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HOUSEHOLD TREATMENT COST OF BREAST CANCER DISEASE AND COST COPING STRATEGY OF WOMEN, PRESENTING AT THE KORLE BU TEACHING HOSPITAL

BY

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DECLARATION

This is to declare that this dissertation is the result of my own research. Published literature of other researchers which have been cited have been duly acknowledged by means of referencing.

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DATE:……...

DEDICATION

Dedicated to Fafa, Mawuli, Aseye, Nunya, Selenu, Seyra, Edem, Klenam, Kwami and Elorm.

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LIST OF ABBREVIATIONS

AJCC	American Joint Committee on Cancer
BOD	Burden Of Disease
BRCA 1	Breast Cancer 1
BRCA 2	Breast Cancer 2
CHE	Catastrophic Health Expenditure
COI	Cost Of Illness
DALY	Disability Adjusted Life Years
DF	Distress Financing
ER	Estrogen Receptor
EU	European Union
FCM	Friction Cost Method
GDP	Gross Domestic Product
GLOBOCAN	Global Cancer Incidence, Mortality and Prevalence
HCM	Human Capital Approach
KATH	Komfo Anokye Teaching Hospital
KBTH	Korle Bu Teaching Hospital
LCIS	Lobular Carcinoma In Situ
NHIA	National Health Insurance Authority
NHIS	National Health Insurance Scheme
PR	Progesterone Receptor
SES	Socio-Economic Status
TNM	Tumor, Nodal status, Metastasis
YLD	Years Lost due to Disability
YLL	Years of Life Lost
WHO	World Health Organisation
WHO-CHOICE	World Health Organisation- Choosing Interventions that are Cost Effective
WTP	Willingness To Pay Method

ABSTRACT

Objective: The study is aimed at determining the household treatment cost of breast cancer and the cost coping strategies of patients at the Korle Bu Teaching Hospital.

Methods: This study is a cross-sectional study involving use of the cost of -illness method to estimate the direct, indirect and intangible costs and the cost coping strategies used by patients and their households during breast cancer treatment at the Korle Bu Teaching Hospital. Data was collected from the breast cancer clinic of the Korle Bu Teaching Hospital. The response rate was 97% with 74 respondents. Data collated was entered into Excel 2013 and exported to STATA 15 for analysis. The study assessed the medical and non-medical expenditure, a univariate and multivariate sensitivity analysis of cost elements, cost by reported financial and physical health status, the time loss to patients and relatives, the psychological burden of illness and the cost coping strategies adopted by households.

Results: The average household expenditure was GHS 5,407.40 (medical expenditure: GHS 4,311.90, non-medical expenditure: GHS 823, indirect cost: GHS 272.40). Majority of respondents experienced a low to moderate intangible cost (97%) and the cost coping strategy mostly used by respondents is the publicly provided strategy (60% utilization rate).

Conclusion: Breast cancer is diagnosed at a relatively young age in Ghana compared to the more developed countries. The direct cost of treatment makes up 95% of the total cost.

CHAPTER ONE

INTRODUCTION

1.1 Background

Breast cancer is the number one cause of death in women globally (Vondeling et al, 2018). According to GLOBOCAN, worldwide, there were 2.1 million new cases of breast cancer diagnosed in 2018, accounting for 25% of all cancer cases in women. The incidence of breast cancer is highest in the Australia subcontinent, Northern, Western and Southern Europe and the Americas (Bray et al, 2018).

It has been found that the incidence of breast cancer has increased by 5% per year in poor and rich nations. For instance the rates in Singapore, Korea and Japan have at least doubled in the past decades. Furthermore, the registry in China has documented an increased incidence between 20% and 30% (Coughlin et al, 2009).

The World Health Organization (WHO) has found that more than 50% of the victims of cancers live in poor countries, and constitutes less than 10% of the cancer care costs. It is also a known fact that poor countries use only 5% of chemotherapeutic medications, while 95% of cancer treatment drugs are sold in richer nations where only 39% of all cancer cases occur (WHO, 2008).

Over the past 20 years, the mortality trends of breast cancer had been relatively stable and even decreasing in many developed countries. However, in developing countries of Africa, Asia, and southern America the incidence of breast cancer has been on the ascendency. There are however variations in the surge of breast cancer cases, Africa is experiencing much lower spread rates

compared to Asia. Nonetheless, the age-adjusted death rate in Africa is the highest worldwide, with Nigeria having the highest death rate (Azubuike et al, 2018).

In Ghana, cancer of the breast is the commonest cause of cancer associated death in women (Thomas et al, 2017). The country however has no official data on breast cancer cases since much of the data remain estimations from health facilities (Thomas et al, 2017).

Most reported cases show that young women suffering from the disease often report late to hospitals at very advanced stages (III and IV), and usually have big masses, with only a few being hormone receptor positive. The advanced stages at presentation imply that there are delays in seeking treatment. Most patients delay as much as 10 months before seeking treatment (Thomas et al, 2017). Clegg-Lamptey(2009) realized that delayed presentation is as a result of several factors. 57% of respondents absconded because of the fear of surgery, another 37% resorted to herbal treatment and 30% sought solace in prayer camps.

The economic cost of morbidity and mortality from cancer globally was $895 billion in 2008. The figure accounts for 1.5% of global GDP in 2008. The productivity losses as a result of breast cancer remain the largest loss to the global economy. Deaths and morbidity from lung cancer, colorectal and breast cancer account for the biggest cost burden globally. Luengo-Fernandez et al (2013) found that the cost burden of lung, breast, colorectal, and prostate cancers in the European Union was about 55·3 billion euros in 2009, accounting for 44% of the economic cost of cancer in the European union.

In Ghana, few studies have been done to estimate the economic burden of breast cancer. Hughes et al (2011), in a study found the direct annual cost per patient to be GHS 2,070.83 and the indirect annual cost to be GHS 3,937.16.

1.2 Problem statement

Luengo-Fernandez et al (2013), found the cost of cancer to the European Union to be 126 billion euros in 2009, with medical cost accounting for 51 billion euros (40%). The economic burden of breast cancer was found to be 15 billion euros. Indirect cost attributable to breast cancer amounted to 3.25 billion euros and cost of informal care averaged some 3.2 billion euros. Richer countries have a higher prevalence of breast cancer, with the exception of Japan, than poorer countries (Igene et al, 2008).There is a knowledge gap, regarding the economic cost of breast cancer in sub-Saharan Africa. In Ghana, the information on the treatment cost of breast cancer is scanty. Most previous studies on the treatment cost of breast cancer in Ghana focused mainly on the direct and the indirect cost. The present study, in addition to the above, will also estimate the intangible costs and the cost coping strategies associated with treatment. The correlation between the health, financial status and the average cost of treatment will also be ascertained.

The cost of breast cancer management in Ghana remains estimations from institutional based studies which are very few. The consequences of not knowing the economic cost of breast cancer management is dire. Policy actors are unable to target resources towards breast cancer care, since they are not aware of the impact on socio-economic growth. In Ghana, the cost of healthcare is mainly borne by relatives, even though the National health insurance partly covers part of the cost. Patients pay for consultation, laboratory investigations, biopsy and imaging. The cost of interventions such as chemo radiation and surgery are also mostly borne by patients. There are two main forms of surgery, breast conservation and mastectomy, each with its attendant cost. The cost of care is overwhelming to patient and their households and may lead to cost coping strategies such as taking loans to offset the cost.

This study would use the cost-of-illness approach to estimate the average monthly household cost of breast cancer, for patients seeking treatment at the Korle Bu Teaching Hospital (KBTH).The outcome of this study maybe instrumental in informing policy changes so far as care for breast cancer is concern. Health resources can therefore be adequately apportioned to cater for the needs of patients who require breast cancer treatment.

1.3 Justification Statement

The purpose of this study is to determine the cost implications of breast cancer management on households affected by the disease. A considerable number of studies have been done on the epidemiology of breast cancer in Ghana, but only a few studies focused on the cost burden of the disease. Due to the limited number of studies done on the cost of treatment, policy makers are unaware of the economic burden of the disease on households. Moreover, the last documented study done on the cost of breast cancer management in Ghana, was five years ago, hence the need for a more current information on the cost burden. Determining the cost of management may influence the targeting of resources towards breast cancer treatment in the country.

1.4 General objectives

The general objective is to determine the household treatment cost of breast cancer and the cost coping strategies of patients at the Korle Bu Teaching Hospital.

1.4.1 Specific objectives

The specific objectives are to:

1. Determine the direct cost (ie medical and non-medical costs) of breast cancer treatment to patients
2. Determine the indirect cost of care to patients

3. Ascertain the intangible (psychological ie pain, stress, fear, anxiety) cost of treatment to patients
4. Assess the cost coping strategy of patients

1.4.2 Research questions

The research questions are:

1. What are the direct costs involved when patients and their relatives seek breast cancer treatment?
2. What are the indirect costs incurred by patients and their household when seeking treatment?
3. What are the intangible costs incurred during treatment?
4. What are the cost coping strategies adopted by patient and their families?

1. 5 Conceptual framework of household treatment cost of breast cancer and the cost coping strategies

There are three kinds of cost incurred by patients undergoing breast cancer treatment. These are the direct (out-of-pocket) cost, indirect or loss of productivity cost, and the intangible cost.

According to Lyman et al (2001), direct health services costs refer to medical and non-medical cost. Direct medical costs represent the costs of services such as consultation, diagnosis, cost of prescriptions and palliative care Direct nonmedical costs refers to expenditure on items such as food and drinks, lodging and transportation.

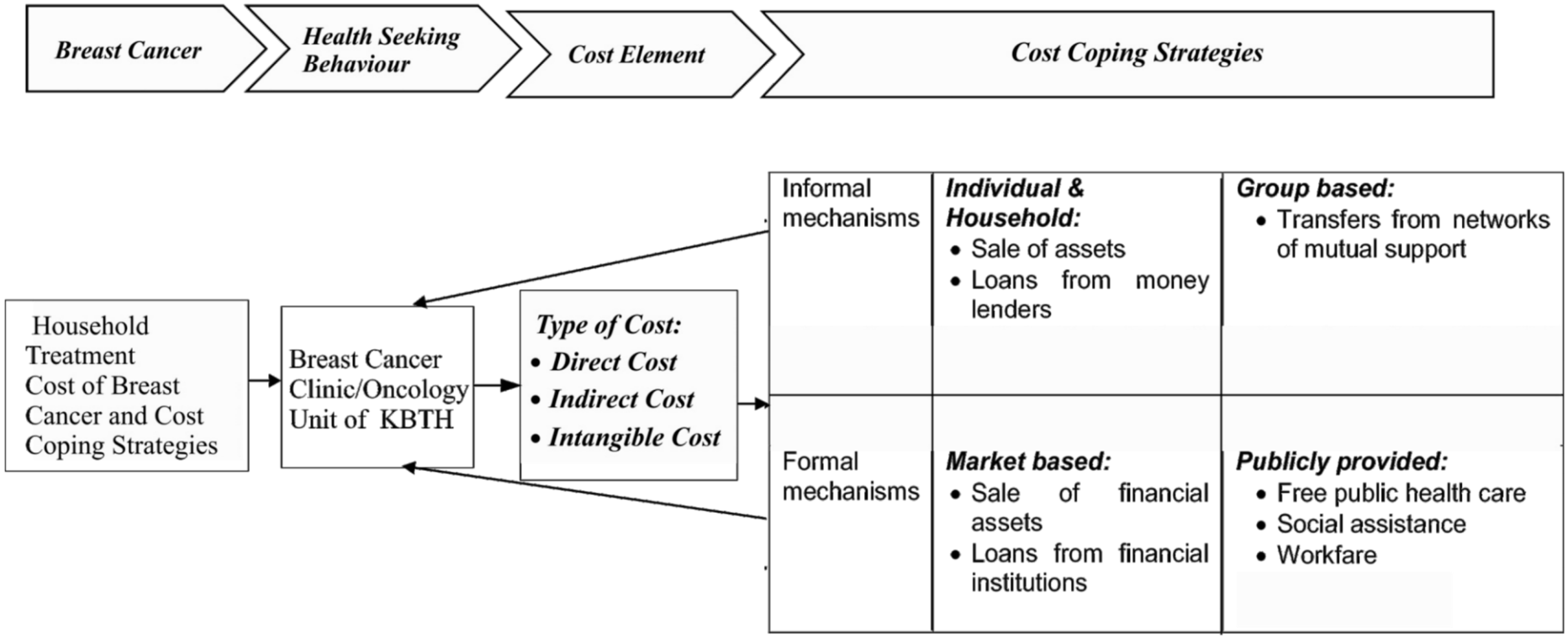
Medical cost includes money spent on consultation, prescriptions, laboratory investigations, radiotherapy, chemotherapy and imaging. Non-medical cost, include money expended on transportation, throughout medical treatment, lodging and feeding cost. Indirect cost refers to

productivity losses, time lost due to travelling, and doctor-waiting time. Productivity losses encompasses the individual's or household members' loss of working time as a result of the illness.

Intangible cost focuses on the psychological impact of the disease. These include fear, emotional pain, depression and loss of companionship. The intangible cost is the most difficult variable to measure, since it is not easily quantifiable in monetary terms. The fourth significant variable is the cost coping strategies adopted by patients. Some may take loans or sell personal assets. Cost related-medical non adherence may also be a coping strategy. (Zullig et al, 2013). This study would use the cost-of-illness approach to estimate the household cost incurred as a result of treatment for breast cancer. It would focus on the direct, indirect, intangible costs and also determine the cost coping strategies used by breast cancer patients as shown in Figure 1.

j **Figure 1: Conceptual framework of household cost of breast cancer treatment**

Figure 1: Conceptual framework of Household cost of Breast Cancer Treatment



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter would focus on breast cancer, its etiology, risk factors, modes of diagnosis, treatment modalities and prognosis. The economic burden of breast cancer management would also be highlighted. The discussion is divided into to six thematic areas, namely, breast cancer etiology and epidemiology, diagnosis, cancer management and prognosis. The rest are the economic burden of breast cancer treatment and the cost burden in Ghana.

2.2 Breast cancer aetiology and epidemiology

Recent information shows that about 2.1 million new cases of breast cancer were reported in 2018, which is equivalent to 25% of cancer cases in women (Bray et al, 2018). As far as cancer cases are concerned, breast cancer is the most commonly diagnosed cancer in a number of countries (154 of 185) and a leading cause of mortality in most countries. The countries exempted are Australia/New Zealand, Northern America (where the predominant cause of cancer deaths is lung cancer), and some sub-saharan countries (where cervical cancer rates predominates). In terms of mortality, Fiji is estimated as having the highest mortality due to breast cancer in 2018 (Bray et al, 2018).

Apparently, new cases of breast cancer have gone up since 2012 given that 1.7 million new cases and 521,900 deaths occurred in 2012 and 1.38 million cases and 458,000 deaths in 2008. Furthermore, it was estimated that 231,840 (29%) new cases of advanced breast cancer occurred in women in the United States in 2015 vis –a-vis 105,590(13%) new cases of lung cancer

(Azubuike et al,2018). According to GLOBOCAN, breast cancer contributes to 11.6% of all new cancers in 2018 and the number one cause of cancer deaths among women.

Globally, the incidence of breast cancer has been relatively stable; however, same cannot be said of sub saharan Africa where the incidence and mortality are on the ascendency. (Azubuike et al, 2018). Investigations by scholars reveal that major triggers of cancer cases are hereditary and genetic factors among persons with a considerable familial history of breast or ovarian cancer. Studies of migrants have found that nonhereditary factors constitute the major impetus for the obvious regional and interracial discrepancies in incidence (Bray et al, 2018).

Ohene-Yeboah et al (2012), indicates that breast cancer among indigenous black African populations are severe with unyielding prognostic features that include youthful age , metastatic disease, large size of lump , high grade histologic subtypes and low rate of hormone receptor status. In Ghana, breast cancer accounts for about 16.0% of all cancers, and is the commonest cancer among females (25%) as 400 new cases are diagnosed yearly in Korle Bu Teaching Hospital in Accra. In Kenya, about 19% of all cancers in women is attributed to breast cancer, in Zimbabwe 12.5% breast cancer cases were recorded, 14. 1 % in Tanzania and 25% in Liberia (Clegg Lamptey, Dakubo, Attobra 2009). Probable risk factors associated with breast cancer can be divided into the nongenetic, non-modifiable risk factors, nongenetic, modifiable risk factors and genetic factors (Winters et al, 2017). The ensuing paragraphs would focus on the various factors implicated in the etiology of breast cancer.

2.3 Non-genetic non-modifiable risk factors

2.3.1 Age factor

The incidence of breast cancer increases proportionally with age as the disease has its peak occurrence around age 60 with a sharp decline which begins at 40 years and diagnosis peak age between 40–50 years in Asian and 60–70 years in developed nations. In Ghana, most patients diagnosed with the condition are relatively young as most of them are in the age bracket of 40 – 49 (Archampong et al, 2009.). New data have found that more than 77% of breast cancer cases in the United States happened in women who are aged 50 or older (Tamimi et al, 2016).

2.3.2. Race

There are disparities in breast cancer cases with regards to race as the overall incidence of breast cancer is lower among black women than in whites. Among the two races however, black women have the highest breast cancer mortality rates for all known stages of diagnosis as black women i are more likely to develop invasive cancers (Winters et al, 2017). Several studies have shown that blacks are generally disadvantaged when it comes to the treatment of breast cancer. Black women were least likely to have undergone a therapeutic surgical procedure or to have received radiation therapy (Eley et al, 1994).

2.3.3 Early menarche/late menopause

Early menstruation and late menopause have significant influence on breast cancer development. The risk of developing breast cancer is about 20% higher in girls that commence menstruation before 11 years than to those that begin at age 13. Furthermore, women who had their menopause at 55 years or older have about a 12% increased risk than women who went through this stage between 50 and 54 years (Winters et al, 2017). Women who experienced a natural

menopause after 55 years are two times likely to develop breast cancer compared to women who had it before 45 years (McPherson, Steel, Dixon. 2000).

2.4 Non-genetic modifiable risk factors

2.4.1 Income, education and health insurance status

All over the world, there remain significant differences in the occurrence of breast cancer among the various socio-economic strata. Studies show that the mortality-to-incidence ratio of breast cancer is decreased in countries with a high human development index than those with low indices (Winters et al, 2017). Educational status was found to be inversely related to breast cancer prognosis. Additionally, the ability to pay for treatment has an influence on availability of health services and breast cancer management whilst a reduced accessibility has been linked to delayed diagnosis and treatment (Winters et al, 2017).

2.4.2 Changing patterns in reproduction

Late childbearing, decrease period of breastfeeding, and the additional use of hormonal contraceptives are associated with a higher risk of developing breast cancer. However, women who have their first child deliveries at younger ages and have more children have less breast cancer risks (Archampong et al, 2009). The risk of breast cancer and postmenopausal carcinoma, triples when the first birth occurs after age, 35. NuIliparity increases the risk and unmarried nulliparous women have a greater risk than those who are married (Winters et al, 2017).

2.4.3 Post-menopausal hormonal replacement therapy

Women on oestrogen-containing contraception and hormone replacement therapy for a period of more than 5 years have an increased risk of cancer. The risk disappears 5 years after cessation of

hormonal replacement therapy (Archampong et al, 2009). It has been observed that cancers seen in women taking hormonal replacement therapy are usually less invasive clinically compared to those diagnosed in women who have not taken hormonal replacement therapy (McPherson, Steel, Dixon. 2000).

2.4.4 Smoking

Smoking has been known to increase the risk of breast cancer but the risk level is higher for women who engaged in smoking before their first pregnancy by 21% and heavy chain smokers (Winters et al, 2017). However, other studies have indicated that there is not much association between smoking and breast cancer (McPherson, Steel, Dixon. 2000).

2.4.5 Previous history of breast cancer

The incidence of breast cancer is 16 times higher in patients who have been treated for cancer of one breast as it is known that 15 % and 16 % of patients who survive 20 and 30 years of breast cancer treatment respectively develop cancer in the other breast (Archampong et al, 2009). It is known that women with severe epithelial dysplasia have a four to five times increased risk of getting breast cancer than women who do not have any of these changes (McPherson, Steel, Dixon. 2000).

2.4.6 Alcohol abuse on breast cancer

Alcohol abuse has been associated with the increased risk of breast cancer as some studies have established a cause and effect relationship, while others found a linkage with cumulative alcohol intake over time (Winters et al, 2017). Tamimi et al, 2016, concluded from their study that

significant reduction in alcohol consumption, together with other modifiable risk factors, can reduce the risk of cancer by 34%.

2.5 Genetic factors

Inherited breast and ovarian cancers are usually caused by mutations in either the BRCA1 or BRCA2 genes. About 3% of breast cancers and 10% of ovarian cancers originate from the mutations in these genes. Moreover, women with these mutations are more prone to the development of cancer by age 70 than others. More risk factors mentioned in literature include cancer of the uterus and ovary, high fat intake, obesity and benign breast conditions contribute to breast cancer among women (Archampong et al, 2009). Patients with cancer in both breast, those who develop multiple cancers, and women who get afflicted an early age are more likely to be carrying mutations that increases their vulnerability to developing cancer (McPherson, Steel, Dixon. 2000).

2.6 Histological types of breast cancer

A review of literature, identifies various histological forms of cancer. The prevalent ones are the ductal and lobular carcinoma-in-situ, invasive ductal and lobular cancers, mucinous type, medullary and papillary cancers. These cancers are of various grades and prognostic factors (Archampong et al, 2009). Different histological types of breast cancer are known to be linked with peculiar biological features which are associated with varied clinical consequences, an example is the tubular carcinoma, which has survival rates similar to normal life expectancy (Rakha et al, 2010).

2.7 Diagnosis of breast cancer

Breast cancer diagnosis involves a combination of three tests, commonly referred to as triple assessment. A focused history and physical examination, radiology and core tissue biopsy for histology. The triple method is used to accurately make a diagnosis of all palpable masses in the breast. The triple method is regarded as positive if any of the components is positive and negative when all components test negative (Jan et al, 2010).

Jan et al, (2010) reported a sensitivity and specificity of 100% and 93% respectively when triple assessment was used in the study of breast cancer diagnosis at the Government Medical College, Srinagar, Kashmir.

Breast Cancer is classified using the TNM classification and AJCC staging system. The TNM classification characterizes the size of the swelling (T for Tumor), the presence of nodes (N for Nodes), and the presence or absence of metastases (M for Metastases). The AJCC staging system further classifies breast malignancy in stages which have their prognostic significance. There are four main stages. The most notable changes in the latest edition of the AJCC staging system for breast cancer are the exclusion of lobular carcinoma in situ (LCIS) from Tis classification and the creation of 2 new types of prognostic stages(Sanders et al, 2018).The disease subtypes are also further classified depending on the cancer response to hormones. Some cancer subtypes respond to oestrogen(ER) and progesterone (PR) and are said to be ER and PR positive, whiles, others do not, and are referred to as ER and PR negative tumors. This classification has prognostic significance.

2.8 Management modalities for breast cancer

The process of diagnosing and treating breast cancer is undergoing a considerable shift from an all-inclusive approach to individualized care. More advanced methods, including molecular

imaging and gene typing has enabled better characterization of tumors. These new methods, coupled with new advances in surgery and radiotherapy, has resulted in a multidisciplinary approach which has minimized treatment failure and increased survival (McDonald et al, 2016). Breast cancer is however, traditionally managed using three main modalities, Surgery, chemotherapy and radiotherapy. A combination of any two of the treatment regimen and in some cases, three can be used (Archampong et al, 2009).

2.8.1 Surgery

In the early part of the 20th century, women with breast cancer were treated by Halsted radical mastectomy (McDonald et al, 2016). The kind of tumor determines the form of surgery performed, it may involve a lumpectomy (removal of the lump only) or mastectomy (removal of the breast). The surgeon ensures that the tissue removed has clear margins devoid of cancer. If the margins are still positive for cancer, further operations would be required (Sharma et al, 2010).

2.8.2 Radiotherapy

Radiation therapy is associated with the usage of X or gamma rays to destroy cancer cells. These radiations are eliminating cancer cells that may remain post-surgery. Radiation therapy is mostly performed after surgery and it is regarded as an integrated component of breast conservation surgery (Sharma et al, 2010). Radiation has been proved to treat effectively stage 0 breast cancer (McDonald et al, 2016).

2.8.3 Chemotherapy

Chemotherapy involves the usage of cytotoxic drugs to kill cancer cells. The treatment of breast cancer entails taking a thorough history, examining the patient and conducting laboratory and

imaging investigations. Chemotherapeutic drugs are usually given in 4 to 8 cycles. Chemotherapy can sometimes be given to reduce tumor size and make breast conservation possible (Sharma et al, 2010). The decision to use these cytotoxic drugs is based on sound clinical judgment and the potential survival benefit to patients amidst the adverse effects (McDonald et al, 2016).

2.9 Prognosis

The likely outcome or prognosis of breast cancer is dependent on a host of factors. These factors need to be taken note of when planning management for these patients. Cao et al (2016), studied the predictive and prognostic factors of breast cancer. They identified varied of factors to have influence prognosis. They identified spread of cancer cells to lymph nodes as the strongest prognostic factor. The lymph nodes function as filters to aid the immune system to eliminate cancer cells, therefore preventing distant spread to organs. Patients with metastatic disease require chemotherapy and elaborate radiation. Cancer subtypes with oestrogen and progesterone receptor positivity are also known to have better prognosis compared to those without. Evidence has shown that even patients with suppressed expression of oestrogen receptors may benefit from hormonal treatment. Tumors with high proliferation rate have a worse prognosis compared to those with low proliferation. The size of the breast lump and the rapid formation of new blood vessels also affect prognosis adversely (Cao et al, 2016).

2.10 The economic effect of breast cancer treatment

Breast cancer treatment has led to the imposition of considerable economic implications on communities and policy actors have a vested interest in comprehending the economic costs of disease so to determine the equitable allocation of state resources to disease categories and to

assess the cost/benefit ratio (Daroudi *et al*.2015). The estimation of the economic burden of breast cancer is approached using the cost of illness method.

A study done in the European union reported that cancer cost the European Union (EU) over 126 billion euros in 2009, with health services constituting 40% of the total cost. Across Europe, the economic cost of cancer was estimated at 102 euros per person, but there were significant variations from Bulgaria to Luxembourg. Losses due to early deaths cost about 42·6 billion and absenteeism from work is estimated to cost an additional 9·43 billion euros. (Luengo-Fernandez et al, 2013) Lung cancer led the pack with an economic cost of 18·8 billion euros, followed by breast cancer (15·0 billion euros) and colorectal cancer (13·1 billion euros).

In the United Kingdom, studies have shown that the direct cost of palliative breast cancer treatment totaled £12,502. A constituent of this estimate is the average monthly cost per patient with Stage IV breast cancer, which sums up to £679 for palliative care (Foster et al, 2011).

In the United States, the total mean cost for treatment of metastatic breast cancer disease was estimated at $35,164 per patient and in multivariation analyses, were found to decline with the age of patients (Forster et al, 2011). Max et al, (2008), found the economic burden of breast cancer in California approached $1.91 billion in 2008. Vondeling and his colleagues in the Netherlands, proffered that breast cancer in the Netherlands has caused over 3000 deaths, resulted in untold hardships and an economic burden of more than 1.27 billion euros (Vondeling et al, 2018).

It is quite apparent from the studies above, that the cost of managing breast cancer is astronomical. Late stages of the disease are associated with higher healthcare cost compared to the early stages. The more developed countries also appears to have more in-depth analysis of

the cost burden of breast cancer to their economies hence are better able to target resources towards the prevention and treatment of breast cancer.

Ranganathan et al (2018) worked on the global burden of breast cancer and came up with some interesting observations; continents with the highest incidence were South Asia and Latin America. These numbers were higher than observations seen in North America. Moreover, it was apparent that countries in South Asia recorded the highest welfare losses to breast cancer.

There is overwhelming evidence that breast cancer takes a toll on many economies. However, lower and middle income countries are at a greater disadvantage. Azubuike et al (2018) concluded from their study that Africa currently has the highest age-adjusted mortality rate due to breast cancer in the world. The scarce economic resources coupled with the scantly equipped medical facilities on the continent makes the situation dire.

Jain et al (2016) studied the economic cost of breast cancer on families in India. Probability sampling was used to sample all districts in Punjab by administering questionnaires to 221 patients. Study results in Punjab showed the direct cost constituted 79% of the total economic burden. Prescriptions, admissions and indirect losses made up over 50% of the total cost. The majority of households surveyed experienced catastrophic health expenditure and distress financing. The cost coping strategies adopted included spending savings (74%), individual and household strategy (88%), relying on networks of social support (55%), and market based (30%). Catastrophic health expenditure was defined as out of pocket expenditure (excluding reimbursement, if any) which is greater than 40% of the total nonfood expenditure of the household. They also defined distress financing as financial activities, such as taking loans from banks/money lenders or selling economic productive assets (fertile land, commercial vehicle, property as source of income etc.).

Most of the women involved in the study were housewives whose wages were estimated using global substitution method, this involves, taking domestic workers as substitute to the housewives, who were paid even lower than unskilled workers in Punjab. Their study also concluded that when treatment was sought from public hospitals, 46% households had faced distress financing, as compared to the 54% of households who sought treatment in private facilities. The percentage of borrowing was greater among the households who had sought treatment in private sector (17%) as compared to the public sector (14%) (Jain et al, 2016).

Daroudi et al (2015), estimated that the economic cost of breast cancer treatment in Iran was close to a billion dollars. Substantial component of the cost was as a result of productivity losses to the disease and the direct medical cost accounted for just 19% of the total cost. Chemotherapy constituted the main component (about 80%) of the medical cost.

In order to determine the direct medical costs, they categorized the whole disease process into three phases: initial care, continuous care and terminal care. The initial costs included the diagnosis cost, the cost of surgery and chemo-radiation. The continuing costs included the cost of endocrine treatment, OPD visit, laboratory and imaging services. The terminal care cost was the cost of the last year of life. To calculate the direct medical costs, they estimated the mean cost of care in each phase and multiplied by the number of patients who received treatment (Daroudi et al, 2015).

The two studies done in Punjab, India and Iran emerged with two contrasting outcomes. Whiles in India, direct cost constituted the largest component of total cost of illness (79%), it made up a relatively smaller percentage in the Iran study (18.56%). Following in that trend is the productivity losses, whiles it assumes a larger share in the Iran study (77%), it is smaller component in Punjab (13.44%). Perhaps, differences in study design could have accounted for

the contrasting outcomes. It is also essential to observe that the study in Iran was on a national scale using the prevalence based approach whiles in India, it was on a much smaller scale and limited to the district of Punjab. (Daroudi et al, 2015, Jain et al, 2016).

Kim (2015) researched on the economic cost of breast cancer in Korea. The prevalence-based method was used to estimate the burden of breast cancer on the economy between 2007 and 2010. The inclusion criterion was breast cancer patients who were admitted or visited an OPD clinic during the period. The costs of breast cancer was divided into two, namely, direct and indirect. Within the period reviewed, the rate of breast cancer managed went up from 7.9% to 20.4%. The economic losses to the state as a result of breast cancer increased by about 41%. The direct medical care cost was 1.4 times greater than the figure for 2007. The direct non-medical costs increased by about 50%. With regards to the indirect costs was about 37% over the 2007 figure (Kim et al, 2015).

In comparison to breast cancer, studies done on cervical cancer estimates the annual direct medical costs to hover between $300 – 400 million in the United States. Direct medical cost was also estimated to be about $20,000 per patient (Insinga, Dasbach and Elbasha, 2005). In the area of indirect cost, the value for the productivity losses of women dying from cervical cancer in California was estimated to be $351,000 per cervical cancer death (Insinga et al, 2005). Fleurence et al (2006), also estimated annual healthcare cost of cervical cancer in the U.S to range from $2.25-$4.6 billion. These figures are however relatively small when compared to the annual health care cost of breast cancer which was estimated at $16.5 billion dollars as at 2010 (Yabroff et al, 2011). Quentin (2011), conducted a study on the cost of screening cervical cancer and treatment in Ghana, where the annual cost was estimated between 0.6 and 4.0 million US dollars depending on the coverage and adopted screening strategy.

2.10.1 Cost burden in Ghana

Literature on cost of breast cancer treatment in Ghana is quite scanty. Very limited research work has been done in this area, which emphasizes the need for a comprehensive study on the subject.

Niens et al (2014) conducted a study on breast cancer outcomes at the Komfo Anokye Teaching Hospital (KATH). They determined the socioeconomic status and the stage at diagnosis for 90 patients receiving treatment at KATH. Data on the socio-economic status (SES) were retrieved using a questionnaire. Patients were grouped into quintiles, with the first quintile constituting the poorest 20% and the fifth, the wealthiest 20%. They then compared the averted DALYs between quintiles. From their study they estimated the monthly average household expenditure to be GHS 231. They however, could not find any linkage between health outcomes and socioeconomic status, and attributed the lack of association to small sample size. The study opined that the best way to improve management of breast cancer in Ghana is to disseminate information on the disease and advocate for early treatment.

Zelle et al (2012), studied the cost and effect of breast cancer treatment in Ghana. Their analysis was pivoted on the WHO-CHOICE method, with results evaluated in DALYs and cost-effectiveness ratios. The study was based on secondary data collated at the Korle-Bu Teaching hospital. Estimates from the study suggested that twice yearly screening of women aged between 40 and 69 years, in addition to treatment of all stages, seems to make economic sense ($1299 per DALY averted).Information dissemination via the mass media was the second best alternative (estimated at $1364 per DALY averted). Mammogram was not cost-effective. This study however appears quite limited since it was model based and no primary data was used.

Hughes et al (2011), also studied the economic cost of breast cancer at the Komfo Anokye Teaching Hospital. The human capital method and the bottom-up computational approach were

used to evaluate the indirect cost and direct cost respectively. Cost of medications was the most significant direct cost in the study. The study also found the direct annual cost per patient to be GHS 2,070.83 and the indirect annual cost to be GHS 3,937.16 per patient. In all, the average cost per patient for the period under consideration was GHS 6,008.09. The study unearthed the economic cost of the disease which is felt socially and economically. This revealed how much the Ghanaian society would have saved if the disease is prevented. They recommended that government should increase subsidization of the treatment of the disease and to strategically intensify public awareness.

2.10.2 Cost of illness studies (COI)

The fundamental goal of cost of illness studies is to estimate the economic implications of illness on the society. Cost of illness, holistically looks at the impact of disease on health outcomes in societies and countries (Jo, 2014). Its objective is to evaluate the costs of pertinent issues with the aim of unravelling the economic cost (Jo, 2014). The category of cost of illness can vary from the disease prevalence condition to its effect on life expectancy, survival and morbidity. Precise information about Cost of illness is important and critical helps to formulate policies and institute appropriate interventions and allocate resources with due cognizance of budgetary constraints. The burden of disease studies, categorically calculates the number of years of life lost (YLL) due to precipitated death, and the number of years lost to disability or morbidity (YLD). These two categories together, make up DALYs or the disability-adjusted life years (Jo, 2014).The aim is to measure all the cost elements of a disease, especially the direct, indirect, and intangible costs. The output except for the intangible cost is expressed in monetary terms which is representative of the burden of the disease on the society. It is an accepted way of estimating the total cost of a disease on countries and as a conduit to influence policy making.

Organizations such as the World Health Organization commonly use such studies for decision making (Byford et al, 2000). Estimating the cost of an illness provides very useful information. Firstly of all, it gives us an idea of the amount of money, the society is spending on the treatment of the disease, and by that we determine how much would have been if the disease was eradicated. Secondly, we are able to estimate the various cost components and their contribution to societal development. Thirdly it helps in soliciting for funds for research through exposing areas where structural inefficiencies occur (Byford et al, 2000).

The cost of illness method usually does not involve testing a hypothesis. It involves decisions such as the study design, data collection, the approach to costing (either disease-specific or total costs), and the cost components to include (direct, indirect or intangible). (Onukwugha et al, 2015).

Approaches to cost of illness studies

Incidence and Prevalence

Cost of illness studies can be categorized into either prevalence or incidence-based depending on how the collected data is used. The prevalence based method is the most commonly used and it estimates the cost of a disease over a period, in most cases, over a year, whiles the incidence based approach estimates the lifetime effect of a disease until it disappears. (Jo, 2014). Prevalence based method accounts for the mortality and hospital admissions attributable to a disease in a year. Furthermore, it estimates the cost arising from such deaths and admissions. The incidence approach on the other hand, aggregates the mortality or admissions in a year and applies a lifetime cost to it. The prevalence based method is the only practicable means to measure morbidity emanating from a particular disease, since a good number of these conditions are debilitating and chronic. It may however, not quantify the long term consequences of such

diseases. In a nutshell, the prevalence method measures the cost of illness in the present and past in a given year, whiles the incidence method measures the present and the future cost of illness in one year (Jo, 2014).

2.10.3 Direct cost

This refers to cost arising from the health system, individual and their families, and the society. It consists of medical and non-medical costs. The former refers to health care related expenditures on diagnosis, imaging, laboratory investigations and rehabilitation, whiles non-medical cost is related to the usage of non-medical resources like transportation, food, lodging kand property losses as a result of illness. The costs estimates for chronic conditions are usually higher than acute (Jo, 2014).

2.10.4 Indirect cost

This refers to productivity time forfeited due to morbidity and mortality, which afflicts by the individuals and their families, employers and the society in general. The productivity losses constitute a part of the welfare losses due to condition. There are three main methods of estimating indirect cost (Jo, 2014).

Indirect costs are not usually estimated due to the absence of the primary information required to evaluate them. To make up for the absence, most estimates utilize information from other sources that may provide the data. Indirect costs are mostly sustained and measured when a person misses work due to illness. (Boccuzzi, 1987)

The productivity losses from disease may vary depending on the form of disease. Employees in poor health are likely to miss more work and contribute to less work result in less efficiency in

comparison to healthier individuals (Boccuzzi, 1987). The indirect cost can be estimated using three approaches, namely, the human capital method, the friction cost approach and the willingness to pay method.

Human capital approach

Human capital can be categorized into two forms in economics. First of all, humans are used as a labour force to boost production, with the aid of factors such as money, land and machinery. Secondly, the human capital can be seen as a source of investment achieved through education and training (Jo, 2014). Cost of illnesses studies focuses on the last definition which projects an individual's productivity in the community. The indirect cost linked with morbidity and mortality reflects the value of the contribution the individual would have made, had he maintained a good health. The human capital approach therefore estimates the productivity of the individual presently, assuming that his future earnings reflect his future productivity. Moreover, there are controversies regarding the assumptions made in its calculations. It assumes that a worker is irreplaceable even if the unemployment rate is high. This method may therefore over approximate the value of productivity. Inspite of this, the human capital approach is widely used by researchers (Jo, 2014). In the context of breast cancer, the afflicted individual's inability to perform her daily tasks results in significant human capital loss to the country.

Friction cost method

It is regarded as a good substitute to the human capital method. It determines the value of human capital when an unemployed person replaces a sick worker until that worker returns or is replaced. Therefore, the cost is limited to the period of injury or death, and is referred to as the

friction period. It is believed that the friction cost method will estimate a lower cost than the human capital approach in the long run (Jo, 2014).

Willingness to pay method

This method attempts to estimate the value people are ready to pay to reduce the risk of death or illness. There are many methods used in estimating the willingness to pay, including surveys, looking at salaries for risky jobs and examining the demand for goods that leads to better quality of life (Jo, 2014).

Advantages and limitations of the methods

The value of the indirect cost obtained using the human capital approach may be affected by the current socio-economic situation such that certain groups may receive higher values than others resulting in a statistical bias. The friction cost method is sparingly used because it depends on voluminous date to estimate losses in the friction period (Jo, 2014).The justification for the human capital approach, is not the fact that it measures the value of life, but that it provides a measure of the cost of a disease. It is also preferred to the friction and the willingness to pay approach because it is relatively easier to measure. (Hodgson and Meiners, 1982).

2.10.5 Intangible costs

The intangible costs refer to losses or benefit that are brought to the fore due to a disease but has no implications on the usage of resources. These losses include physical and psychological derangements such as depression, emotional loss, pain and stress. Disease may bring about personal losses that cannot be accounted for in the direct and indirect cost measurements (Hodgson and Meiners,1982). Pain and suffering can be determined by the frequency, duration, and the severity of pain vis-à-vis the dosage of drugs needed to relief it (Hodgson and

Meiners,1982). As the term connotes, it is a challenge expressing intangible costs in monetary terms (Telser et al, 2011). Examples of intangible cost include pain, suffering, depression, anxiety and family stress (Yousefi et al, 2014).

2.10.6 Cost coping strategies

The coping behavior can be defined as a set of responses of households to cope with the costs of an event, or process, which threatens the welfare of the household (Kumar, 2018). Most of the literature on coping behavior with ill-health has its origin in studies of poverty, famine and starvation in Asian and African continents (Kumar, 2018). Coping strategies, according to the scholars on famine studies, refers to activities that are carried out, in a measured sequence to reduce the response to external shocks, such as drought and cattle death that causes declines in food availability (Kumar, 2018).

Although strategies to cope with cost of illness are context-specific yet researchers working on the topic of coping strategies broadly divided the strategies into two groups: cost prevention strategies and cost management strategies. (Kumar, 2018).Cost prevention strategies are aimed at reduction in the cost of illness by either ignoring the illness or by delaying the treatment. These strategies are used by poor households by modifying illness perception and continuing to work despite the illness and by not seeking the treatment for illness to avoid financial costs.

Cost management strategies, which are aimed at managing the cost of illness, constitutes resource mobilization, spending adjustments, and labour supply adjustments strategies. Resource mobilization strategies are aimed at covering the financial cost of illness. The empirical evidences in the available literature suggest that use of savings, borrowings, and selling of assets are the most commonly used strategies to cope with cost of illness (Kumar, 2018).

The evidences from literature suggest that the socially and economically challenged households become more impoverished and experience a decline in overall economic situation due to illness shocks (Russell 2005). Due to high cost of illness, these households borrow at unusual rate of interest, reduce expenditure on food or education, or sell assets (Kumar, 2018).

It has also been revealed from literature that households, who intend to cope with indirect cost of illness opt for intra-household's labour substitution and poor households sometimes even withdraw children from school and put them to work. The coping strategies adopted to deal with indirect cost of illness not only impacts the households but also the next generation of households as it sometimes hampers the education of children (Kumar, 2018).

2.10.7 Conclusion

The literature reviewed, examined in detail the epidemiology and aetiology of breast cancer.The diagnosis, management and the prognostic indicators of the disease were emphasized. Far reaching implications of the household cost and the economic burden of the disease was laid bare. Comparative studies on cervical cancer and its cost implications was also reviewed. The increasing cost of cancer treatment especially, breast cancer management brings to the fore, the need to pay more attention to this socioeconomic problem.

Cost of illness studies were categorized into three main broad groups. Direct, indirect and intangible costs. Coping strategies by households was the fourth arm identified and the least studied. This study will focus on the cost coping strategies, together with the other three groups mentioned.

The few literature found on breast cancer diagnosis, treatment and associated costs in Africa and Ghana in particular seem to suggest a low research culture in African Institutions. This study

would focus on estimating the direct, indirect, intangible costs and the cost coping strategies of breast cancer patients at the KBTH.

CHAPTER THREE

METHODS

This chapter provides an overview on the methods used in the study.

The subtopics to be discussed include the study design, study area, study variables, study population, sample size, sampling process, data collection techniques and tools, estimation of the direct, indirect and intangible costs and cost coping strategies adopted by respondents quality control, ethical considerations, source of funding, conflict of interest declaration, assumptions and limitations of the study.

3.1 Study design

This study employs a cross-sectional design using the cost-of-illness method to estimate the direct, indirect and intangible costs and the cost coping strategies used by patients and their households during breast cancer treatment at the Korle Bu Teaching Hospital.

3.2 Study area

This study was conducted at the breast clinic of the Korle-Bu Teaching Hospital. It is the foremost teaching hospital in Ghana, and was established in 1923. It has a total bed capacity of 2000. About 1500 patients are seen at the outpatient department and 250 admitted daily. The breast clinic would be the main focus of this study. This unit diagnosed and managed 347 new cases of breast cancer in the year 2016 (KBTH annual report, 2016). Information for the study would be taken from patients with breast cancer attending this clinic. The hospital is located in the Ablekuma South Constituency. The constituency forms part of the Accra Metropolitan Assembly. The population of the Metropolis is estimated at 1,665,086 according to the 2010

population census with 800,935 being males and 864,151 females. The main economic activities in this community is fishing and trading.

3.3 Study population

The study population is made up of all patients diagnosed as having breast cancer and undergoing treatment at the breast cancer unit of the Korle- Bu Teaching Hospital.

3.4 Study variables

Table 1 outlines the various variables to be used in the study. It includes variables for direct cost, indirect cost, intangible cost and cost coping strategies adopted by patient and relatives.

Table 1: Description of study variables

Type of cost	Category of Cost	Variable
Direct cost	Medical	1.Cost of consultation 2.Cost of prescriptions 3. Cost of laboratory investigations 4.Cost of Imaging Studies 5.cost of surgery 6. Cost of chemotherapy 7. Cost of radiotherapy
	Non-Medical Cost	1. Cost of transportation 2. Cost of feeding 3. Cost of lodging
Indirect cost	Productivity losses	1. Productivity loss to patient and accompanying relative 2. Travelling time 3. Patient waiting time

Intangible cost	Psychological cost	1. Pain 2. Fear 3. Depression 4. Anxiety 5. Stress
Cost coping strategy	Coping strategies	1. Selling personal assets 2. Sale of financial assets 3. Taking loans from financial institutions 4. Taking loans from money lenders 5. Transfers from networks of mutual support 6. Subsidies 7. Savings 8. Taking less medications than prescribed

3.5.1 Eligibility criteria

Women with breast cancer seeking treatment at the breast units of the KBTH, willing to partake in the study.

3.5.2 Exclusion criteria

Women with breast cancer who are too ill to communicate or unwilling to partake in the research.

3.6 Estimation of sample size

From previous study conducted by Niens et al, (2014), looking at treatment outcomes for breast cancer management at the Komfo Anokye Teaching Hospital, the monthly average household expenditure was estimated to be GHS 231 with a standard deviation of GHS 127.5.

The sample size is calculated using the formula

$$n = \frac{\left(Z_{1-\frac{\alpha}{2}}\right)^2 \sigma^2}{e^2}$$

$Z_{1-a/2}$ = 1.96, standard deviation =127.5, E (margin of error) = 30

$$= \frac{(1.96 \times 127.5)^2}{30^2} = 69.4 = 69$$

Accounting for 10% non-response rate = 69 x 0.1 = 6.9

Hence sample size = 69 + 7 = 76

3.7 Sampling procedure

The list of all breast cancer patients seeking treatment within the month of May were retrieved from records at the breast clinic at Korle Bu. All women who are capable of communicating and willing to partake in the study are eligible. The participants were selected by simple random sampling, using a random number table. After retrieving the folders, each folder was assigned specific numbers. The random number table is a table of numbers arranged randomly. The table was followed chronologically, from top to bottom, the first 76 (seventy six) numbers on the random number table which coincided with specific folder numbers were selected for the study. Patients, whose folders had been selected, were invited to participate in the study. An informed consent was obtained from all selected patients before questionnaire was administered.

3.8 Quality control

Mechanisms were instituted to achieve data reliability and quality to reduce impact of biases. These comprised of training of research assistants, pre-testing of questionnaires, and the administration of questionnaires and consent form, data entry and processing. Completed questionnaires were taking through the validity process and entered daily. The data was then scrutinized for errors and cleaned.

Training of research assistants

Research assistants with working knowledge of breast cancer management and are fluent in Ga, Twi, Ewe and English were recruited. The training of the two research assistant included the explanation of questionnaires, privacy and confidentiality, seeking informed consent and ethics. They were remunerated for their service.

3.9 Data analysis

3.9.1 Estimation of direct cost

The total direct cost was estimated by adding up all expenses incurred by breast cancer patients for medical and non-medical reasons. The medical cost is an aggregation of the costs of consultation, folders, prescriptions, laboratory investigations, surgery, radiotherapy and chemotherapy, and non-medical costs such as transportation, lodging/rent, food and drinks. The total direct cost was estimated by adding up the medical and non-medical costs, and to obtain the average cost per patient, it was divided by the total number of respondents.

3.9.2 Estimation of indirect cost

The human capital approach was used in the estimation of the indirect cost by using the daily minimum wage of GHS 10.65 for 2018.

Days lost at work to patient - it is the addition of all work days lost by patient who were employed during the period of diagnosis and treatment.

Productivity loss due to travelling- it is the aggregation of hours lost to patient and accompanying relatives due to travelling to and from the hospital as well as time lost in carrying out other activities related to the condition.

Productivity loss due to waiting time- it refers to the summation of all hours spent waiting to be seen by a doctor

The indirect cost was estimated as the product of the number of hours lost and the national daily minimum wage of GHS10.65. The total indirect cost was calculated as the overall total losses of the patient and accompanying relative. To determine the average indirect cost, the total sum was divided by the number of respondents.

The relationship between the average cost of treatment and the financial and physical health status of respondent would be determined. To this end, the questionnaire would include questions on the financial and physical health status of respondents. A cross tabulation of the average cost of treatment and the health and financial status of respondent would determine the relationship between these variables.

3.9.3 Sensitivity analysis

Sensitivity analysis was carried out to assess the validity of cost estimates. This was achieved through variation in the cost of some key variables such as the costs of chemotherapy and the daily minimum wage to see if there if there had been any significant effect on the results of the study. Singular and multi-variations sensitivity analyses (SA) were done by changing cost estimates in chemotherapy and the daily minimum wage. These elements were chosen

because of the uncertainty associated with them. 3%, 5% and 7% increments in these cost components were done and the corresponding changes in the total cost calculated. Uncertainties around errors such as errors in measurement of the various cost component, interviewer bias and recall bias were taken into consideration.

3.9.4 Estimation Of intangible cost

The Likert scale was employed to estimate the intangible cost. The scale used has four options, [1] Not at all, [2] Mildly, [3] Moderately, [4] Severely/Extremely, considering variables like fear, stress, depression and pain. The scores for each category or variable were used to describe that domain. The summation of the various categories of the intangible costs were scored and re-classified. This was then used to describe the effect of breast cancer on survivors.

Table 2: Composite Intangible Cost

No	Domain	Dimension	Score Range
1.	Pain	1. Not at all 2. Mildly 3. Moderately 4. Severely	3-12
2.	Fear	1. Not at all 2. Mildly 3. Moderately 4. Severely/Extremely	4-16
3.	Depression	1. Not at all 2. Mildly 3. Moderately	4-16

		4. Severely/Extremely	
4	Stress	1. Not at all 2. Mildly 3. Moderately 4. Severely	1-4
	Total		48
	Range		12 - 48

1 Scores estimated from 3 questions by 4 responses = 12

2 Scores estimated from 4 questions by 4 responses = 16

3 Scores estimated from 4 questions by 4 responses = 16

4 Scores estimated from 1 question by 4 responses = 4

3.9.5 Composite intangible score

The composite intangible score is obtained by summing up the dimensions in each category and multiplying by the number of questions in the questionnaire related to that particular variable. The total score was aggregated and classified into Low, Moderate and High intangible cost with the corresponding ranges using the descriptive tertile statistics method.

Table 3. Composite intangible score ranges

No	Dimension	Range
1.	Low	12 - 24
2.	Moderate	25 - 37
3.	High	38 - 48

3.9. 6 Determination of cost coping strategies

Cost coping strategies are divided into two main groups; these are the informal mechanisms and the formal mechanisms. The informal mechanism is further divided into the Individuals & household and Group based categories and the formal mechanisms, subdivided into Market based and publicly provided categories. The study determined which of the cost coping strategy category is mostly used by participant. The four categories are then ranked from mostly used to least used according to the proportion of participants choosing each.

Table 4. Cost coping strategies

Groups	Categories	
Informal mechanisms	Individual & Household: • Sale of assets • Loans from money lenders	Group based: • Transfers from networks of mutual support
Formal mechanisms	Market based: • Sale of financial assets • Loans from financial institutions	Publicly provided: • Free public health care • Social assistance • Workfare

3.10 Ethical considerations

3.10.1 Ethical approval

Approval for the study was sought from the Korle-Bu Teaching Hospital Institutional and ethical review board.

3.10.2 Description of study population

The subjects of this study are mainly women seeking treatment for breast cancer at the Breast cancer units at the Korle Bu Teaching Hospital in May, 2019.

3.10.3 Recruitment and sampling process

The principal Investigator and two research assistants collaborated with a clinician of the department to recruit participants and interview them during the study period, until the sample size of 76 was attained. The clinician helped retrieve the folders and the list of patients presenting to the clinic for treatment. After retrieving the folders, each folder was assigned specific numbers. The random number table was used to select the folders. The random number table, is a table of numbers arranged randomly. The table was followed chronologically, from top to bottom, the first 76 (seventy six) numbers on the random number table which coincided with specific folder numbers were selected for the study. Patients, whose folders have been selected were then invited to participate in the study. An informed consent explaining the need for the study was first obtained, before questionnaire was administered. Participation was voluntary and patient can opt out at any point in time.

3.10.4 Potential risk/benefits

The research poses minimal risk to the study population; such as discomfort associated with answering questions. The study would be beneficial to both the sampled population and academia. It will provide the study population and government information about the estimated cost of breast cancer and the cost coping strategy to patients. Also, the estimation of the cost of breast cancer will influence policy making and hopefully, special considerations and provisions will be made for breast cancer care during preparations of the health budget.

3.10.5 Privacy and confidentiality

Data collected from respondents and relatives are kept private and confidential. Interviews were conducted in enclosed places, away from the hearing of other patients and medical staff. Participants were assured that the data collected were safe and not shared with any other person. Initials were used instead of names to protect the privacy of respondents. Data and results were also reported in aggregates devoid of names.

3.10.6 Voluntary consent/withdrawal

Written informed consents were obtained from respondents and the accompanying relatives before collection. Participation is voluntary and respondents can opt out at any point in time.

3.10.7 Consenting process

An information leaflet was provided spelling out the background of the study. The potential benefit of the study to participants and the country outlined. The participants were then assured of their privacy and confidentiality. A consent form was then provided for interested participant to sign, indicating their willingness to participate in the study.

3.10.8 Data usage and storage

The answered questionnaires were serialized, coded and stored at a safe place to which only the principal investigator had entry. The coded questionnaires were entered into Microsoft Excel 2013 and then exported to STATA 15 for analysis. Soft copies were stored on an external hard drive and google.

3.10.9 Compensation

There was no monetary compensation for respondents. The appreciation of the principal investigator and other members of the team was however extended to the participants.

3.10.10 Declaration of conflict of interest

There is no conflict of interest.

3.10.11 Funding

The study was sponsored by the principal investigator.

3.11 Assumption

It was assumed that the National daily minimum wage was reflective of the daily wage earned by respondent.

3.12 Limitation of study

1. Recall bias – Some participants may not be able to accurately recollect information regarding the cost of treatment and the cost coping strategies they adopted leading to recall bias.
2. Interviewer bias – it occurs when there is a systematic difference in the collection, recording and interpretation of data. To reduce the impact of this problem on data accuracy, research assistants were recruited and trained. The training involved, among others, explanation of questionnaires and seeking informed consent for the study.
3. Sample size – small sample size may affect the external validity of the research. The relatively short period for data collection influenced the number of people who were invited to participate.

CHAPTER FOUR

RESULTS

This chapter outlines the socio-demographic characteristics, the direct and indirect costs, the intangible cost and the cost coping strategies adopted by patients and relatives. Additionally, the results would also focus on the income and socio-economic status of the various households.

4.1 Background characteristics

The response rate of the study was 97% (74).As indicated in Table 5, most respondents were between the ages of 50 and 59 years (26%) with the least age bracket being those 69 years and over (11%).About half (46%) of the respondents were married and about 10% were separated from their spouses. With respect to education, most were middle school leavers (45%) and the least educational level was the senior high school level (7%).

Most of the respondents were self-employed, making up 53% (39), with the private sector recording the lowest proportion (8%). Christianity predominated as the religion of choice (82%), the least sect practiced was the traditional religion (3%).Majority earned an income of less than GHS 2000 monthly(57%) and just 11% earned above GHS 2000 whilst 28% had no source of income. About 96% of respondents had a valid NHIS card.

An analysis of the duration following treatment initiation showed that the difference between the age groups was statistically significant ($p = 0.019$). The time difference between diagnosis and initiation of treatment was also statistically significant (CI 5.12 – 9.71 $p = 0.000$)

Table 5: Socio-demographic characteristics

Characteristics	Number	Percentage (%)
Age		
30-39	11	14.9
40-49	18	24.3
50-59	19	25.7
60-69	18	24.3
>69	8	10.8
Marital Status		
Single	12	16.2
Married	34	46.0
Divorced	11	14.9
Widowed	10	13.5
Separated	7	9.5
Educational status		
No education	9	12.2
Primary	8	10.8
JHS/Middle school	33	44.6
SHS	5	6.8
Tertiary	19	25.7
Employment status		
Unemployed	21	28.4
Private Sector Employee	6	8.1
Public Sector Employee	11	14.9
Self Employed	36	48.6

Religion		
Muslim	11	14.9
Traditionalist	2	2.7
Christian	61	82.4
Income band		
<2000	42	56.8
>2000	11	14.8
0 (No Income)	21	28.4
NHIS card validity		
Valid	71	96.0
Not valid	3	4.0

4.2 Direct cost of breast cancer treatment

As shown in Table 6, the direct cost for treating breast cancer patients in a month was approximately GHS 379,986 (USD[1] 69,595). The direct cost is composed of the medical cost, which was estimated at GHS 319, 084 (USD 58,440) and the non-medical cost, estimated at GHS 60,902 (USD11,154). It is estimated that each household spends on average, GHS 5,135 (USD 940) as direct cost, when seeking treatment, of which the medical cost consumes 84% of total cost. Ultimately, the direct cost makes up 95% of the total cost.

[1] *Note 1US Dollar = GHS 5.46 Source: Interbank Exchange rate, Bank of Ghana*

Table 6: Direct and indirect costs

Type of costs	Sum(GHS)	Mean	Standard deviation	Median	Minimum	Maximum	Cost profile (%)
Direct costs							
Direct medical							
Consultation	7,138.0	96.5	249.8	0.0	0.0	1,440.0	1.8
Investigations	139,245.0	1,881.7	936.5	1,800.0	0.0	5,650.0	34.8
Treatment	172,701.0	2,333.8	2,456.4	2,060.0	80.0	15,810.0	43.2
Total medical	319,084.0	4,311.9	2,738.73	3,870.0	300.0	18110.0	79.8
Direct non medical							
Transportation	28,685.0	387.6	550.7	100.0	5.0	2,000.0	7.1
Food and drinks	26,397.0	356.7	458.3	27.5	2.0	1,500.0	6.6
Lodging/rent	5,820.0	78.7	587.3	0.0	0.0	5,000.0	1.5
Others	0.0	0.00	0.0	0.0	0.0	0.0	
Total direct non-medical	60,902.0	823.0	1,163.8	150.0	10.0	6,100.0	15.2
Total direct	**379,986.0**	**5,135.0**	**2,923.3**	**4,540.0**	**820.0**	**18,145.0**	**95.0**
Indirect cost							
Absenteeism(per month)	1,586.9	21.4	64.2	0.0	0.0	319.5	0.4
Travel	313.5	4.2	5.3	2.7	0.0	39.9	0.1
Waiting	301.4	4.1	1.7	4.7	0.0	7.3	0.0
Patient total indirect	2,201.8	29.8	64.9	8.3	0.0	338.1	0.5
Other person accompanying patient	17,955.9	242.7	475.0	33.3	0.0	1,317.9	4.5
Total indirect	**20,157.7**	**272.4**	**474.1**	**48.6**	**0.0**	**1,396.5**	**5.0**
Patient total	382,187.8	5,164.7	2,924.9	4,550.7	828.0	18,149.0	95.5
Grand Total	**400,143.7**	**5,407.4**	**2,973.8**	**4,957.6**	**841.3**	**18,149.0**	**100**

4.3 Indirect cost of breast cancer treatment

The total productivity losses with respect to patients and accompanying relatives was estimated at 2,865.9 hours.The indirect cost, a cost expression of the productivity losses and time spent in seeking treatment is approximately GHS 2,201.80 (USD 403.30). The losses attributable to an accompanying relative is also estimated at GHS 17,955.90 (USD 3,288.6). Consequently, the total indirect cost is estimated at GHS 20,157.70 (USD 3,691.90). These findings are illustrated in Table 6. The total cost attributable to the patient is approximately GHS 382,188 (USD 69,998) whiles the total cost with the accompanying relative included, sums up to GHS 400,143.70 (USD 73,286.40).

Hence, the average household expenditure on breast cancer treatment is estimated at GHS 5,407.35 (USD 990.40), whiles the average cost attributable to the patient only, is approximately GHS 5,164.70 (USD 945.90). The direct cost constitutes 95% of the total cost, as indicated in figure 2.

4.3.1 Cost by reported financial and physical states

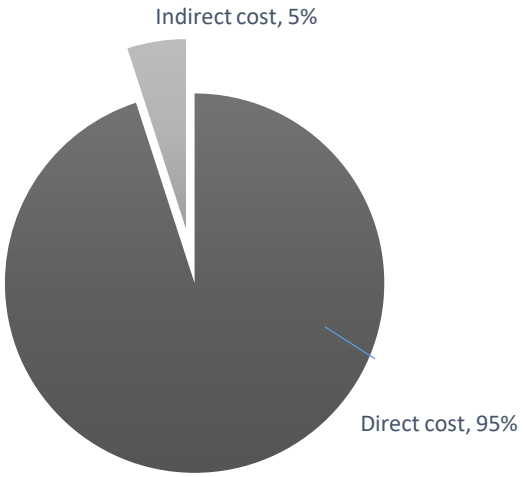
Table 7 shows that respondents who reported poor financial status incurred a lower average direct cost (GHS 4,714) compared to those who described their financial situation as 'Comfortable' (GHS 5659), however, with respect to indirect cost, patients in the poor category incurred more (GHS 293) compared to those in the 'comfortable' category. Similarly, patients who reported 'Good' health, had a higher average direct cost (GHS 5,368), followed by those who considered their physical health as 'Fair' (GHS 5,118), while individuals in 'Poor' physical health recorded the lowest cost (GHS 3,701). Productivity losses and time spent seeking treatment (indirect cost) was higher among those who reported, 'Poor' health (GHS 450),

moderate in respondents who reported 'Good' health (GHS 278) and lowest in individuals who reported 'Fair' health.

Table 7 : Average cost by reported financial and physical health status of respondents

	Financial status (GHS)		Physical health (GHS)			
Type of costs	**Comfortable**	**Poor**	**Poor**	**Fair**	**Good**	**Total**
Direct cost	5658.52	4713.54	3701.33	5117.76	5368.28	5134.95
Indirect cost	246.82	292.99	449.63	228.66	277.66	272.40
Total cost	**5905.34**	**5006.53**	**4150.96**	**5346.42**	**5645.94**	**5407.35**

Figure 2: Cost profile of breast cancer treatment (%)



4.4 Sensitivity analysis on cost components

As shown in Table 8, a sensitivity analysis was conducted on the cost of chemotherapy and the minimum wage. The cost elements were varied by 3%, 5% and 7% respectively. The change in the cost of chemotherapy yielded a 0.1%, 0.2% and 0.3% increments in the total cost. The direct cost also increased by the same margin (0.1%, 0.2% and 0.3%) while there was a corresponding decrease in the proportion of the indirect cost. The same analysis conducted on the daily minimum wage yielded a 0.2%, 0.3% and 0.4% increments in the total costs, with the same marginal increases in the indirect cost and corresponding decreases in the direct cost (0.2%, 0.3% and 0.4%). A concurrent variation in chemotherapy and the daily minimum wage resulted in a 0.3%, 0.5% and 0.7% increases in the total cost, while the indirect cost increased by 0.2%, 0.3% and 0.4% respectively and the direct cost decreased by similar margins.

Table 8: sensitivity analysis

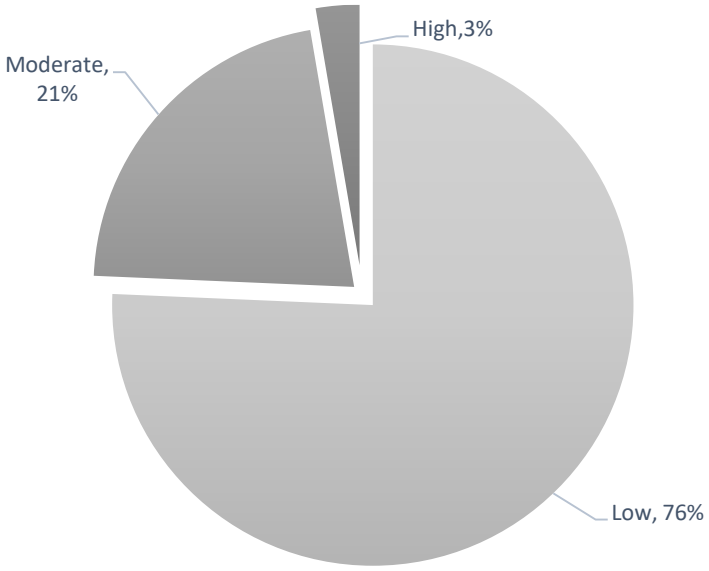
Scenario	Cost component	Change in parameter	Total cost	% change in total cost	% of total cost		% change in total cost	
					Direct	Indirect	Direct	Indirect
Base scenario	**Total cost**	**0%**	**400143.7**	**0**	**95.0**	**5.0**	**0**	**0**
Variation (One way sensitivity analysis)*	**Chemotherapy**	3%	400705.2	0.1	95.1	4.9	0.1	-0.1
		5%	401079.5	0.2	95.2	4.8	0.2	-0.2
		7%	401453.8	0.3	95.3	4.7	0.3	-0.3
Variation(one way sensitivity analysis)*	**Wage**	3%	400748.4	0.2	94.8	5.2	-0.2	0.2
		5%	401151.5	0.3	94.7	5.3	-0.3	0.3
		7%	401554.7	0.4	94.6	5.4	-0.4	0.4
Multivariation(Multiway sensitivity analysis)*	**Chemotherapy & wage**	3%	401309.8	0.3	94.8	5.2	-0.2	0.2
		5%	402087.3	0.5	94.7	5.3	-0.3	0.3
		7%	402864.7	0.7	94.6	5.4	-0.4	0.4

*The cost of chemotherapy and wage were varied by 3%, 5% and 7% respectively

4.5 Intangible cost of breast cancer treatment.

Figure 3, illustrates the psychological effects of breast cancer treatment on patients. It is classified into low, moderate and high. About 76% of respondents had a low intangible cost, 21% with a moderate cost and 3% experienced a high cost.

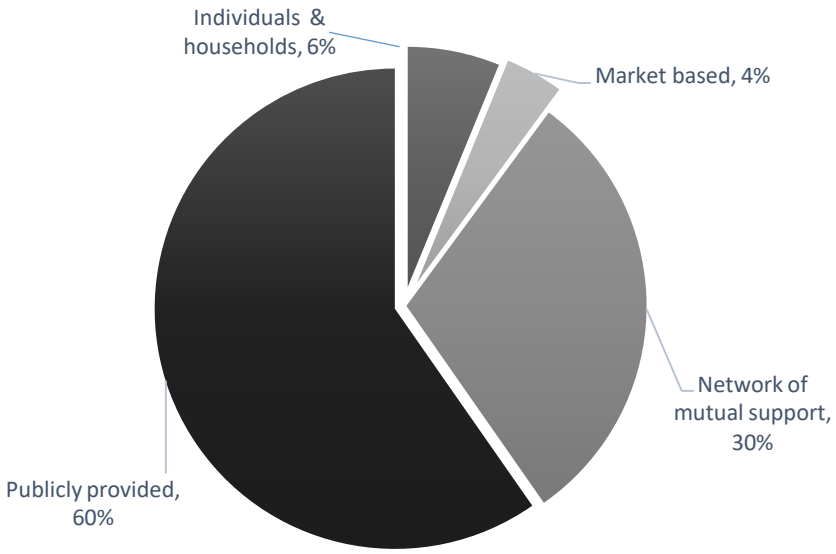
Figure 3: Intangible cost of breast cancer treatment



4.6 Cost coping strategies of breast cancer patients

Among the various coping strategy categories, the publicly provided strategy is the most commonly adopted with a utilization rate of 60%. This is mostly due to the fact that most respondents had a valid NHIS card (96%). Furthermore, the network of mutual support had a rate of about 30%, this is followed by the individual and household strategy (6%) and market based (4%), as shown in Figure 4.

Figure 4: Cost coping strategies of breast cancer patients



The most common source of funding for breast cancer treatment amongst respondent is the National Health Insurance Scheme (89.2%) and family support (89.2%). This was followed closely by self-sponsorship (77%). Remittances and private insurance constitutes the least sources of funding used (1.4% respectively). Majority of the respondents reported that the NHIS was partially beneficial (84%).

CHAPTER FIVE

DISCUSSION

5.1 Introduction

The treatment for breast cancer accounted for an average household cost of GHS 5,407.40 (USD 990.40), direct cost was estimated at GHS 5,135.00 (USD 940.40) and indirect cost was an average of GHS 272.40 (USD 49.80). Most respondents reported a low intangible cost (76%). The cost coping strategy mostly adopted is the publicly provided schemes, with a 60% utilization rate. From the foregoing, it can be argued that the disease is costly to both households and the state hence the need for strategic interventions to fund breast cancer treatment, so as to reduce the economic burden on struggling families. Discussions will focus on the various cost elements and coping strategies, the socio-demographic characteristics, the household financial situation, issues with diagnosis, treatment and the physical well-being of patients.

5.2 Background characteristics

The response rate of the study was 97 % (74), with patients, aged between 30 and 78 years (mean 53.6, median 54 years). About 49% of the sample population were below the mean age of 53.6 years and approximately 65% fall below the retirement age of 60 years. Most respondents were in the age bracket of 50 – 59 years (approx. 26%), with those aged 69 years and above recording the lowest proportion (11%). Furthermore, about 39% of the population were below the menopause age of 50 years. This indicates that breast cancer is diagnosed at a relatively younger

age in developing countries compared to the developed world. This assertion is confirmed by Clegg-Lamptey et al (2009) and Hughes et al (2011).

Most of the women were married (46%), 16% were single and 23% were either divorced or separated. This compares with results from Clegg-Lamptey et al (2009), where approximately 58% of breast cancer patients were married, 19%, single and 22% were either divorced/ separated or widowed. The effect of the marital status on breast cancer survival cannot be downplayed, it has been proven that married women tend to have a higher survival and lower intangible cost compared to the unmarried. According to Falagas et al (2007), marriage and social support are associated with better breast cancer prognosis and survival whiles depression and emotional constraint were associated with decreased survival. Osborne et al (2005) and Tominaga (1998) also found that unmarried and divorced women were at an increased risk of death from breast cancer. Reynolds et al (1994) argues that the absence of close ties, including marriage and sources of support were associated with increased death rate from breast cancer.

In the present study, most patients were middle school leavers making up approximately 45% of the study group. 26% had tertiary education, 11% were primary school leavers and a further 12% had no education. The level of education in a comparative study by Liao et al (2017) in China, reported similar trends. Educational levels have an impact on the diagnosis and treatment of breast cancer. Women who are better educated tend to present earlier with early stage disease in comparison to those who are least educated. Liu et al (2017) reported that the majority of women who presented with early breast cancer had tertiary education (73.3%), whiles, the highest incidence of terminal breast cancer was seen in the uneducated group (31.5%).

Employment and income status correlates with the ability to afford medical treatment. 49% of study subjects were self-employed and a further 23% were employed in both public and private

sectors, and 28%, were unemployed. A significant proportion of respondents (57%) earned less than GHS 2,000.00 (USD 366.30) per month, with just 1% earning more than GHS 5,000.00 (USD 915.80) per month. Analysis shows a correlation between income levels and the cost of treatment. Individuals who earn more than GHS 2,000.00 (USD 366.30) are likely to spend more on healthcare (GHS 5,801.80, USD 1,063.00) on average, compared to those who earn less (GHS 4,869.80, USD 891.90).

Furthermore, an evaluation of the time difference between diagnosis and treatment showed that there were substantial delays in the initiation of treatment. For instance, for the age group 50 -59 years, it took an average of 9.5 months for treatment to commence, likewise, there was a 7.9 months delay to treatment for the 40-49 year group. The duration following treatment initiation between the different age groups was statistically significant (p=0.019). Moreover, the time difference between diagnosis and treatment was also statistically significant (CI 5.12 -9.71 p = 0.000). These unwarranted delays have inimical effect on survival and prognosis. The cause of the delay is two-pronged, delays from the health system and delays from patients and relatives. Clegg-Lamptey (2009) realized from his study on the subject matter, that delayed presentation and initiation of treatment is a culmination of several factors. 57% of respondents absconded because of the fear of surgery (mastectomy), another 37% resorted to herbal treatment and 30% sought solace in prayer camps, reporting back in the advanced stages of the disease. Clegg-Lamptey (2009) opines that exposing newly-diagnosed patient to healthy breast cancer survivors may help in forestalling the canker. He further reiterated the need for counselling sessions and dispelling misconceptions linking mastectomy to death as measures that can mitigate the delays in seeking care.

As shown in the results section, about 96% of respondent had a valid NHIS card plausibly because they know that breast cancer management is expensive. Most patients may have registered with the NHIA only after they have been diagnosed as having breast cancer. Niens et al (2014) observed a similar scenario in their study on treatment cost of breast cancer in Ghana, 95% of respondents had a valid health insurance card.

Although, 96% had a valid card in the present study, only 89% regarded the NHIS as a source of funding for their cancer treatment. Also, 16% of respondent thought the NHIS was not beneficial whiles the rest (84%) considered it as being partially beneficial. It can be adduced from the foregoing that, the NHIS having a higher coverage among those seeking treatment does not necessarily mean they consider it as a crucial source of funding. Haw (2018), found that NHIS users had a poor perception about the quality of healthcare they received compared to the non-insured. In addition, public health facility NHIS users reported a lower quality of service than users in private facilities.

5.3 Direct cost of breast cancer treatment

The average household direct expenditure for treatment of breast cancer was GHS 5,135.00 (USD 940.00), this is made up of the medical cost (GHS 4,312.00, USD 790.00) and the non-medical cost (GHS 823.00, USD 150.00). The cost of surgery (mastectomy mainly), constituted about 23% of the total medical cost input, with chemotherapy, prescriptions and imaging making up 6%, 9% and 16% respectively. Patients are afflicted by a double burden, namely the psychological burden of the disfigurement of surgery and the financial implications of it. Be that as it may, they are also confronted by the escalating cost of chemotherapy. In 2016, patients paid an average amount of GHS 351.00 for chemotherapy, surgery and radiotherapy (Gyau, 2016).

However, the average cost of chemotherapy only, in this study is GHS 252.00, which is more than half the combined cost of chemotherapy, surgery and radiotherapy in 2016. Consequently, the cost of treatment borne by patient is increasing year on year even though the economic fundamentals remain basically the same.

The monthly averages observed are similar to results obtained by Mahmood et al (2018) in Pakistan where monthly averages for medical cost amounted to USD 1,262.00. This cost is however lower, to the data reported by Ekwueme (2016), where it was estimated at USD 5,711.00. The difference could be explained by the fact that the general cost of medical care in the developed world, the United States, in this case, is much higher than then the cost of healthcare in developing countries. This is confirmed by the WHO report on public spending on health, which observed that health's share of gross domestic product in the developed countries is 8.2%, to an average of 6.3% in low and middle income countries. The median per capita spending on health in the year 2016, was on average USD 2,000.00 in the high income countries compared to a measly USD 100.00 in low and middle income countries (WHO, 2018).

O'Neill et al (2015) found that the median non-medical cost of breast cancer treatment in HUM hospital in Haiti was USD 550.00 for a complete course of care. The period of care was estimated to be approximately a year. The median non-medical cost at KBTH was GHS 150.00 (USD 27.50), multiplied by 12 gives the median expenditure for a year, thus USD 330.00. The cost in HUM is relatively higher to the observation in KBTH. The discrepancy in cost could be accounted for by the differences in the methods used. The non-medical cost at HUM was estimated by multiplying the cost by the total number of visits to the hospital, whiles at KBTH the cost was estimated by taking into consideration the average cost on each visit.

The average non-medical cost reported by Liao et al (2017) is about 11% of the total direct cost as compared to 16% in this study. The lower proportion of non-medical expenditure as a constituent of direct cost is therefore consistent with data from other countries. The cost of transportation (47%) forms a significant chunk of the non-medical cost, followed by the expenditure on food and drinks (43%). Together, they form 90% of the total non-medical cost, suggesting that food and transportation is important to breast cancer patients.

Additionally, the direct cost expenditure of respondents with a poor financial status (mean, USD 863.00) suggest that, they were likely to spend less on healthcare (medical and non-medical expenditure) compared to patients who described their finances as comfortable (mean, USD 1,036.00). The direct cost expenditure among those with a comfortable health status is 20% higher than the expenditure found in those with a poor financial status. Individuals with a better financial status have a bigger leverage in affording treatment than the poor. Poverty may therefore be significant in decreasing survival and worsening prognosis in breast cancer patients. Similarly, good health was associated with a higher direct cost (USD 983.00), compared to poor health (USD 678.00). It is plausible that individuals in good health probably spend more in maintaining a good diet and nutrition (non-medical cost) hence are in a better state unlike those in poor health. Mourouti et al (2014) observed that there is an inverse relationship between the consumption of fruit and vegetables (relatively expensive) and breast cancer (risk and survival). Those who consumed more fruits and vegetables are at a reduced risk of developing breast cancer and have a better prognosis even when it occurs. Conversely, patients who consume more

dietary fats (less expensive) due to their lifestyles or their inability to afford healthier diets are at an increased risk of developing the disease.

A multivariate sensitivity analysis on cost of chemotherapy and the minimum wage showed that a 3%, 5% & 7 % increments in these two elements, could results in a 0 3-0.7% increments in the total cost. The direct cost saw a diminution in proportions of 0.2 – 0.4%. Looking at the escalating cost of chemotherapy, the sensitivity analysis is all the more meaningful. Patients are likely to bear the brunt of steeper increases in treatment cost unless containment measures are instituted by policymakers to forestall it.

5.4 Indirect cost of breast cancer treatment

The total indirect cost was GHS 20,157.70 (USD 3,692.00), which works to an average cost of GHS 272.40 (USD 49.80). This cost constitutes 5% of the total cost input. It is made up of the cost loss to absenteeism from work due to the illness, the time spent travelling to and from the hospital and time spent waiting for the health personnel. In addition to the losses incurred by patient, the lost from an accompanying relative constitutes the remainder. The total productivity losses expressed in hours is 2,866 hours. Patients absent themselves for a total of 149 days due to sickness and spent an accumulated time of 236 hours travelling to and from the hospital each month. The average time spent waiting for a health personnel is 3 hours per patient. Gyau (2016) estimated the total time lost to breast cancer to be 2,496 hours in a similar study.

In comparison, Liao et al (2017) estimated total time lost to be USD 835.50 per person per month. Mahmood et al (2018), reported a monthly indirect cost of USD 274.00 in Pakistan, which is four (4) times higher than the cost in the present study. Hughes et al (2011) also estimated the indirect cost for breast cancer treatment at KATH, Kumasi, Ghana. The indirect cost per person per year amounted to GHS 3,937.20 with a monthly average of GHS 328.00.

This cost made up 66% of the total cost in Kumasi compared to just 5% in our study. Liao (2017) found that the indirect cost constituted 18% of the total cost in his study, which is markedly lower than what was observed by Hughes (2011) in Kumasi and about three (3) times higher than the cost component in this study. Differences in the productivity cost could be as a result of the usage of different instruments to measure the work lost or differences in the monetization process or study design.

Productivity losses have a bearing on economic development, more importantly in countries where the young and the middle-aged form the workforce. Ekwueme (2016) showed that work lost per capita is higher in younger employed women than in older employed women. Breast cancer in young women generally, tend to be more aggressive requiring more elaborate treatment precipitating various physical and psychosocial effects which may culminate in prolonged absenteeism. Another study conducted in Poland (Lyszczarz and Nojszewska, 2017) on productivity losses attributable to breast cancer concluded, that indirect cost accounted for 0.162-0.171% of GDP throughout the period of the study, it also led to an increment in the cost of social insurance benefits and diminished tax revenues. These economic losses could be mitigated through disease screening and prevention, treatment of early stage breast cancer and providing care to survivors. The treatment of breast cancer should be regarded as an investment which can reap economic benefits for the country and improve the quality of life of survivors. Prioritizing breast cancer treatment in health systems in developing countries is all the more crucial because productivity and the workforce are essential resources. Low and middle income countries (LMIC), need to recognize these facts and intervene to buoy up their economies (Lyszczarz and Nojszewska, 2017).

An analysis of the indirect cost also shows that, patient in poor physical health, had a higher productivity loss on average (GHS 450.00) compared to those in good health (GHS 278.00). The productivity loss among those in poor physical health is 62% higher than the losses seen in those in good health. Patient in poor health are more likely to absent themselves from work and relatives may spend a longer time taking care of them at home. A study done by Mitchell et al (2011) showed that health risk and conditions are related to productivity loss. Individuals in poor health had a higher productivity loss ranging from USD 15.00 to USD 1,601.00 per year than similar employees in good health. The average total cost is estimated at GHS 5,407.00 (USD 990.00), which is composed of the direct cost making up 95% of the cost and an indirect cost, of GHS 272.00 (USD 49.80). This observation is consistent with findings by Gyau (2016), Liao (2017) and Mahmood (2018).

5.5 Intangible cost

Emotional and family support is critical to patient diagnosed with breast cancer, hence the intangible cost associated with the disease cannot be ignored. However, estimating the psychological effect is a challenging task, moreover its value cannot be expressed in monetary terms hence it is not as much appreciated as the direct and the indirect costs. Psychological cost in this study covers four main domains, namely, pain, fear, depression and stress. Most participants reported a low intangible burden (76% of respondents), with 21% and 3% reporting moderate and high cost respectively. Although, all patients reported some level of psychological problem, the average effect is on the level of mild to moderate impact rather than high. This is in line with previous scientific work on psychological effects of breast cancer by Cvetkovic and Nenadovic, (2016). Ganz (2008) found that most women adapt well to the diagnosis of breast

cancer and manage to endure the complex and sometimes toxic medications associated with initial treatment and recurrence. Even for women with recurrence, psychological well-being was often maintained. Nevertheless, a good number of women in the present study had to quit their jobs as a result of the illness, moreover cancer treatment is associated with great financial loss to patients and their families. The psychological burden of enduring toxic medications and the cosmetic effect of disfiguring surgeries cannot be overemphasized. Alexander et al (2019) reported that majority of women experience significant social embarrassment in dealing with breast cancer, its treatment and aftermath. Most patients therefore avoid social interactions in order to escape the stigma.

A good number of women also have to rely on relatives to take care of them especially when they are bedridden. In addition to their own burden, some women become concerned about the schooling of their children, the provision of care to dependent parents and their spouses. Marriages are also severely strained by breast cancer, it leads to maladaptive patterns of interactions between couples and negatively influences relationships (Alexander et al 2019, Zimmermann 2015).

5.6 Cost coping strategies

As a result of the huge financial burden, breast cancer imposes, cancer victims and their families have to adopt several measures to cope with the cost. According to Kumar (2017), poorer households become more impoverished and experience declines in their financial situation due to illness shocks. Richer homes, due to secure jobs, stronger social networks and assets base are better able to cope with the economic ramifications of disease. Nipp et al (2014) suggested that patients are most likely to use lifestyle altering approaches such as borrowing money, spending

savings and spending less on leisure activities than to use care altering strategies such as spending less on medications.

From the present study, most patients adopted the publicly provided strategy as a cost coping measure (60% utilization rate). This emanated partly, from the fact that the vast majority of patients subscribed to the NHIS (96%). Kavosi et al (2014) found a relationship between health insurance and catastrophic health expenditures. When significant proportions of health services are not covered by insurance, households had to devote a higher percentage of their incomes on health care. Majority of respondents (84%) were of the opinion that the health insurance in its current form provided only partial benefit for treatment of their condition. They therefore had to resort to other financial measures such as loans to deal with the economic onslaught of treatment. About 30% of households also rely on social support from networks such as religious groups and clubs to mitigate the cost of care. Kumar (2017) suggested that social networks could either play a small or significant role in helping patients deal with adverse health outcomes. Studies done in Burkina Faso showed that social networks played a small role and coping with the burden of ill-health was done mainly at the household level. Household approach had a utilization rate of just 6% in this study, whiles market based constituted 4%. In a comparative study, by Kung et al (2015), where participants used at least one life-style altering strategy, about 40% used the market based approach to cope with escalating cost. 25% sold their possessions (household approach) and 60% spent savings to make up for the shortfall.

The results obtained in this study, are in keeping with the conceptual framework with the inter-relations between the cost elements and the cost coping strategies of breast cancer management being well established. The study was able to evaluate the various cost elements pertaining to

the treatment of breast cancer at the KBTH, more so, it examined how the cost of care led to the coping strategies adopted by respondents in order to adapt to the escalating cost. The conceptual framework is therefore appropriate and served as a useful theoretical basis for determining the outcomes of the study.

5.7 Limitations

The study was an institutional based one, limiting the scope of the data collected. Be that as it may, this institution is one of only two referral facility for treatment of breast cancer hence the findings are still relevant. Secondly, the usage of the national minimum wage for determining the indirect cost may have introduced bias in the total cost input since income variations exist across sectors. Additionally, data collection involved asking respondents to provide cost information including figures, which could have led to recall bias and some selection bias could also have been introduced due to the exclusion criteria used, which included debarring ill patient who could not communicate from taking part in the study. Lastly, the data was collected by more than one research assistant which could have resulted in interviewer bias. To reduce its impact, research assistants were adequately trained in taking consent and information.

CHAPTER SIX

Conclusion

From the study, breast cancer is diagnosed at a relatively younger age in Ghana and other developing countries than the advanced nations. In addition, marriage confers better survival and prognosis for breast cancer patients whiles the absence of close ties and divorce increases the risk of death. The cost of surgery constituted 23% of the total medical cost input, while the direct cost made up 95% of the total cost. Furthermore, it was revealed that there was substantial delays in the initiation of treatment which may worsen the outcome of the disease, coupled with the increasing cost of treatment which seems to be putting financial pressure on patients.

The estimated productivity losses expressed in hours is 2,866 hours and patients absented themselves for a total of 149 days due to sickness. Productivity losses from breast cancer had negative repercussions on women economic activities. Moreover, breast cancer in younger women is more aggressive requiring elaborate treatment that can result in prolonged absenteeism from work. Besides, most patients with breast cancer tend to experience mild to moderate intangible burden, in addition, they experience extreme social isolation and embarrassment. It was realized that poorer households become more impoverished and experience deterioration in their financial situation due to illness. The publicly provided strategy was the most utilized cost coping strategy.

Recommendations

1. It emerged that there was a significant time lag between diagnosis and the initiation of treatment. Treatments are therefore initiated in the advanced stages of the disease when prognosis is poor. It is imperative that screening, counselling and mass media educational programs are embarked upon to reach out to people suffering from the disease early enough to ensure they did not succumb to it.

2. The escalating cost of medications, especially chemotherapeutic drugs meant that patients had to pay more for treatment year-on-year. Moreover, the majority of patients thought the NHIS provided only partial relief in the treatment of their ailments; which was inadequate. Decision makers therefore need to intervene to ensure the scheme covers the full medical cost of breast cancer treatment in order to reduce the economic burden on households.

3. The intangible cost associated with the disease implies that survivors are likely to suffer from its psychological effects even long after treatments. Counselling, family and social network supports are crucial to help them cope with the aftermath. Counselling centers should therefore be established to provide psychological support to cancer victims.

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QUESTIONNAIRE

TITLE: Household Treatment cost of Breast Cancer and Cost Coping Strategy of Women, presenting at the Korle Bu Teaching Hospital.

I am Kekeli Adanu, a student of the School of Public Health, conducting a research on the treatment cost of Breast cancer and the Cost Coping Strategies adopted by patient and their household when undergoing treatment for this condition.

I wish you could spare sometime and participate in this study. You are assured of the highest level of privacy and confidentiality.

Thank you

Respondent Code …… Date of Interview (dd/mm/yyyy) ……/……/…….

SECTION A: SOCIO-DEMOGRAPHY STATUS

No	Questions	Responses
1	Name (Initials)	
2	Age as at last birthday	……
3.	Sex 1. Male 2. Female	[ ]
4	Marital Status 1. Single 2. Married 3. Divorced 4. Widowed 5. Separated	[ ]
5	Educational Status 1. No Education 2. Primary	

	3. JHS/Middle School 4. SHS 5. Tertiary	[ ]
6	Religion 1. Muslim 2. Traditionalist 3. Christian 4. Other	[ ]
7	Employment Status 1. Unemployed 2. Private Sector Employee 3. Public Sector Employee 4. Self-Employed If unemployed, skip to Q 11	[ ]
8	If Employed, what is your occupation? 1. Health 2. Civil Service 3. Security services 4. Business/ Petty trading 5. Banking 6. Other, Please Specify……..	[ ]
9	If employed, are you still working despite your illness? 1. Yes 2. No	[ ]
10	How much do you earn monthly? 1. Less than GHS 500 2. GHS 500 – GHS 1999 3. GHS 2000 – GHS 4999 4. GHS 5000 – GHS 10,000 5. > GHS 10,000	[ ]
11	Do you have a valid NHIS card?	[ ]

	1. Yes 2. No	
12	When were you diagnosed as having breast cancer?	……. years
13	Is there a family history of breast cancer? 1. Yes 2. No If No, skip to Q 15	[ ]
14	If yes to 13 above, please specify …….	
15	For how long have you been on treatment?	……..yrs …….mnths
16	What is the source of funding for your treatment? (tick as many as applicable) 1. Self [ ] 1. NHIS [ ] 1. Pension [ ] 1. Remittances [ ] 1. Family Support [ ] 1. Private Insurance [ ] 1. Donations/Gifts [ ]	
17	How would you classify your household's financial situation these days? [1] Very comfortable [2] Comfortable [3] Poor [4] Extremely poor	[ ]
18	How do you rate your own physical health now? [1] Poor [2] fair [3] good [4] excellent	[ ]

SECTION B - DIRECT COST

MEDICAL

19. How much did you and your household spend on the following in a month?

No	Item	Cost
a	Folder	
b	Consultation	
c	Prescriptions per month	
d	Laboratory Investigations per month	
e	Imaging studies	
f	Histopathology	
g	Chemotherapy per month	
h	Surgery (mastectomy/breast conservation surgery)	
i	Radiotherapy per month	
j	Others (please specify)	

NON –MEDICAL

20. How much was spent on the following?

No	Item	Cost
a	Transportation	
b	Food and drinks	
c	Lodging/rent	
d	Others (specify)	

SECTION C – INDIRECT COST

No	Item	
21	How many days did you absent yourself from work within the past month because of your sickness?	…… days
22	On the average, how many days do you absent yourself from work per month on account of your sickness?	……days
23	On the average, how many hours do you spend travelling to and from the hospital each month?	……. Hours
24	On the average, how long do you have to wait before seeing a doctor?	…….hr(s) ……. mins

Person Accompanying Patient

25	How many people accompany patient to the hospital on each visit? If None, skip to Q 29	……..
26	How many days did you absent yourself from work within the past month because of patient's illness?	……. days
27	On the average, how many hours do you spend travelling together with patient to and from the hospital each month?	……. Hours
28	On the average, how many hours in a day does a household member spend taking care of patient?	…….hours

SECTION D – INTANGIBLE COST

29. Pain

29 a	I feel pain in my breast 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]
29 b	I feel pain around my arms 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]
29 c	I feel general bodily aches and pains 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]

30. Fear

30 a	I am worried about my future 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]
30 b	I am afraid of dying as a result of my sickness 1. Not at all 2. A little 3. Moderately 4 Extremely	[ ]
30 c	I worry that the cancer may spread to other part of my body 1. Not at all 2. Mildly 3. Moderately 4. Extremely	[ ]
30 d	I am worried that my children may inherit the condition	

	1. Not at all 2. Mildly 3. Moderately 4. Extremely	[ ]

31. Depression

31 a.	I feel is not worth living anymore 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]
31 b.	I feel I am a burden onto those who take care of me 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]
31 c.	I feel my partner does not find me attractive any more 1. Not at all 2. Mildly 3. Moderately 4. Extremely	[ ]
31 d.	I sometimes feel like committing suicide 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]

32. Stress

32 a.	I feel stressed out by my condition 1. Not at all 2. Mildly 3. Moderately 4. Severely	[ ]

Cost Coping Strategies

33. Individual and Household

33 a	Did you or any household member have to sell a property to cater for your illness? 1. Yes 2. No If No, skip to Q33c	[ ]
33 b	If Yes above, please specify item and how much was realized …… ….	
33 c	Did you or any household member have to take money from lenders? 1. Yes 2. No If No, skip to Q 34	[ ]
33 d	If Yes above, please specify amount …….	
34	Market Based	
34 a	Did you have to take loans from any financial institution to take care of your illness? 1. Yes 2. No If No, please skip to Q34 c	[ ]
34 b	If Yes to above, how much …….	

34 c	Did you have to sell any financial assets to take care of your illness? 1. Yes 2. No If No, please skip to Q 34e	[ ]
34 d	If Yes, please specify ……..	
35	Networks of Mutual Support	
35 a	Are you a member of any group/Club 1. Yes 2. No If No, skip to Q 35 d	[ ]
35 b	If Yes to 'g' above, have you receive any financial support from this group to take care of your illness? 1. Yes 2. No	[ ]
35 c	If Yes, How much were you given?.....	
35 d	Have you received any support from any religious grouping (eg church/mosque)? 1. Yes 2. No If No, skip to Q 36	[ ]
35 e	If Yes, specify amount……	
36	Publicly Provided	

36 a	Are you a registered member of the National Health Insurance scheme (NHIS)? 1. Yes 2. No If No, please skip to Q 36 c	[ ]
36 b	If Yes above, how beneficial has the NHIS been towards treatment of your illness? 1. Not beneficial at all 2. Partially 3. Covers full cost of treatment	[ ]
36 c	Have you received any other form of social support from Government? 1. Yes 2. No If No, please skip to Q 36 e	[ ]
36 d	If Yes, please specify ……	
36 e	Have you received any form of support from your workplace? 1. Yes 2. No	[ ]
36 f	If Yes, please specify …… …….	

Thank You

APPENDICES

Appendix I: Information Leaflet

Project Title: Household Treatment cost of Breast cancer disease and cost coping strategies of women, presenting at the Korle Bu Teaching Hospital

Background

My name is Kekeli Kodjo Adanu, a student from the School of Public Health, University of Ghana. I am conducting a study on the household treatment cost of Breast cancer disease and the cost coping strategies adopted by women affected by the disease. The study is necessary because policy makers are unaware of the total cost implications of the disease on healthcare, the study would therefore estimate the total economic cost of breast cancer on households.

Procedures

The study would involve administering a questionnaire to participants who are willing to participate in the study. Participation of patients and their relatives is voluntary.

Risks and Benefits

The research poses no major risk to participants. There are significant benefits to be derived from the study. Participants and the society would know the average amount of money needed for management of the disease. Policy makers are also better informed by knowing the cost implications of the disease on households and the economy. Government and policy makers are better able to target adequate resources towards the care of patient with breast cancer.

Participation is voluntary and you are not under any obligation to answer all questions. You are also at liberty to withdraw from the study at any point in time. I will however encourage everyone to participate fully since the findings would be of immense benefit to participants, academia and policy makers.

Do you have any questions? If yes, please state below

……..

……

……

……

Any further questions on this study can be directed to

Kekeli Kodjo Adanu

0506816784

Kadanu2000@yahoo.com

Appendix II: Consent Form

I have read the information given above, or the information above has been read to me and I understand fully. I have been given a chance to ask questions concerning this study and questions have been answered to my satisfaction. I voluntarily agree, and also voluntarily agree for my relative to participate in this study knowing that I have the right to withdraw and also withdraw my relative from this study at any time without affecting any future provision of health care to me.

…… …… ….....

Name of Participant Signature/Thumbprint Date

…… …… ……..

Name of Researcher Signature/Thumbprint Date

APPENDIX III: KBTH ETHICAL APPROVAL CERTIFICATE

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

My Ref. No. KBTH/MD/93/19

Your Ref. No......

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18th April, 2019

KEKELI KODJO ADANU
SCHOOL OF PUBLIC HEALTH
UNIVERSITY OF GHANA, LEGON

INSTITUTIONAL APPROVAL: KORLE BU TEACHING HOSPITAL-SCIENTIFIC AND TECHNICAL COMMITTEE/INSTITUTIONAL REVIEW BOARD (KBTH-STC/IRB/00043/2019

Following approval of your study entitled "Household Treatment Cost of Breast Cancer Disease and Cost Coping Strategy of Women Presenting at KBTH" by the Korle Bu Teaching Hospital-Scientific and Technical Committee/Institutional Review Board.

I am pleased to inform you that institutional approval has been granted for the conduct of your study in Korle Bu Teaching Hospital.

Please contact the Head of Department to discuss the commencement date of the study.

Please note that, this institutional approval is rendered invalid if the terms of the Institutional Reviewed Board/Scientific and Technical Committee approval are violated.

Sincere regards,

Dr. Ali Samba
Director of Medical Affairs
For: Chief Executive Officer

Cc: The Chief Executive
Korle Bu