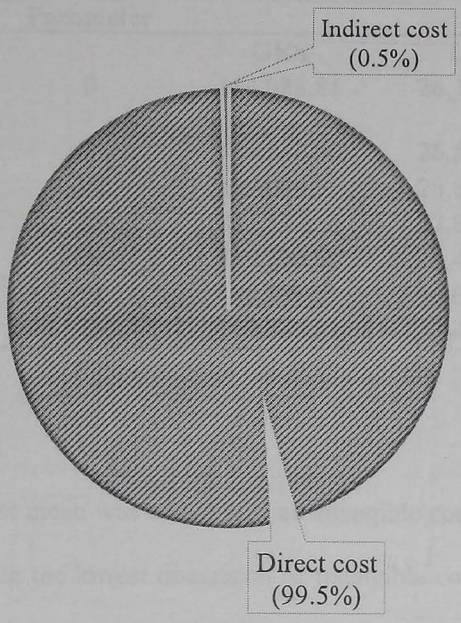

Figure 3: Total cost of BPH to Patients

4.5 Sensitivity Analysis of the cost of BPH

Sensitivity analysis was performed to determine the robustness of the study. The components on which the sensitivity analysis was performed were the cost of medicines and cost of diagnostics. One way sensitivity analysis was performed by varying the increase in cost by 5%, 10% and 25%. The variation of 5%, 10%, and 25% in cost of medicines produced a percentage change of 1.3%, 2.6% and 6.6% respectively in the total cost. Also, variations of 5%, 10%, and 25% in cost of diagnostics produced percentage change of 1%, 2.1%and 5.1% in total cost. The results of the sensitivity analysis are shown in Table 7.

Table 7: Sensitivity Analysis of Total cost of BPH

Scenario	Cost Component	%Change in Parameter	Total Cost		%Change in total cost
			GHS	US$	
Baseline scenario		0	114,028.81	26,153.40	0
*variation	Medicines	5	115,541.60	26,500.37	1.3
		10	117,053.51	26,847.14	2.6
		25	121,590.56	27,887.74	6.6
*variation	Diagnostics	5	115,200.81	26,422.20	1
		10	116,372.81	26,691.01	2.1
		25	119,888.81	27,497.43	5.1

4.6 Intangible cost of BPH

The domain with the highest mean was discomfort as intangible cost with a mean of 2.0 whereas the domain with the lowest dimension of intangible cost was functional limitation with a mean of 1.3 (Table 8).

Table 8: Descriptive Statistics of Likert scale for BPH patients

Number	Domain	Dimension	Frequency (n=165)	Percentage (%)	Mean score
1	Pain	1.Not at all	99	60	
		2.A little	55	33.3	
		3.Moderate	7	4.2	1.5
		4.Quite a bit	2	1.2	
		5.Extremely	2	1.2	
2	Emotional suffering	1.Not at all	117	70.9	
		2.A little	39	23.7	
		3.Moderate	8	4.6	1.4
		4.Quite a bit	1	0.4	
		5.Extremely	1	0.4	
3	Discomfort	1.Not at all	48	28.8	
		2.A little	78	47.2	
		3.Moderate	27	16.7	2.0
		4.Quite a bit	9	5.5	
		5.Extremely	3	1.8	
4	Functional limitation	1.Not at all	125	75.7	
		2.A little	37	22.1	
		3.Moderate	2	1.6	1.3
		4.Quite a bit	1	0.6	
		5.Extremely			

4.7 Composite Intangible BPH score

The intangible cost for BPH patients at the Trust Specialist urology clinic was further described using the corresponding composite scores of low, moderate and high intangible cost of BPH. The highest composite BPH score was the low dimension constituting 78% (129) of the total score and the least score was the moderate dimension representing 22% (36) of the total score (Figure 4).

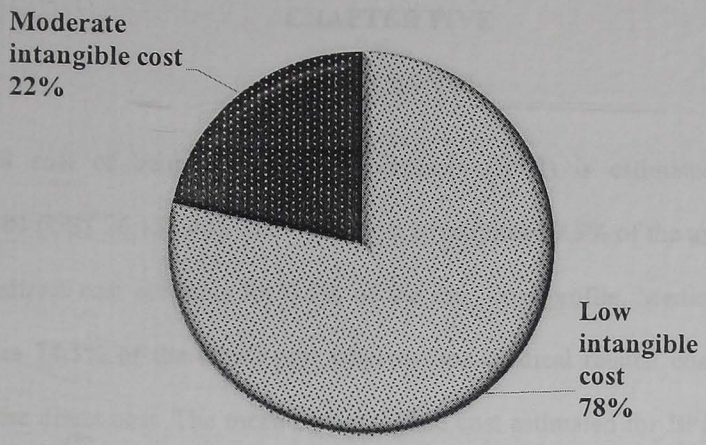

Figure 4: Composite intangible BPH score

CHAPTER FIVE

DISCUSSION

The total cost of benign prostatic hyperplasia (BPH) is estimated to be GHS 114,028.81 (US$ 26,153.40). The direct cost constitutes 99.5% of the total cost profile whilst indirect cost accounts for 0.5% of the total cost profile. Medical related cost constitutes 74.5% of the direct cost whereas non-medical related cost accounts for 25% of the direct cost. The mean for intangible cost estimated for BPH patients was highest for discomfort (2.0) and least for functional limitation (1.3).

5.1 Direct cost of BPH

This study reveals that the direct cost for the treatment of BPH is high compared to the indirect cost. This is evident in the proportions of the direct and indirect cost estimated which are comparable to similar studies done in other countries. This finding is similar to the direct cost estimated in Hungary by Rencz et al. (2015) who found out that the direct cost constituted about 77% of the total cost of treatment for BPH. The proportion of cost reported in this study is higher as compared with the study done in Hungary. The direct costs was higher in the study done in Hungary which was estimated at US$ 989.88 as the average annual cost per patient for BPH treatment as compared to (US$ 157.65) per patient per month estimated in this study. However, the estimated annual total direct cost per patient is estimated as (US$ 1,891.80) which falls in line with the findings of the study done in Hungary as both studies show a high direct cost component. This may be attributed to the perspective and duration of the two studies. Whilst this study estimated costs from the patient perspective, Rencz et al. (2015) estimated costs from the societal perspective. The societal perspective considers the costs incurred by both the patient and the health

care provider. Also, the cost estimated from this study was for a one month period whereas the study by Rencz et al. (2015) was an annual estimated cost. Both studies however used similar cost components such as consultation, medications, diagnostic tests and travel costs.

Another study by Scott & Scott (1993), in New Zealand also estimated direct cost of benign prostatic hyperplasia treatment to be US$ 8,731,200.00 annually from the societal perspective. The estimated overall annual direct cost in this study is estimated at US$ 233,942.16. This further goes to agree with the study done in New Zealand. Furthermore, another study by Saigal & Joyce (2005), also estimated the annual direct cost per patient from the health system perspective to be US$ 3,257.00 thus further confirming that the direct cost incurred in the treatment of BPH is high. Comparing the direct cost of treatment of chronic diseases such as diabetes also from a study by Quaye, Amporful, Akweongo, & Aikins (2015) in Ghana, which constituted 78% of the cost in managing diabetes. Thus this may further be explained in comparison to the findings in this study that the direct cost incurred by patients in treating or managing chronic diseases is quite high due to the medical resources needed to give necessary treatment and management for such lifelong diseases. The direct non-medical cost of treatment has the highest cost component being food cost, representing 19.4% of the total direct cost of 99.5%. A study conducted by Kristal et al (2008) in the United States of America found evidence that dietary patterns of high vegetables and proteins, moderate alcohol intake and low fat and red meat may reduce the risk of BPH thus a change in diet may be useful in the management of BPH. This may be the reason why the food cost of the non-medical related cost was high as respondents may have been put on special diets thus increasing the direct cost in this

study. Another study by Bravi et al (2005) in Italy further confirms the relation of diet lifestyles and BPH risk and management.

5.2 Indirect cost of BPH

The indirect cost is estimated as GHS 614.81 (US$ 141.01), constituting the least proportion (0.5%) of the total cost of benign prostatic hyperplasia (BPH). This is contrary to that of Rencz et al (2015) who estimated indirect cost of BPH treatment to be 23% in their study conducted in Hungary. The total annual indirect cost per patient in that study was estimated at US$ 277.44 whilst the estimated annual indirect cost per patient in this study is estimated to be US$ 26.88, thus comparing both studies show that the estimated annual cost per patient in the study conducted in Hungary is higher than as estimated in this study. This may be due to the retirement age stated in their study as 65 years; hence patients with BPH spent more years in active employment therefore increasing their productivity loss as compared to the retirement age of 60 years used in this study. This further goes to concur with another study by Saigal & Joyce (2005) conducted in the United States of America who also estimated an annual indirect cost of US$ 5 million, borne by employers as a result of BPH treatment. It must be noted however that, the estimated indirect cost of this study may have been either overestimated or underestimated because respondents who were in active employment may in reality be either earning more or less of the approved national daily minimum wage of the country that was used in to value the productivity days lost. This limitation may be rectified in future studies if respondents are able to give their actual daily wages and productivity time lost. Additionally, productivity losses may have been over or under valued because of recall bias and respondents not knowing the actual hours lost due to BPH. This limitation may be addressed if a

prospective study is undertaken rather than the retrospective approach used in this study.

5.3 Total cost of BPH Treatment to Patients

The total cost of BPH treatment is estimated to be GHS 114,028.81 (US$ 26,153.40). The average monthly cost incurred by patients in the treatment of BPH is estimated to be GHS 697.12 (US$ 159.89). However, the reported average monthly income of respondents is GHS 2,743.01 (US$ 629.13), thus it can be deduced that the cost of BPH treatment to patient accounts for 25.4% of the income accrued to them per monthly basis. This may further be explained by the fact that the payment option at the Trust Specialist Hospital has 63% of the respondents having their BPH treatment cost been paid by their respective employers.

5.4 Intangible cost of BPH

The findings of this study further reveals that the domain with the highest intangible cost to patients with BPH is discomfort (mean score 2) for most BPH patients. This implies that majority of the patients with BPH have some level of discomfort due to their condition. Pain is the second highest domain (mean score 1.5) which may suggest that the intangible cost resulting from the discomfort of patients may be linked to the pain they experience. However, the domain with the least intangible cost is functional limitation (mean score 1.3) which implies that BPH did not affect the functional abilities and activities of patients much. Even though intangible costs to BPH patients may seem to be negligible in this study, the burden of patients to their relatives were not determined hence a limitation of this study. The intangible cost of BPH to patients is further described using the composite scores to determine the

differences of patients' response to the combined intangible cost. The highest composite BPH score is low dimension making up 78% (129) of the total score. This is followed by the moderate dimension representing 22% (36) of the total score. The highest composite score of low implies that responses of more than three-quarters of BPH patients is negligible compared to their responses to the individual intangible cost components. The least composite score of moderate implies that less than a quarter of responses of BPH patients are marginal compared with their individual intangible cost components. This further goes to explain that most BPH patients in this study experienced low intangible costs. Comparing the intangible costs estimated by (Addo, Rebecca, Nonvingo, Justice, Aikins, Moses 2013) which estimated intangible costs of mental illness to be 71.5% of households were affected emotionally by the illness of their relatives. This is contrary to the intangible costs found in this study. This may be due to the difference in perspectives in which both studies were conducted.

5.5 Sensitivity of BPH costs to Changes in Medicine and Diagnostic Prices

The total cost of BPH is most sensitive to 25% variation in both the cost of medication and diagnostics. This is because both the cost of medication and diagnostics are direct cost components thus changes in cost of both components produce changes in the proportions of direct cost than with indirect cost. Comparing the findings in this study with a study conducted by Quaye et al. (2015) in Ghana also showed a sensitive variation in the cost of medicines used in the treatment of diabetes when sensitivity analysis was conducted thus concurring with the findings in this study.

The total cost of benign prostatic hyperplasia treatment to patients at the Trust Specialist Hospital is estimated to be GHS 114,028.81 (US$ 26,153.40) with direct cost constituting 99.5% and indirect cost constituting 0.5%. The intangible cost of benign prostatic hyperplasia to patients is estimated to be low.

It is worth noting that this study was conducted in an urban private hospital and that its findings may not be applicable to an urban public hospital or a rural hospital.

CHAPTER SIX

CONCLUSION & RECOMMENDATIONS

6.1 Conclusion

The economic burden of benign prostatic hyperplasia to patients in this study provides useful information relating to the high cost of treatment of benign prostatic hyperplasia to patients. The direct costs constitutes more than two-thirds (99.5%) of the total costs with the cost of treatment significantly contributing (74.5%) to direct medical cost while indirect cost constituted (0.5%) of the total cost. Furthermore, intangible cost to patients with benign prostatic hyperplasia in this study was found to be low.

6.2 Recommendations

The recommendations of the study are as follows:

1. Further studies should be conducted into estimating the total cost and intangible cost of benign prostatic hyperplasia from the societal perspective in both private and public hospitals across all regions in Ghana.
2. Stakeholders such as the Ministry of Health (MOH) and Ghana Health Service (GHS) should ensure that benign prostatic hyperplasia awareness week is incorporated into the health calendar of the country by the Government to help in early detection to reduce cost of treatment to patients.

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APPENDICES

Appendix I: Respondent Information Sheet

General Information

Title of Research: Economic burden of benign prostatic hyperplasia in patients at the Trust Specialist Hospital.

This study is being conducted by Miss. Doreen Efua Adu-Gyamfi, a graduate student at the University of Ghana, School of Public Health, as part of the requirement in pursuing an MPH programme.

The main objective of the study is to collate the cost incurred by patients in treating benign prostatic hyperplasia. A structured open and close ended questionnaire covering all the objectives of the study will be used for the data collection. A total of 278 participants will be interviewed for this study; this number will comprise male patients that visit the urology clinic of the hospital. The interview will take approximately 30 minutes to complete.

Participants will gain a better insight into the cost of managing BPH and ways of improving how to manage the disease. It will also inform policy makers on better and more effective ways of developing safety interventions and preventive educational campaigns in addition to the body of knowledge on cost of benign prostatic hyperplasia management in Ghana.

The identity of participants will not be disclosed as every questionnaire will be given unique code numbers instead of names, data collected therefore will not be linked in any way to a participant.

Participation in this study is voluntary, quality of health service offered to respondent will not be affected if a participant refuses to take part or even decide not to go on with an interview that has already started. A participant also may also decide not to answer any question that makes him or her uncomfortable.

Before Taking Consent

Do you have any questions you will like to ask about the study? Yes/No

If yes, please indicate the questions below

.....

.....

.....

If you have any further questions concerning the conduct of this study, please do not hesitate to contact the following;

Miss Doreen Efua Adu-Gyamfi on 0243045628

Email-egyaaba@gmail.com

Hannah Frimpong

GHS-ERC Administrator

Numbers: Office; +233302681109, Mobile; 0243 235 225

Email- Hannah.Frimpong@ghsmail.org

Abena Kwaa

Assistant GHS-ERC Administrator

Number; Mobile – 0244 712 919

Email – nanatuesdaykad@yahoo.com

Appendix II: Consent Form

Participant Consent Form – Participants

School of Public Health

College of Health Science

University of Ghana

Project Topic

Economic burden of benign prostatic hyperplasia in patients at the Trust Specialist Hospital.

Background

Dear Participant,

I wish to invite you to participate in an academic research involving male patients that visit the urology clinic of The Trust Specialist Hospital. My name is Doreen Efua Adu-Gyamfi, a student of the School of Public Health, University of Ghana. I am undertaking a study on the topic: **Economic burden of benign prostatic hyperplasia in patients at the Trust Specialist Hospital.**

The objective of this study is to collate the cost incurred by patients in treating benign prostatic hyperplasia. This is to help inform policy makers, on better and more effective ways of developing safety and preventive interventions and also to add to the body of knowledge on cost of benign prostatic hyperplasia management in Ghana.

Procedures

The study seeks to interview the male patients that visit the urology clinic and collate all the cost involved with the management of BPH. Questionnaires would be administered which you would be assisted to fill by myself or a research assistant.

Risks and Benefits

The information you provide will help me understand the costs involved in the management of BPH. The information, I believe, would benefit you in the long run as it would kindle the interest of policy makers to pay more attention to the management of BPH. Your participation in this study would only take 20 minutes of your time. Be assured that the information you will provide would be treated with the uttermost confidentiality and anonymity.

Right to refuse

Participation in this study is voluntary and you can choose not to partake. You are at liberty to withdraw from the study at any time. However, I will encourage your full participation since your participation is important.

Client's Consent

I, ...declare that the purpose, procedures as well as risks and benefits of the study have been thoroughly explained to me and I have understood them. I hereby agree to take part in this study.

Signature of participant / thumbprint.....

Date..... / ..... / .....

Interviewer's Statement

I, the undersigned, have explained this consent form to the subject in simple language that she/he understands, clarified the purpose of the study, procedures to be followed as well as the risks and benefits involved. The subject has freely agreed to participate in the study.

Signature of interviewer.....

Date ..... / ..... / .....

Address

Doreen Efua Adu-Gyamfi

P.O.Box OS 1900

Osu-Accra

0243045628

Email: egyaaba@gmail.com

In case of any concern you can contact the Ethics Administrator, Ms Hannah Frimpong,

GHS /ERC on: 0243235225 / 0507041223.

Appendix III: Questionnaire

Dear respondent,

This is a research being carried out on benign prostatic hyperplasia (BPH) at the Trust Specialist Hospital in Osu of Greater Accra Region. I will therefore like to take a few minutes of your precious time to answer these questions. You are assured that the answers you give will be strictly confidential and your name will not be mentioned in my response report. Thank you.

Qn No.	Questions	Response
Respondent ID: |___|___|___|		
Section 1	**Socio-demographic information**	
1	What is your age in years (i.e. age at last birthday)?	|___|___|years
2	What is the highest level of school you attended? 1. No education 2. Primary 3. Middle 4. JSS/JHS 5. Secondary/Vocational 6. SSS/SHS 7. Higher	
3	What is your current marital status? 1. Married/living together 2. Divorced/ Separated 3. Widowed 4. Never married	
4	What is your employment status? 1. Unemployed 2. Employed	
5	If employed, what is your occupation, that is, what kind of work do you mainly do? 1. Trader 2. Civil servant	

Qn No.	Questions	Response
	3. Health professional 4. Banker 5. Private sector worker 6. Teacher 7. Artisan 8. Fisherman 9. Farmer *If **unemployed**, go to Qn 6*	
6	If unemployed, reason for not being employed? 1. Retired 2. Unable due to BPH 3. Other (please specify).....	
7	What is your average monthly income from all income sources? 1. Main salary ..... 2. Pension ..... 3. Remittances ..... 4. Other specify	
8	How many people are supported on this income?	|__|__|
Section 2	**Health status and treatment information**	
9	What is your current prostate-specific antigen (PSA) level?	.....
10	For how long have you been diagnosed with BPH?	|__|__|
11	Have you been diagnosed with any of the following complications due to BPH? Please tick	
	(a) Urinary tract infection (UTI) 1. Yes 2. No	
	(b) Renal insufficiency 1. Yes 2. No	
	(c) Bladder stones 1. Yes 2. No	
	(d) Erectile dysfunction 1. Yes 2. No	
	(e) Other (please specify)	
12	What condition did you receive treatment for today? a) Urinary tract infection b) Renal insufficiency c) Bladder stones d) Erectile dysfunction e) BPH	

Qn No.	Questions	Response
	f) Other (please specify).....	
13	Do you skip BPH treatment? a) Yes b) No	
14	Why do you skip treatment?	
	a) Cost 1. Yes 2. No	
	b) Work 1. Yes 2. No	
	c) Distance to hospital 1. Yes 2. No	
	d) Nobody to accompany you to hospital 1. Yes 2. No	
	e) Lengthy time spent at hospital 1. Yes 2. No	
	f) Other, please specify	
15	Who pays for your BPH treatment? 1. Self 2. Spouse 3. Parent 4. Brother/sister 5. Son / Daughter 6. Co-operate/Employer 7. Private Health insurance 8. Other (please specify).....	
Section 3	**Direct cost information**	
	Direct medical cost information How much money (GHS) did you spend in the last month for: **(Please skip if bills are paid by company or insurance)**	
	(a) Consultation	

Qn No.	Questions	Response
16	(b) Which of the following test(s) and images have you done in the last month? Please tick where applicable a) Urine test b) Urinary flow test c) Prostate-specific antigen (PSA) d) Prostate biopsy e) Digital rectal exam (DRE) f) X-ray g) CT-Scan	
	(c) How much did you spend on the test(s) and images in the last month?	
	(d) How did you spend on your BPH medicines in the last month? **(Please skip if bills are paid by company or insurance)**	
	(e) Have you been on admission in the last month due to BPH? ..... (f) If yes, how much was your admission cost? ..... **(Please skip if bills are paid by company or insurance)**	
17	***Direct non-medical cost information*** How much money did you spend in the last month for? (GHS)	
	(a) travel cost (i.e. amount spent on transport to the hospital)	
	(b) food cost (i.e. amount spent on food whilst on treatment)	
	(c) Other cost.....	
Section 4	**Indirect cost information**	
18	How many days have you been absent from work (if applicable) in	☐☐ days

Qn No.	Questions	Response
	the last month because of BPH (i.e. treatment, recovery)?	
19	How many minutes did you spend travelling to and from the urology clinic?	☐☐☐ minutes
20	How many minutes did you spend at the hospital?	☐☐☐ minutes
21	Does anyone accompany you to the clinic? 1. Yes 2. No *If **No**, go to Qn 24*	
22	What is kind of employment is the person engaged in? ……	……
23	How much does the person earn averagely per month? ……	……
Section 5	**Intangible Cost information** **The following is a list of statements which reflect how people sometimes feel when you are diagnosed with BPH. After each statement, indicate how often you feel that way. There are no right or wrong answers.**	
	PAIN	
24	There is physical pain due to your BPH 1. None 2. Very little 3. Moderate 4. Severe 5. Very severe	
	EMOTIONAL SUFFERING	
25	There is a feeling of depression due to your BPH 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	

Qn No.	Questions	Response
26	I feel that BPH has affected my marriage 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	
27	Your job side lines you due to your BPH 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	
	DISCOMFORT	
28	Using the washroom causes discomfort due to BPH 1. None 2. Very little 3. Moderate 4. Severe 5. Very severe	
29	There is discomfort at bedtime due to my BPH 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	
	FUNCTIONAL LIMITATION	
30	There is limitation in your activities due to BPH 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	
31	My hobbies are affected due to BPH 1. Not at all 2. Slightly 3. Moderately 4. Quite a bit 5. Extremely	

THANK YOU FOR YOUR TIME

Appendix IV: Ghana Health Service Ethical Approval

GHANA HEALTH SERVICE ETHICS REVIEW COMMITTEE

In case of reply the number and date of this Letter should be quoted.

Research & Development Division
Ghana Health Service
P. O. Box MB 190
Accra
Tel: +233-302-681109
Fax + 233-302-685424
Email: ghserc@gmail.com

MyRef. GHS/RDD/ERC/Admin/App/17/531
Your Ref. No.

Doreen Efua Adu-Gyamfi
University of Ghana
School of Public Health
Legon, Accra

The Ghana Health Service Ethics Review Committee has reviewed and given approval for the implementation of your Study Protocol.

GHS-ERC Number	**GHS-ERC: 14/03/17**
Project Title	Economic Burden of Benign Prostatic Hyperplasia in Patients at the Trust Specialist Hospital in Greater Accra Region
Approval Date	24th May, 2017
Expiry Date	23rd May, 2018
GHS-ERC Decision	**Approved**

This approval requires the following from the Principal Investigator

- Submission of yearly progress report of the study to the Ethics Review Committee (ERC)
- Renewal of ethical approval if the study lasts for more than 12 months,
- Reporting of all serious adverse events related to this study to the ERC within three days verbally and seven days in writing.
- Submission of a final report **after completion** of the study
- Informing ERC if study cannot be implemented or is discontinued and reasons why
- Informing the ERC and your sponsor (where applicable) before any publication of the research findings

Please note that any modification of the study without ERC approval of the amendment is invalid.

The ERC may observe or cause to be observed procedures and records of the study during and after implementation.

Kindly quote the protocol identification number in all future correspondence in relation to this approved protocol

SIGNED.....
DR. CYNTHIA BANNERMAN
(GHS-ERC CHAIRPERSON)

Cc: The Director, Research & Development Division, Ghana Health Service, Accra