SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

BREAST CANCER SCREENING AMONG NURSES AND MIDWIVES IN MAAMOBI GENERAL HOSPITAL AND ACHIMOTA HOSPITAL

BY:

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THIS DISSERTATION SUBMITTED TO THE SCHOOL OF PUBLIC HEALTH, UNIVERSITY OF GHANA IN PARTIAL FULFILMENT FOR THE AWARD OF THE MASTER OF PUBLIC HEALTH DEGREE.

JULY, 2018

DECLARATION

I, Abena Asamoabea Okoh, hereby declare that apart from references to peoples work that have been duly cited, this dissertation is the result of my own research.

……. ……..

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DR. PRISCILLIA NORTEY DATE

(ACADEMIC SUPERVISOR)

DEDICATION

To my late mother, Dr. Mrs. Henrietta Odoi – Agyarko, who never ceased to pray for me.

ACKNOWLEDGEMENT

My deepest gratitude goes to my supervisor, Dr. Priscillia Nortey for providing extensive knowledge, wisdom, and guidance during this transformative process. My heartfelt thanks goes to my father Dr. Kwasi Odoi- Agyarko and my sister Dr. Mrs. Aba Obrumah Crentsil for their extensive help formatting this dissertation.

I express my gratitude to my sister, Dr. Mrs. Ama Agyeibea Amuasi for her kind words of encouragement and her continual support and motivation.

Most of all, I am forever blessed for my dear family, my husband Dr. David Kwabena Okoh, my children, Nana Kwadwo, Paa Kwasi and Nana Akua for all their help, but especially for their unconditional patience and love. I thank them for their inspiring words of encouragement.

I would like to thank the nurses and midwives of Maamobi General Hospital and Achimota Hospital who set aside time and agreed to be part of this study.

To end with, I am continually grateful to the Almighty God and Our Lord Jesus Christ for giving me the opportunity to carry out this work.

ABSTRACT

Background: The commonest occurring cancer among women worldwide is breast cancer. In addition, it is the principal cause of mortalities in women resulting from cancer (O'Mahony et al, 2013). Statistics show that one out of nine women, will be diagnosed with breast cancer in their lifetime (Torre et al, 2015). There is 95% survival rate if the disease is detected early (Seer, 2008). Early detection can be achieved through the adoption of screening practices (Tavafian et al, 2009).

Objective: To evaluate health beliefs, knowledge regarding risk factors for breast cancer and screening practices among the study participants.

Method: This study was a cross-sectional descriptive survey in two district hospitals in Accra Metropolitan area. The study population comprised of 180 nurses and midwives. Data was collected by means of an electronically administered questionnaire between May and June 2018. The questionnaire covered demographic variables, knowledge on breast cancer risk factors, breast cancer screening practices and assessment of Health Beliefs.

Results: The mean age of the study participants was 32 years ± 8 years. Marital status ($p = 0.01$), income ($p = <0.01$) and work experience ($p = 0.03$) were significantly associated with uptake of breast self-examination. Age (p.value= <0.001), marital status (p.value = < 0.001), income ($p= <0.001$), and work experience ($p = < 0.001$) were significantly associated with uptake of Clinical breast examination. Age ($p=<0.001$), income ($p=<0.001$) and work experience were significantly associated with uptake of Mammography. Majority of participants had good knowledge of breast cancer risk factors, however, this did not translate into breast cancer screening. Uptake of clinical breast examination and mammography were low among the study participants, 31.7% and 6.1%

respectively Majority of the participants, 67.0%, believed that breast cancer screening is not beneficial. Participants' health beliefs did not influence their uptake of breast cancer screening.

Conclusion: The results suggest the need for continuing professional education to improve the attitude of nurses and midwives towards breast cancer screening.

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LIST OF ABBREVIATIONS

ACS - American Cancer Society

AH	-	Achimota Hospital
BC	-	Breast Cancer
BSE	-	Breast Self-Examination
CBE	-	Clinical Breast Examination
DES	-	Diethylstilbestrol
HW	-	Healthcare Worker
HBM	-	Health Belief Model
KBTH	-	Korle bu Teaching Hospital
MRI	-	Magnetic Resonance Imaging
REDCAP	-	Research Electronic Data Capture

CHAPTER ONE

INTRODUCTION

1.1 Background

The commonest cancer among women worldwide is Breast Cancer (World Cancer Research Fund International, 2015).

One out of nine women, will be diagnosed with Breast Cancer in their lifetime. (Torre et al, 2015). Breast Cancer accounts for 25% of all cancer cases and is responsible for 15% of deaths resulting from cancer in women. In 2012 Breast Cancer accounted for almost 1.7 million global cases of cancer, out of which 521,900 mortalities occurred (Torre et al., 2015).

In Ghana, breast cancer accounts for 16% of cancers nationwide (Clegg-Lamptey, Dakubo, & Attobra, 2009).There is a wide disparity between the stages at which women with breast cancer present in the Western worlds as opposed to women in developing countries. In the western countries, the cancers are discovered early in women through comprehensive national screening programs. (The American Cancer Society medical and editorial content team, 2016). Such programs are non-existent in Ghana. Studies have shown that nearly 60% of Ghanaian breast cancer patients present to the hospital with stage III or IV disease with about eight to ten months history of symptoms. At this point the disease has far advanced and treatment options are minimal (Clegg-Lamptey et al, 2009).

Breast cancer, if detected early is curable. Theoretically, 95% survival rate can be achieved if the disease is detected in its early stage. Detecting breast cancer early can be accomplished through adoption of screening practices (Tavafian et al, 2009).

In the Western countries, mortalities resulting from breast cancer have been reducing by approximately 2.2% yearly since 1990. This decline has been attributed to increasing use of screening mammography and improvements in adjuvant therapy in about equal measure. (Warner, 2011).

Studies have shown a 32% reduction in mortality from mammography screening among women in their sixties and a reduction in mortality of 14% in women in their fifties (Warner, 2011)

In Ghana, there is no systematic national screening program or policy. A few non-governmental agencies have over the past years been organizing educational outreach programs and offering free screening services to women (Clegg-Lamptey et al., 2009). The government of Ghana has set aside the month of October as national breast cancer awareness month. During this period several awareness programs are conducted nationwide. However, in spite of the apparent increase in awareness, screening practices are still low in the country (Opoku et al, 2012).

A very critical part of improving the screening uptake is dependent on the health beliefs of clients. Studies have shown that health protective behavior of an individual is influenced by his/her health beliefs which in turn leads to action (Petro-Nustus & Mikhail, 2002).

The Health Belief Model, a psychosocial model, emphasizes that individuals participate in health promoting activities when they value health, define disease as a threat with serious avoidable consequences and anticipate positive results when they practice preventive health activities (Yilmaz & Durmus, 2016).

Healthcare workers have the duty of advancement of public health as well as their own health. They serve as role models for other people in society. It is extensively acknowledged that

healthcare workers play important roles in establishing healthy behaviors (Darweesh, Hadi, Madani, & Mahsen, 2017)

Healthcare workers are well positioned to educate members of the public about breast cancer risk factors and the screening modalities available, thereby influencing behaviors that will reduce the risk of future breast cancer morbidity and mortality.

Nurses and midwives constitute the highest proportion of all the healthcare workers in the country at 39.62% (MOH, 2011). Thus, people in the general public are more likely to encounter a nurse as compared to a doctor or any other healthcare worker. To increase early detection of breast cancer in the general public, nurses and midwives themselves must be able to recognize the risk factors for breast cancer development, and also detect people who are at an increased risk of being diagnosed with breast cancer as well as have knowledge on symptoms associated with the disease. Health beliefs and breast cancer screening practices among nurses and midwives must therefore be known, in order to make appropriate educational and training interventions, which will lead to improved public health service delivery.

Thus, the aim of this study was to assess Health Beliefs, knowledge of breast cancer risk factors and breast cancer screening practices among nurses and midwives in Maamobi General Hospital and Achimota Hospital using the Health belief model.

1.2 Problem Statement

In Ghana, 5 year breast cancer survival rate is less than 25% compared with over 70% in the developed countries (Opoku et al., 2012). This can be attributed to the fact that, in the developed countries, screening by mammography is more readily available, with increased levels of

utilization, thus early detection of cancers before they manifest. In 2015, the percentage of women in the United States who had undergone a mammography in the preceding two years ranged between 63% and 72.3%(National Center for Health Statistics, 2017).

According to the Healthy People 2020, the target/ideal situation for breast cancer screening by mammography should be 81.1 percent (National Cancer institute, 2015)

Studies conducted in Ghana among registered nurses in Komfo Anokye Teaching hospital reported 10% uptake of screening by mammography (Adofo & Akpaloo, 2013). Thus, there is a gap of 71.1% from the ideal situation. This is of great public health significance because, nurses, as advocates of health promotion are in a unique position to teach and encourage the general population on breast cancer screening methods. However, if the nurses themselves do not partake in screening practices, they will be less likely to recommend it to their clients. If this situation is not addressed leading to increased awareness and uptake of breast cancer screening, more women will continue to present with advanced stages of the disease leading to increased morbidity and mortality. This will significantly reduce the working class group in the country and subsequently affect our economy negatively. Also, resources which the government could have used to tackle other developmental programs will be diverted to the treatment and support of these women. Consequently, this study examines the knowledge of breast cancer risk factors, screening practices and health beliefs among nurses and midwives in two district hospitals in the Greater Accra Region.

1.3 Justification

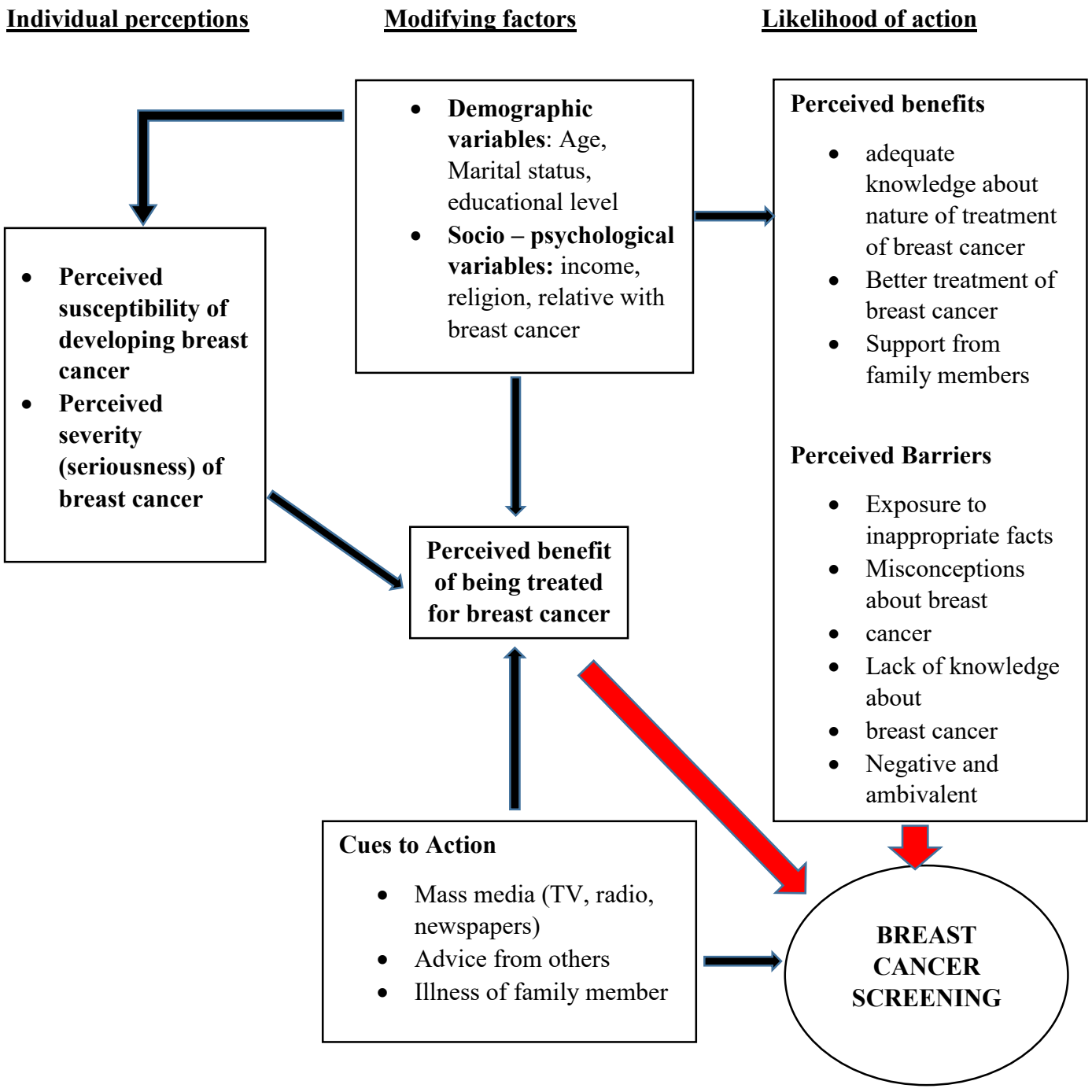
Breast cancer is the leading cause of cancer deaths in women (Jemal, Bray, & Ferlay, 2011) and deaths resulting from breast cancer are expected to increase from 7.4 million in 2004 to 11.8 million in 2030 across the globe (Ministry of Health, 2011). The sure way to reduce mortality from breast cancer is through comprehensive screening methods (Warner, 2011), thus, necessitating this study.

1.4 Conceptual framework

The conceptual framework (Figure 2.1) was adapted and modified from the Health Belief Model. The Health Belief Model is a psychosocial model which is widely used in health education and promotion. The idea of the health belief model is that an individual's health behavior is determined by his/her beliefs or perceptions about the disease and available plans to reduce the incidence of the disease(Stretcher & Rosenstock, 1997).

The model focuses on six main constructs; perceived susceptibility, perceived seriousness, perceived barriers, perceived benefits, self-efficacy and cues to action. These constructs together determine a person's likelihood of partaking in screening practices.

Figure 1. 1: Conceptual framework showing the relationship between variables**.**



Adapted and modified from the Health Belief Model Construct (Stretcher & Rosenstock, 1997)

In addition to the health beliefs, the income of an individual also influences the choices the person may make. Availability of resources can determine the educational possibilities available such as to attend a degree, certificate or diploma program and may also determine if an individual will be able to afford a screening option such as mammography.

Age also has an influence on a person's attitude to screening. Young people usually believe they are not at risk of developing cancer and as such may opt out of screening.

Married people are more likely to go for screening because of emotional and financial support from their spouses.

On the other hand, unmarried women feel they may be rejected by men if they find problems with their breasts and as such may opt out of screening. Women who are highly religious may not partake in screening because they may believe that cancer is a disease from the devil or a form of spiritual punishment when one sins and as such may not take part in screening practices

Consequently, for a woman to take part in screening practices, she must first recognize that she stands a risk and also recognize the threat. She must also be aware of benefits that may arise if she takes part in the screening process.

1.5 Research Questions

1. What is the practice of breast cancer screening among nurses and midwives at Maamobi General Hospital and Achimota Hospital?
2. Are nurses and midwives in Maamobi General Hospital and Achimota hospital knowledgeable about breast cancer risk factors?

3. What are the health beliefs of nurses and midwives working in Maamobi General Hospital and Achimota Hospital towards breast cancer screening?
4. Is there a relationship between demographic characteristics, health beliefs and level of knowledge of breast cancer risk factors, and breast cancer screening practices among nurses and midwives working at Maamobi General Hospital and Achimota Hospital

1.6 Objectives

Main objective

To evaluate the knowledge of breast cancer risk factors, explore breast cancer screening practices and health beliefs of nurses and midwives in two hospitals.

Specific objectives

1. To assess breast cancer screening practices among nurses and midwives.
2. To identify health beliefs of nurses and midwives
3. To evaluate the knowledge of breast cancer risk factors among nurses and midwives.
4. To determine the relationship between breast cancer screening and demographic variables.

1.7 Definition of Key Terms

Screening

Screening is the systematic application of a test or enquiry to identify individuals at sufficient risk of a specific disorder to warrant further investigation or direct preventive

action, amongst persons who have not sought medical attention on account of symptoms of that disorder (Wald, 2001).

Types of Screening:

Clinical Breast Examination

Clinical breast examination refers to physical examination of the breast by a doctor or other health practitioner to detect small lumps or masses.(The American Cancer Society medical and editorial content team, 2016)

Self-Breast Examination

Periodic self-examination of the breasts by an individual in order to detect small lumps or masses (The American Cancer Society medical and editorial content team, 2016).

Screening Mammography

Screening mammography is a radiological examination of a woman's breasts used to detect breast cancer when that cancer is too small to be felt as a lump (Añorbe & Aisa, 2003).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature related to the constructs examined in this study. It begins with a review of the histological features of breast cancer. Next, it looks at the risk factors associated with breast cancer development. The discussion is followed by a review of the different types of breast cancer screening practices available and finally a review of the health belief model constructs.

Global breast cancer incidence rates have been increasing by about 0.5% yearly since 1990.The incidence of cancer is increasing in developing countries such as Ghana, due to population ageing as a result of improved healthcare, and an adoption of lifestyles that promote cancer development such as smoking, physical inactivity, and eating highly refined foods. (Ozmen & Anderson, 2008). The fundamental basis for breast cancer screening is that, it permits the detection of lumps before they become clinically apparent. The pathogenesis of breast cancer is such that, small tumors are more likely to be at an early stage of the disease with better prognosis and as a result better treatment outcomes. Conversely, larger tumors are more likely to be at the late stage with poor prognosis. In this study, screening is defined as application of tests to asymptomatic individuals to detect occult disease.

2.2 Breast Cancer

Globally, the foremost cause of cancer related mortalities in women is breast cancer (Kamangar, Dores, & Anderson, 2006), with the male to female ratio being 1:100. (Siegel, Miller, & Jemal, 2017).

Breast cancer is a disease with varied genetic and clinical expressions. (Polyak, 2007). Five main molecular subtypes have been identified namely, basal-like, Luminal A, Luminal B, Human Epidermal growth factor Receptor positive/ Estrogen receptor negative (HER2+/ER–), and normal breast–like (Sørlie et al., 2006). The molecular variances lead to different clinical presentations which eventually affect treatment response. Basal-like tumors are known to have the worst prognosis, with luminal A-type tumors having the most favorable prognosis (Polyak, 2007). Basal-like tumors are more common in black women compared to non-black women, with the incidence being higher in premenopausal compared with postmenopausal black women. (Carey et al., 2006). The triple-negative immune-phenotype, (estrogen receptor (ER), progesterone receptor (PR) and human epidermal growth factor receptor 2 negative) a type of basal like tumor, is three times more prevalent in black women compared to non-black women, irrespective of age and body mass index. This accounts for a black woman's unfavorable breast cancer prognosis. (Stead et al., 2009).

2.3 Breast Cancer Risk Factors

The precise causes of breast cancer are uncertain. However, some risk factors are known to be associated with the development disease. The risk factors include: increasing age, genetic mutations, inherited mutations of certain genes, such as BRCA1 and BRCA2. Early menarche before age twelve years and late menopause after age 55 years increase the risk due to increased exposure to estrogen and progesterone. Nulliparity or having the first pregnancy after age thirty

years can raise breast cancer risk due to prolonged exposure to hormones. A woman with a personal history of breast cancer or a family history of breast or ovarian cancer, most importantly a first degree relative or having been exposed to some form of radiation therapy has an increased risk of developing breast cancer. Other casual associations for breast cancer are sedentary lifestyle, post-menopausal overweight and obesity, hormone replacement therapy and hormonal contraceptives use, excessive alcohol consumption and smoking.

Unfortunately, there is scarce information about knowledge of breast cancer risk factors among nurses and midwives in Ghana. A study among nurses in Ethiopia showed that 241 (89.3%) of participants were aware of the fact that risk factors are involved in developing breast cancer. 24 (8.9%) said there are no risk factors whiles 4 (1.5%) said they did not know (Lemlem, Sinishaw, Hailu, Abebe, & Aregay, 2013).Out of the nurses who were aware of risk factors, 188 (69.9%) indicated family history as a risk factor.53 (19.65%) mentioned wearing tight bra as a risk factor , 27 (10%) mentioned prolonged breast feeding,38 (14.1%) mentioned multi-parity and cracked nipples as risk factors for breast cancer.

In Karachi Pakistan, a cross sectional survey conducted to explore knowledge of breast cancer risk factors among nurses demonstrated that 35% of the nurses had good knowledge, 40% had average knowledge whiles 25% had poor knowledge about breast cancer risk factors (Ahmed et al,2006).

In order for nurses and midwives to effectively and efficiently promote screening practices for breast cancer, they must themselves be knowledgeable about the risk factors.

2.4 Signs and Symptoms of Breast Cancer

Alterations in the appearance and texture of the breast and nipple with or without nipple discharge are among the common symptoms of breast cancer. Other signs and symptoms include, a breast lump, skin irritation or dimpling, nipple retraction and redness (The American Cancer Society medical and editorial content team, 2016).

2.5 Screening Methods for Breast Cancer

Screening is recommended for diseases that have a high burden of illness, diseases that have safe and accurate tests for screening and confirmation, diseases for which timely treatment leads to better prognosis compared to delayed treatment, with the cost of screening matching the possible benefits (Silvestre, Dans, & Dans, 2011).

Breast cancer screening is the methodical application of a test or investigation to detect persons at risk of developing breast cancer, who have not yet developed clinical symptoms. (Wald, 2001).

The essence of screening is to diagnose cases earlier than they would have presented if symptoms were waited to develop. The main screening strategies employed in breast cancer screening are Mammography, Clinical Breast Examination and Breast Self- Examination.

2.5.1 Screening Mammography

Screening mammography is the gold standard for timely detection of breast cancer. It is a radiological examination of a woman's breasts which aids in the detection of breast cancer before it becomes clinically apparent. The overall benefit of screening mammography is to decrease mortality from breast cancer. (Añorbe & Aisa, 2003).

A study conducted in South Australia estimated that participation in screening mammography reduced cancer mortality by 30–41%. (Roder et al., 2008) . Another study in Western Australia showed a 52% reduction in mortality from breast cancer (Nickson, Mason, English, & Kavanagh, 2012). A review in the United Kingdom, estimated a 20% relative risk reduction in breast cancer deaths as a result of mammographic screening. (Marmot et al., 2013a)

In Australia, screening mammography is offered at no cost to women 40 years and above who are asymptomatic of breast cancer. Similar services are offered to women aged between 45-69 years in New Zealand. (Añorbe & Aisa, 2003).

2.5.2 Clinical Breast Examination

Clinical breast examination is the physical examination of the breast by a doctor or other health practitioner to detect occult masses. The most preferred technique for examination is the Mammacare technique. It involves palpation over the breast in circular motion using the flat of the hands, exerting varying pressures to help detect lumps at different depths. (Brennan, 2016).

Recommendations for using Clinical breast examination for screening asymptomatic women vary greatly (NCCN, 2013). Whereas the National Comprehensive Cancer Network NCCN (USA) recommends annual Clinical breast examination for women ≥40 years (NCCN, 2013), the American Cancer Society (ACS) does not recommend it as a screening tool. (The American Cancer Society medical and editorial content team, 2016). Cancer Australia does not recommend clinical breast examination, however, recognizes the potential benefit it may offer women who do not participate in mammography. Also, the World Health Organization does not recommend clinical breast examination in developed countries but recommends it be considered in women 50–69 years in “limited resource settings with weak health systems” (Brennan, 2016).

Yet, aside these controversies, clinical breast examination has several possible benefits. It has the potential to detect breast cancer that may not be visible to mammography, in women receiving Clinical breast examination in combination with mammography (Alexander et al., 1994) . Clinical breast examination has the added benefit of detecting breast cancer at an early stage, most especially in low resource setting areas where mammography is not readily available. (Mittra et al., 2010).

In addition, Clinical breast examination affords the patient the opportunity to engage with a health worker who may discuss other relevant health issues with her (Mittra et al., 2010).

2.5.3 Breast Self-Examination

Breast self-examination is a monthly examination of one's own breast, done at the same time of each month. In previous years, the American Cancer Society and other international medical and breast cancer associations recommended Breast self-examination as a screening tool. Currently, it is considered optional by these associations.

However, though Breast self-examination continues to be a topic of debate due to the fact that, its effects on reducing deaths from breast cancer has not yet been proven by research, its practice remains very significant in early detection of breast cancer especially in resource limited countries where mammography is not readily available (Carelli et al., 2008).

It is noteworthy, that all the screening modalities have some possible side effects. These include false positives, which may result in needless further laboratory tests, thus causing anxiety. It may also produce false negative results, causing false reassurance when cancer is actually present, leading to possible delay in diagnosis and treatment (Brennan,2016).

2.6 Health Seeking Behavior of Women with Breast Cancer

Health seeking is a learned behavior, and it is therefore necessary to acquire insight into a person's inclination for such behavior before attempts can be made to embolden them to seek care (O'Mahony et al., 2013). To bring about changes in health behavior, an in-depth understanding of the factors that shape behavioral practices is needed before health promotion programs and interventions can bring the desired change in people (Amin et al., 2017).

A study done among female health workers in Eastern Turkey on behaviors related to health beliefs and breast cancer screening found that, among the 268 female workers studied, only 22% perform regular breast self-examination (Canbulat & Uzun, 2008).

Health workers themselves need to be health aware in order for them to motivate their patients to also be aware Therefore, health workers should be the change they hope to see. They must be the first to change. (Thaker et al, 2015).

2.7 Health Belief Model

The Health Belief Model is a psychosocial model frequently used in health education and health promotion (Seer, 2008). It was developed in the 1950's to explain why medical screening programs offered by the US government were not successful. The main concept of the Health Belief Model is that people's behavior are influenced by their beliefs and perceptions.

Beliefs are assumptions we hold to be true. They are formed over several years from our experiences, culture and the environment we are exposed to. What you believe is what you stand for(Auger & Eckhardt, 2011).

The positive aspect is that, beliefs can be changed through well-structured and targeted educational programs. The initial Health belief model consisted of four main parameters. It was later revised by Victoria Champion after which 2 more constructs were added. The six constructs are as follows;

2.7.1 Perceived severity

This construct looks at a person's belief or perception of how serious or severe the disease is. Most often, perception of seriousness or severity comes from medical information or knowledge. It may however also stem from an individual's belief about the effects the disease will have or the difficulties it will have on his or her life in general. Before a health promoting behavior will develop, a threat must be envisaged. A woman must perceive that breast cancer is serious as well as recognize the fact the she has a risk for developing the disease before she will partake in screening practices(Victoria L. Champion, 1999).

2.7.2 Perceived susceptibility

Looks at an individual's belief about the possibility of developing a specific disease. The greater a person's perceived susceptibility is, the greater the likelihood that they will engage in practices to reduce the risk. Thus a woman is more likely to engage in breast cancer screening if she perceives that she is at risk. An increase in perceived susceptibility has been shown to increase screening practices (Holwerda, 2000)

2.7.3 Perceived benefits

Examines an individual's belief on how change in her behavior will improve her life compared to what she was doing previously, or how useful the change will be in reducing her chances of developing a disease. A woman is thus more likely to engage in screening practices if she believes it will reduce her likelihood of developing the disease and also avoid death.(V L Champion & Skinner, 2008).

2.7.4 Perceived barriers

It is an individual's assessment of the factors/impediments that inhibit her from assuming a new behavior. It looks at the negative attitudes related to a health behavior. Of all the constructs, perceived barriers are the most significant in determining behavior change. The barriers may include fear of cancer, cost, time, pain and fear of radiation(Victoria L. Champion, 1999)

2.7.5 Self-efficacy

It is an individual's belief in herself to be able to accomplish a task. Most times, people do not try new things unless they believe they can do it. If an individual beliefs that a new behavior is useful, however does not believe she can do it, the likelihood that they will not try the new behavior is high.

2.7.6 Cues to action

These are events, people or situations that cause people to change their behavior. For example illness in a family member, mass media campaign or advice from someone held in high esteem.

All items in the scale are anchored with a five-point Likert scale with response options from "strongly agree" to "strongly disagree.

However, in this study, only four out of the six health beliefs was used in analyzing participant's health beliefs towards breast cancer screening.

CHAPTER THREE

METHODS

3.1 Introduction

This chapter presents the methods and design of the study, a concise description of the study area, study population, sample size, sampling method, data collection, data handling, data analysis, and ethical consideration.

3.2 Study Type

A cross sectional study was conducted in two districts hospitals in Accra Metropolitan Area between May, 2018 and June, 2018.

3.3 Study Area

District hospitals are health care institutions which provide clinical care at the district level. They usually serve a clearly defined geographic area and provide services for 100,000 to 200,000 people. District hospitals typically have 50 to 60 bed capacity and serve as an integral part of the health delivery system. They are the first point of referral.

The study was conducted in Maamobi General Hospital and Achimota hospital in the Accra Metropolitan Area.

3.3.1 Accra Metropolitan Area

The Accra Metropolitan Area was established in 1898 and has since its establishment served as the capital of the Greater Accra Region. In addition, it serves as the national capital of Ghana. The Accra metropolitan area is simultaneously a city and metropolitan district .The City of Accra is bordered to the North by Ga West Municipal, the West by Ga South Municipal, the South by the Gulf of Guinea, and the East by La Dadekotopon Municipal. It covers a total land area of

139.674 Km2. The city is entirely urban and has a population of 1,665,086 which represents 42 percent of the region's total population. The Accra Metropolitan Area is the economic hub of the Greater Accra Region and the rest of the country. It hosts a number of manufacturing industries, oil companies, financial institutions, telecommunication, tourism, education and health institutions. About 70.1 percent of the population aged 15 years and older are economically active while 29.9 percent are economically inactive (Ghana Statistical Service, 2014)

3.3.2 Achimota Hospital

The facility was inaugurated in 1927 by the Achimota school authorities so serve the health needs of the students and staff hence its location within the school. In 1973, the hospital was absorbed by the Ministry of Health and operated as a government facility. Currently, it offers a wide range of services including obstetric and gynecological care, pediatric services, and recently, general surgery services. The Achimota hospital is located within the Achimota Health zone, which forms part of the Okaikoi Sub Metropolitan area within the Accra Metropolitan Authority. The catchment area of the Achimota Health zone has the Ayawaso (West Lands) area as its northern boundary, Accra – Kumasi road as its southern boundary, Ayawaso District (Legon) and Ga East district (Dome) as its east and west boundaries respectively. The projected 2015 population for the area is 107,559 with a growth rate of 4.4%. The current population of female nurses and midwives in Achimota Hospital is one hundred and sixty one. (Achimota hospital- personal communication, 2017)

3.3.3 Maamobi General Hospital

The Maamobi General Hospital was established in 1969 for the people of Ayawaso Sub-metro as a polyclinic. It is situated in the Ayawaso Sub-Metropolis in the Accra Metropolitan Area. It is

the biggest public health institution in the Ayawaso Sub-Metropolis. The facility was up-graded to a General Hospital in July, 2011**.** The sub-metro is bounded on the North by GIMPA through the University of Ghana Legon, sharing boundaries with the Ga District at I.P.S. Road, on the south by Osu Klotey sub district: Ako Adjei Interchange to Kwame Nkrumah Interchange. Bounded on the East by Kpeshie sub district: Ako Adjei Interchange to Legon and on the west by Okaikoi south district: Kwame Nkrumah Interchange to Apenkwa overhead bridge to Nsawam road. The hospital offers 24hour services. Services include; Obstetrics and Gynecology, General surgery, dental services, Eye care, Ear, Nose and Throat services and General Outpatient Services. The current population of female nurses and midwives is one hundred and sixty three (Maamobi General hospital-personal communication, 2017)

3.4 Study Population

The study population included registered female nurses and midwives in Maamobi General Hospital and Achimota Hospital aged between 20 and 60 years. In Ghana, a registered general nurse or midwife is one who has undergone a three year professional training in general nursing or midwifery (Nursing and Midwery council, 1996)

3.6.1 Inclusion Criteria

1. Nurses and Midwives who were in good health. That is, one who was free from physical disease and pain.

2. Agreed to be part of the study

3. On duty at the time of the study.

3.6.2 Exclusion criteria

1. Participants with a personal history of breast cancer. This category of participants were excluded from the study because their condition or treatment processes may have given them added information about the disease.

2. Male nurses and male midwives. They were excluded because incidence of breast cancer in men compared to women is 1:100.

3. Pregnant nurses and midwives

3.5 Sampling

3.5.1 Sampling Method

Simple random sampling technique was the method utilized for selection of participants. A comprehensive list of all nurses and midwives was obtained from each hospital's administration. Achimota hospital had one hundred and sixty one (161) nurses and midwives and Maamobi General hospital had one hundred and sixty three (163) nurses and midwives.The number of nurses and midwives from each facility interviewed was selected based on their probability proportional to the number of nurses and midwives in each facility. A computer program was used to create a simple random selection of nurses and midwives who qualified to be part of the study from each facility. A total of ninety study participants were interviewed in each facility. The selected nurses were from different units of the hospital. The interviews were conducted at the work station. After informed consent (Appendix 1) was acquired, data collection was done by the means of a self-administered electronic questionnaire

3.5.2 Sample Size

In the estimation of sample size for this study, two prevalent values were considered. Firstly, p = 0.084 for proportion of nurses with adequate knowledge of breast cancer risk factors and p = 0.10 for proportion of screening by mammography

1. Sample size for number of nurses and midwives with adequate knowledge of breast cancer risk factors

The sample size was estimated using Cochran's formula for qualitative outcome which is **n** $=\frac{z^2pq}{d^2}$, where

n = minimum sample size

z = 1.96 which is the corresponding z score for 95% confidence interval

p = 0.084, which is the proportion of nurses with adequate knowledge of breast cancer risk factors i.e. at least knowledge on three out of five risk factor (Adofo & Akpaloo, 2013)

q = (1 – p) = 0.916, proportion of nurses with poor knowledge of breast cancer risk factors

d = 5%, margin of error

n = $(1.96^2 \times 0.084 \times 0.916) \div 0.0025$

= 118.

1. **Sample size for number of nurses and midwives who have ever done mammography**

n $=\frac{z^2pq}{d^2}$, where

n = minimum sample size

z = 1.96 which is the corresponding z score for 95% confidence interval

p = 0.10 This is the proportion for breast cancer screening by mammography in nurses (Adofo & Akpaloo, 2013)

q = (1 – p) = 88% proportion of nurses who do not screen for breast cancer by mammography

d = 5%, margin of error

n = $\{1.96^2 \times 0.10 \times 0.90\} \div 0.0025$ = 138.297, approximately 138

The sample size based on adequate knowledge of risk factors was 118 whereas the sample size for number who had had a mammography was 138. The sample size for the proportion of nurses who had had a mammography, was higher and therefore was considered to accommodate the proportion of nurses who had adequate knowledge on breast cancer risk factors. Sample size 138 was therefore chosen as the minimum sample size for the survey.

To cater for non-response, a value of 30% of the minimum sample size was included in the sample to obtain the final sample size.

The minimum required sample size = 138 + 42 = 180 study participants.

3.6 Data Collection Technique

The questionnaires were administered electronically using Research Electronic Data Capture (Redcap). Redcap is a free secure web application for building and managing online surveys and databases. This is an accurate way of collecting data because checks are programed into the tool to reduce errors.

The software was downloaded unto three tablets, which were used for data collection by the research team. If a participant selected was busy, a later attempt was made to reach the participant. A total of three attempts was made for each participant after which the participant was replaced if all three attempts failed.

The survey was conducted as quickly as possible within each facility to prevent contamination of responses due to communication and spread of information between the nurses and midwives. The questionnaire consisted of four sections (Appendix 2). The first section captured information on demographic variables such as age, marital status, religion, type of nursing/midwifery

certificate held, duration of service and income. The second part of the questionnaire assessed screening practices of the nurses and midwives.

The third part of the questionnaire assessed the level of knowledge of breast cancer risk factors. The questionnaire on the level of knowledge of breast cancer risk factors was adapted from a study done in Karachi, Pakistan (Ahmed et al., 2006). Three questions were identified as key items on basis of their relative importance. Two of them; age at which a woman bears her first child and family history of breast cancer are established breast cancer risk factors. These two questions were given a score of 3 each. The third key question is breast cancer being as a result of a curse or evil eye. This question is highly relevant because many Ghanaians are highly religious and superstitious (Sarpong, 1985). This question was given a score of 2 points. The remaining questions attracted 1 point each. The total score therefore ranges between 0 and 15 and graded as good, average or poor. Participants who could not answer any key question correctly could only score a maximum of 7 points and thus labelled as having poor knowledge of breast cancer risk factors. Participants who could answer at least one key question correctly could only get a maximum of 10points. Thus, a score between 8 and 10 was labelled as having average knowledge of breast cancer risk factors. Scores between 11 and 15 were considered as having good knowledge of breast cancer risk factors.

The fourth part of the questionnaire adopted the Health Belief Model Likert scale (Stretcher & Rosenstock, 1997). Options of the scale are, strongly disagree which is 1 point, disagree 2 points, don't know 3 points, agree 4 points and strongly agree 5 points. As indicated in Chapter two, four out of the six Health Belief model constructs were used to assess health beliefs of participants towards breast cancer screening. These are perceived Self-efficacy, perceived barriers, perceived benefits and perceived susceptibility.

The Self-efficacy scale had nine questions. A participant could score a minimum of 9 points and a maximum of 45 points.

The benefit scale consisted of 6 questions, with a minimum score of 6 and maximum score of 30. The barriers scale had 11 questions with a minimum score of 11 and a maximum sore of 55. Perceived susceptibility scale had 3 questions with a minimum of 3points and a maximum of 15 points. Higher scores indicated more perceived benefits, more perceived risk, more perceived barriers and more self-efficacy.

3.6.3 Training of Research Assistants

The research assistants, one physician assistant and one national service personnel were trained for one week prior to data collection on proper data collection and interview techniques, as well as on ethical issues.

3.6.4 Quality Control

Individual daily checks were done to ensure that standards were adhered to. Data collected was carefully edited and cleaned. Inconsistencies detected were promptly corrected to ensure good quality control.

3.8 Data Processing and Analysis

The analysis was done using Microsoft Excel 2016 and Stata (StataIC) version 15. Descriptive statistics was done to report on demographic characteristics (age, income, qualification, experience, marital status). Chi square test was done to assess the relationship between all the independent variables (demographic variables, knowledge of breast cancer risk factors and health beliefs) and the three dependent variables (Breast self-examination, Clinical Breast examination and Mammography).

Principal component analysis, a statistical technique widely utilized to describe variability among a set of observed variables was used to analyse the health belief model constructs. The principal-component factor method was used as the factor extraction method. Questions were asked on four broad themes of the health belief model– self efficacy, perceived benefits, perceived risk and perceived barriers. An index was constructed for each of these themes. The index was further categorized to categorize the score of each respondent on the themes assessed.

Subsequently, hierarchal logistic regression was conducted to determine the association between the dependent variables (Self breast-examination, Clinical breast examination and Mammography) and the Health Belief Model whiles controlling for demographic variables (age, marital status, qualification, income, experience) and knowledge of breast cancer risk factors.

Three models were developed for the three dependent variables. Model one had two steps whereas models two and three had three steps each.

In model one, uptake of Breast self-examination was used as the dependent variable. In step one of model one, demographic variables were entered as control variables and in step two knowledge of breast cancer risk factors was added on.

In models two and three, uptake of Clinical breast examination and Mammography were used as the dependent variables respectively. In step one, demographic variables were entered as control variables. In step two, knowledge of breast cancer risk were entered and in step three, the health belief constructs were added on.

Tables 3.1 to 3.5 illustrate the dependent and independent variables used for both the Chi square /Fisher exact test and the hierarchical logistic regression.

Table 3. 1 Operational definition for dependent /outcome variable

Variable	**Operational definition**	**Scale of Measurement**	**Source of data**
Breast Self-examination	Breast self-examination is a monthly examination of one's own breast, done at the same time of each month (ACS,2016)	Binary: Yes or No	Interview
Clinical breast examination	Physical examination of the breast by a doctor or other health practitioner to detect occult masses (ACS, 2016)	Binary : Yes or No	Interview
Mammography.	Radiological examination of a woman's breasts which aids in the detection of breast cancer before it becomes clinically apparent (Añorbe & Aisa, 2003).	Binary: Yes or No	Interview

Independent variables: Demographic variables (Age, Marital status, educational qualification, religion, income, experience) Knowledge of breast cancer risk factors, Health belief model constructs (perceived susceptibility, perceived benefits, perceived barriers and self-efficacy),

Table 3. 2: Operational Definition of Independent variables

Variable	Operational definition	Scale of Measurement	Source of data
Demographic variables			
Age	Age of nurse or midwife at last birthday	Continuous in years	Interview
Marital status	Nurse or midwife's marital status	- Single - Married - Cohabiting - Divorced - Widowed	Interview
Educational qualification	Type of nursing or midwifery qualification	- Certificate in Nursing/Midwifery - Diploma in Nursing/Midwifery - Degree in Nursing/Midwifery	Interview
Religion	Type of religious belief	- Traditional - Christian - Moslem - other	Interview
Income	Income of nurse or midwife	- < ¢1500 - ¢1501 – 2200 - ¢2201 - 2900	Interview
Experience	Duration of practice	Continuous measured in years	Interview

Table 3. 3 Knowledge of breast cancer risk factors.

Variable	**Questions**	**Scale of Measurement**	**Source of data**
Knowledge of breast cancer risk factors			
Number	Variable	Score for correct answer	Interview
1.	Communicable disease	1	
2	Irritation of a tight bra	1	
3.	Overweight risk	1	
4.	Late conception	3	
5.	Use of oral contraceptives	1	
6.	hard blow to the breast	1	
7.	Most lumps cancerous	1	
8.	First blood relative	3	
9.	Breast feeding	1	
10.	Curse/evil eye	2	

Source: Ahmed et al, 2016

Table 3. 4 Practice of breast cancer screening

Question	**Answer**
Have you ever done a self-breast examination?	Yes/No
Have you ever done a clinical breast examination?	Yes/No
Have you ever had a mammography?	Yes/No

Table 3. 5 Operational definition of Health Belief Model Constructs

Variable	Operational definition	Scale of measurement	Source of data
Perceived susceptibility	An individual's assessment of her chances of getting the disease	Likert scale Strongly disagree – 1point Disagree – 2 points Don't know – 3 points Agree – 4 points Strongly agree - 5	Interview
Perceived barriers	An individual's opinion as to what will prevent her from adopting a new behavior	Likert scale Strongly disagree – 1point Disagree – 2 points Don't know – 3 points Agree – 4 points Strongly agree – 5	Interview
Perceived benefits	An individual's opinion of whether the new behavior will be beneficial	Likert scale Strongly disagree – 1point Disagree – 2 points Don't know – 3 points Agree – 4 points Strongly agree - 5	Interview
Self-efficacy	A persons belief in her ability to do something	Likert scale Strongly disagree – 1point Disagree – 2 points Don't know – 3 points Agree – 4 points Strongly agree - 5	Interview

Source: Champion et al,1999

3.9 Ethical Considerations

Ethical clearance was obtained from the Ghana Health Service Ethical Review Board Committee (Appendix 3). A letter of introduction was also obtained from the University before going to the field (Appendix 4). Permission was sought from the Managements of the Maamobi General Hospital and Achimota Hospital before the study was conducted in the facilities. The purpose of the study was explained to each participant after which they were presented with an informed consent form. A participant was enrolled only after she agreed to the terms specified on the informed consent form.

The confidentiality of the information they provided was assured. The participants were made aware before the questioning begun of their right to exit the study anytime they felt uncomfortable with how the study or questions involved were proceeding. Interviewing of participants were done at locations where they were not overheard by others so that everything said remained confidential between the researcher and the particular participant.

Participants' identifying information was kept to the minimum and was only visible to the principal investigator after the data collection. Data obtained during the study was safely kept online in principal investigator's REDCap account. A backup copy was also kept in the email of the researcher. The downloaded dataset was stripped of all identifying information, stored on a compact disc, and submitted to the School of Public Health's Department of Epidemiology and Disease Control.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents data collected from participants of the study based on the statement of the problem and the objectives of the study.

The findings of the study are presented as follows.

4.2 Demographic characteristics

The participants' age ranged between 20 years and 59 years, with a mean age of 32years ± 8years. These are highly qualified nurses and midwives with three out of every five nurse and midwive (31.5%) having a high professional qualification (Table 4.1).

Table 4. 1 Demographic characteristics

Variables	Numbers	Percent %	Mean (SD)
Age (years)			32(8)
Qualification			
Certificate	78	43.3	
Diploma	71	39.4	
Degree	31	17.2	
Religion			
Moslem	20	11.1	
Christian	160	88.9	
Marital Status			
Never married	56	31.1	
Ever Married	124	68.9	
Length of service (years)			
<1	40	22.2	
1 – 2	15	8.3	
3 – 4	30	16.7	
>5	95	52.8	
Average monthly income (Ghana cedis)			
< 1500	119	66.1	
1600 - 2200	47	26.1	
2300 - 2900	14	7.8	

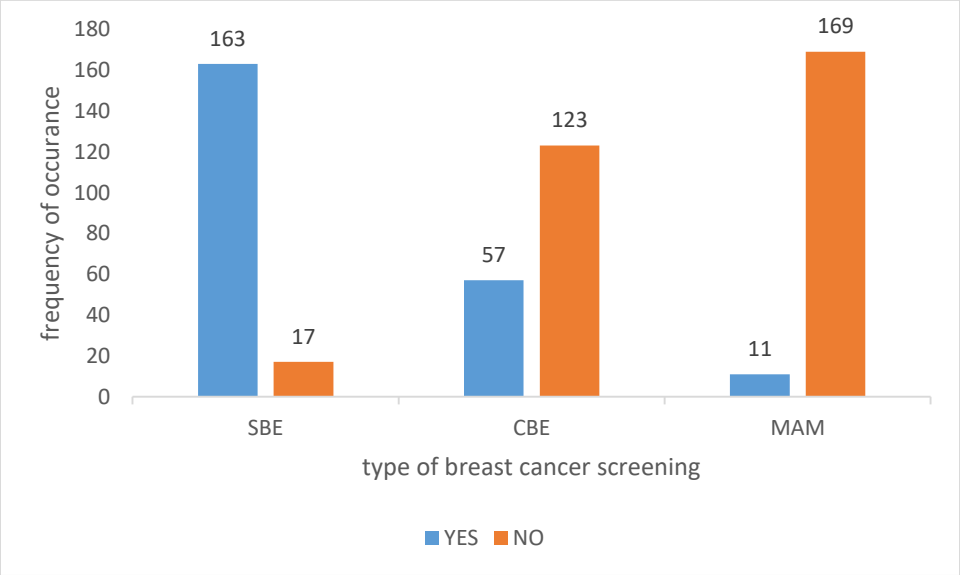
Source: Field Work, July 2018

Majority of the participants (88.9%), were Christians and (68.9%) had ever been married. A little over half of the participants, (52.8%) had been working for over 5years and 66.1% receiving a salary less than GH. ¢ 1,500 (Table 4.1).

4.3 Practice of breast cancer screening

Majority of the nurses and midwives, (90.6%) had done self breast examination at least once in their lifetime. However, only 31.7% had ever received a clinical breast examination at least once in their lifetime and only 6.1% had ever received mammography at least once in their lifetime. (Figure 4.1).

Figure 4. 1: Practice of breast cancer screening



Note: Yes means yes to breast cancer screening and No means no to breast cancer screening. SBE is Self-breast examination, CBE is Clinical breast examination and MAM is mammography.

Source: Field work, July 2018.

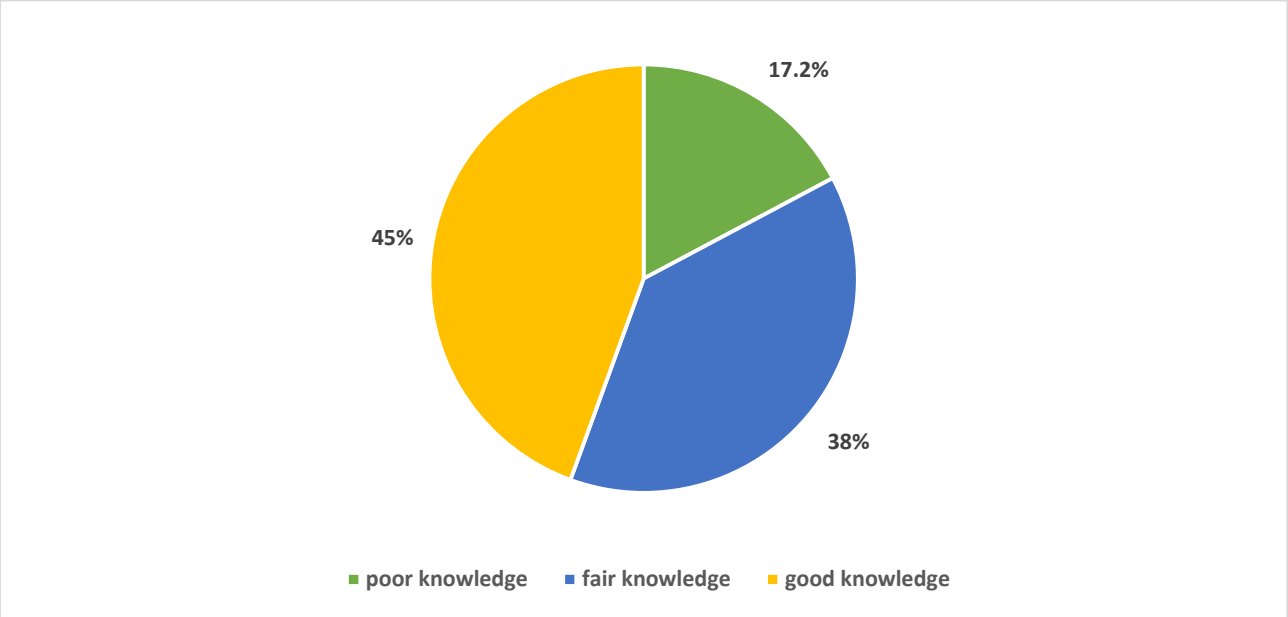
4.4 Knowledge of breast cancer risk factors

Ten questions were asked regarding knowledge of breast cancer risk factors. These included three questions which were identified as key items based on their relative importance. Two

questions which are established breast cancer risk factors attracted a score of 3 each. The third key question attracted 2 points. The remaining seven questions attracted 1 point each. The minimum score a participant could get was 0 and the maximum 15. Scores between 11 and 15 were regarded as having good knowledge. Scores between 8 and 10 were regarded as having average knowledge and scores below or equal to seven were considered as having poor knowledge of breast cancer risk factors

Participants of the study scored between 3 and 15 with a mean of 10.0 ± 2.8. As shown in Figure 4.2, 17.2% had poor knowledge of breast cancer risk factors.

Figure 4. 2 Knowledge of breast cancer risk factors.



Source: Field work, July 2018

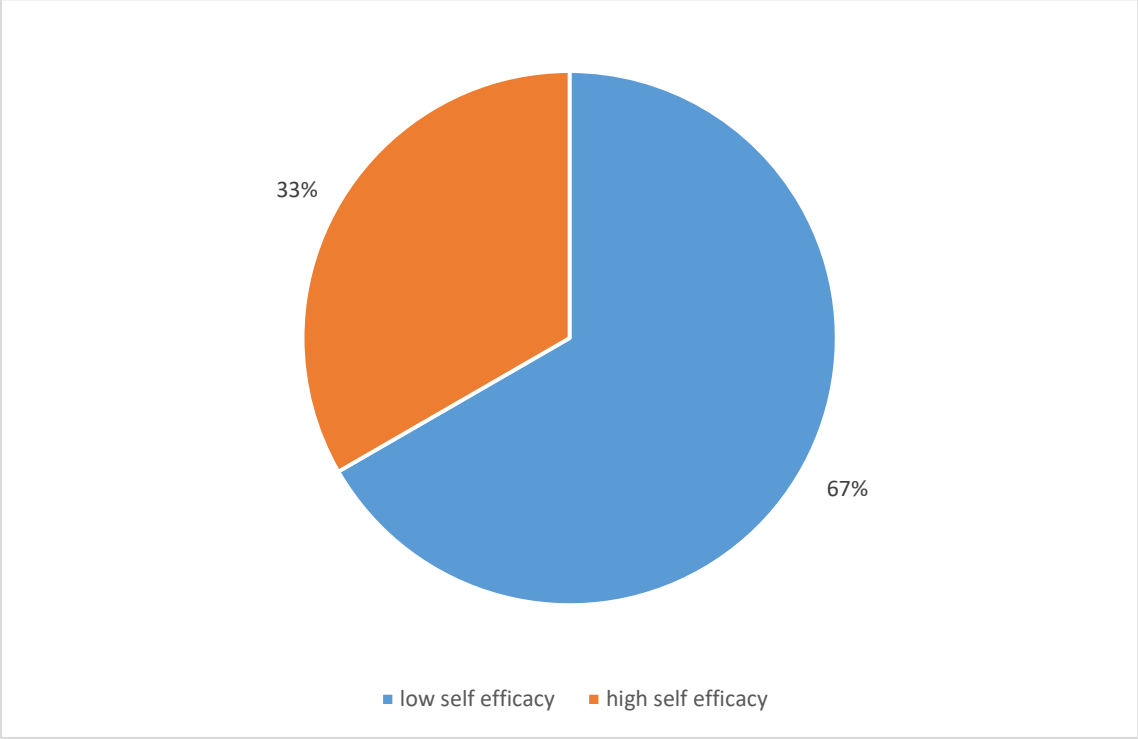
4.5 Health Belief Model constructs

Four out of the six Health Belief Model constructs developed by Champion et al, have previously been used to assess Health Beliefs of participants towards clinical breast examination and mammography. Shown below is the assessment of health beliefs of the nurses and midwives using these constructs.

However, breast self-examination was not assessed using the health belief model construct since uptake was very high.

1. Self-efficacy: Majority of the participants, 66.67% had low self-efficacy. This means, most of the participants did not believe in their own ability to commence steps to receive either a Clinical breast examination or Mammography (Figure 4.3).

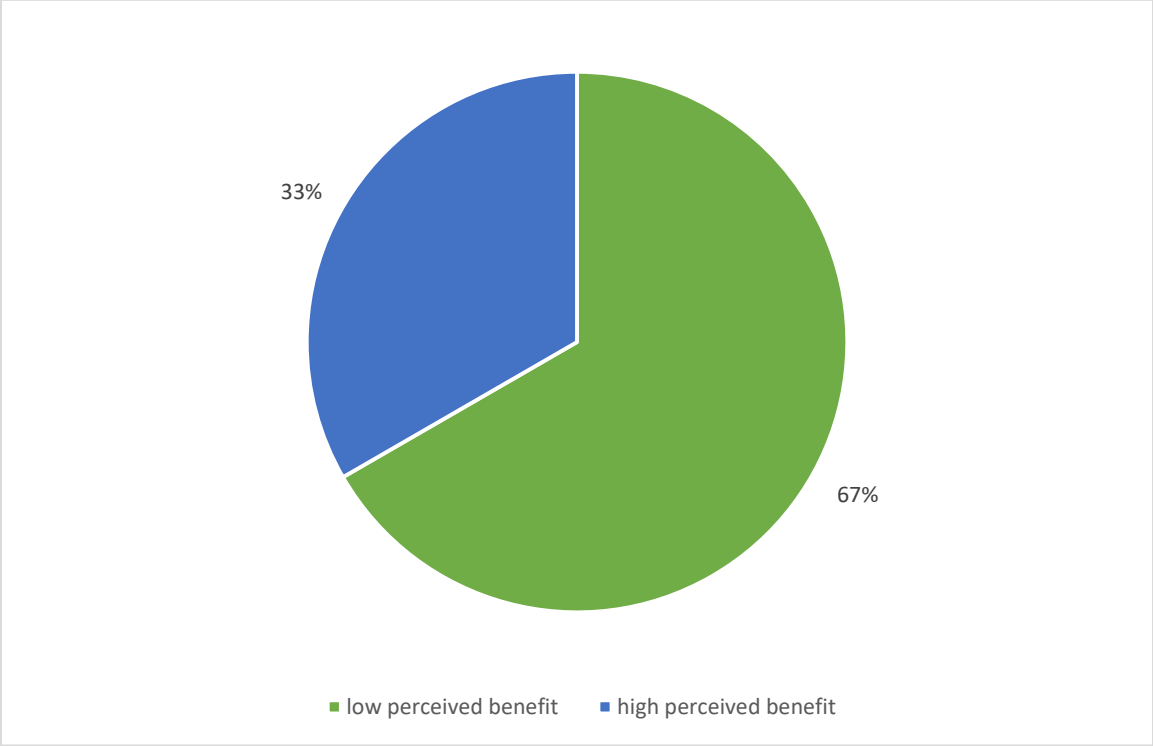
Figure 4. 3 Self efficacy towards breast cancer screening



Source: Field work, July 2018

2. Perceived benefits: Majority of participants, (66.7%) had low perceived benefit score. This meant that, majority did not believe that screening for breast cancer is beneficial. (Figure 4.4)

Figure 4. 4 Perceived benefits for breast cancer screening

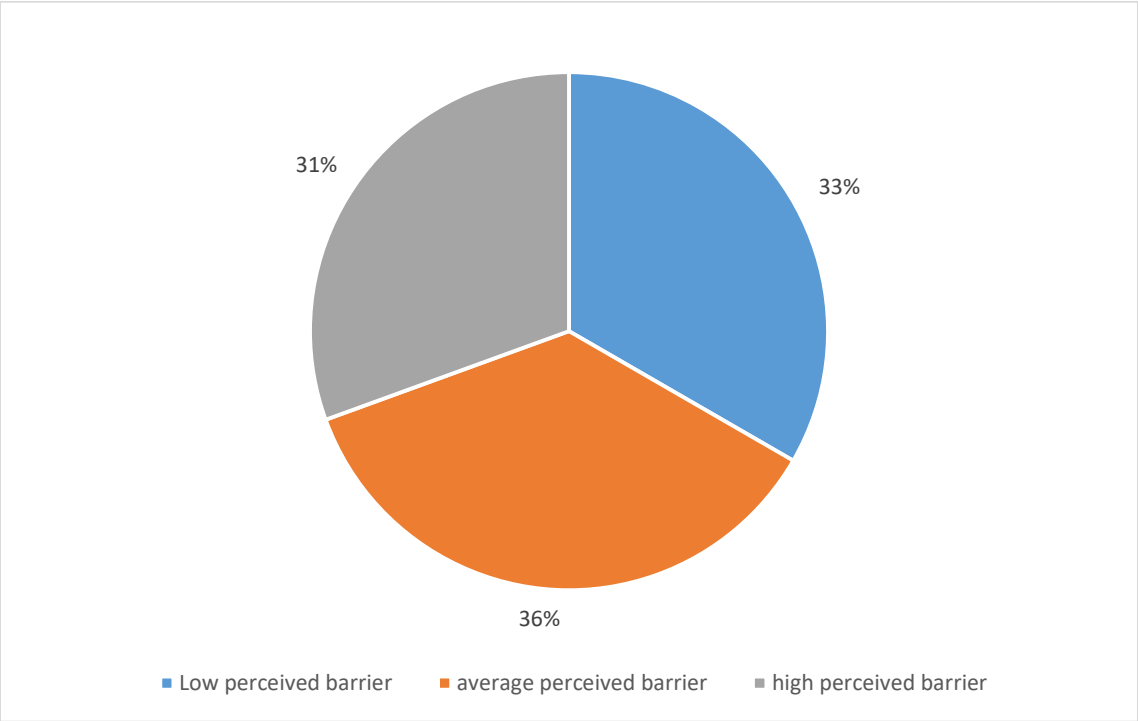


Source: Field work, July 2018.

3. Perceived barriers towards breast cancer screening

As shown in figure 4.5, 31% of participants had high perceived barrier towards breast cancer screening. This means that a third of participants believed, that there were obstacles preventing them from taking part in breast cancer screening.

Figure 4. 5 Perceived barriers for breast cancer screening

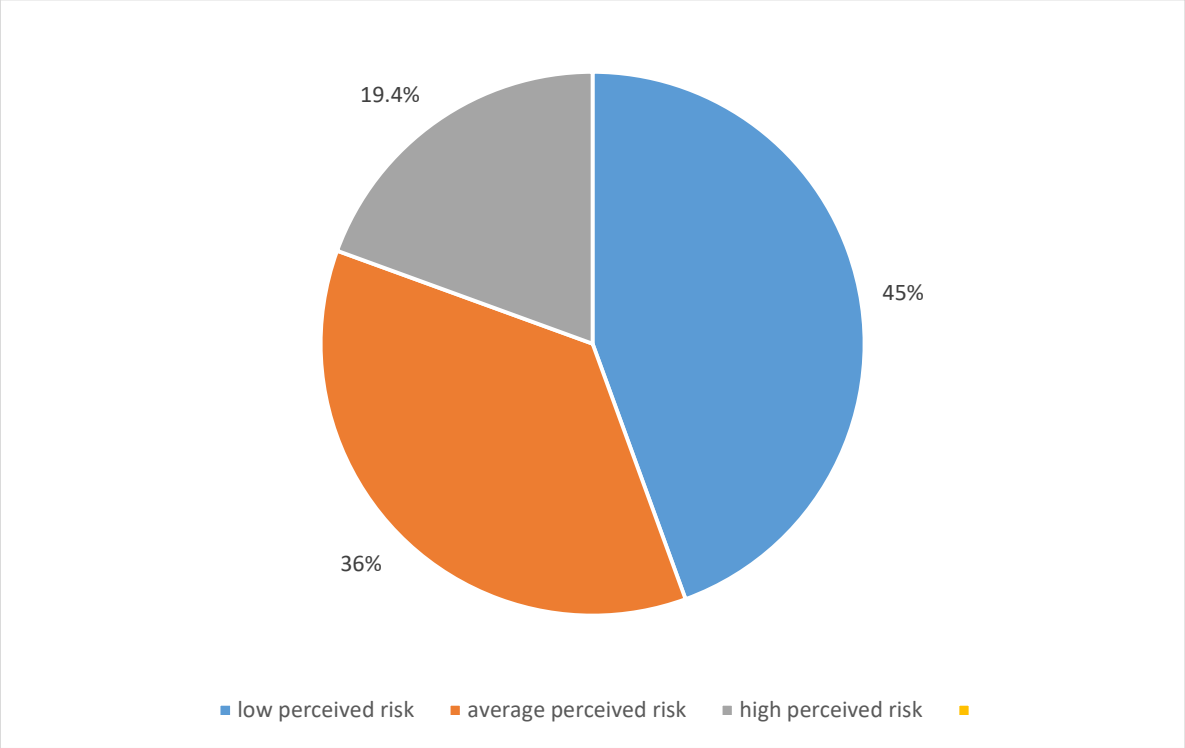


Source: Field work, July 2018

4. Perceived Susceptibility for breast cancer screening

Only a few participants, (19.4 %) had a high score for perceived susceptibility. Majority of participants did not believe they had a risk for developing breast cancer. (Figure 4.6)

Figure 4. 6 Perceived Susceptibility



Source: Field work, July 2018

4.6 Bivariate analysis

1. Bivariate analysis between Breast self-examination and independent variables

a).Bivariate analysis between breast self-examination and demographic variables showed significant associations between breast self-examination and marital status, income and experience, with p values of 0.010, < 0.010 and 0.030 respectively. This means that a participant's uptake of breast cancer screening is influenced by her marital status, income and work experience (Table 4.3).

Table 4. 2 Bivariate analysis between Breast self-examination and demographic variables.

Variable		**Breast self-examination**		
	Yes N (%)	No N (%)	Chi square	p-value
Age			5.89	0.187
20-29	61 (84.7)	11 (15.3)		
30-39	78 (92.9)	6 (7.1)		
40-49	13 (100)	0 (0.0)		
50-59	11 (100)	0 (0.0)		
Qualification			1.74	0.521
Certificate	70 (89.7)	8 (10.3)		
Diploma	63 (88.73)	8 (11.27)		
Degree	30 (96.8)	1 (3.2)		
Religion			0.52	0.410
Moslem	19 (95.0)	1 (5)		
Christian	144 (90)	16 (10)		
Marital status			**6.73**	**0.010**
Never married	46 (82.1)	10 (17.9)		
Ever married	117 (94.4)	7 (5.65)		
Income			**9.64**	**<0.010**
<1500	102 (85.7)	17 (14.3)		
1501-2200	47 (100)	0 (0)		
2201-2900	14 (100)	0 (0)		
Experience			**8.86**	**0.030**
<1	34 (85.0)	6 (15)		
1-2	11 (73.3)	4 (26.67)		
3-4	28 (93.3)	2 (6.67)		
>5	90 (94.7)	5 (5.26)		

Source: Field work, July 2018

b). Bivariate analysis between breast self-examination and knowledge of breast cancer risk factors was not statistically significant.

This implies that, a participant's level of knowledge of breast cancer risk factors does not influence her uptake of breast cancer screening. (Table 4.4)

Table 4. 3 Bivariate analysis between BSE and knowledge of risk factors

Variable	**Breast self-examination**			
	Yes N (%)	No N (%)	Chi square	p-value
Knowledge			4.56	0.128
Poor	25 (80.7)	6 (19.3)		
Average	63 (91.3)	6 (8.7)		
Good	75 (93.8)	5 (6.2)		

Note: Poor knowledge is a score of 0 to 7, average knowledge is a score of 8 to 10 and good knowledge is a score of 11 to 15

Source: Field work, July 2018

2. Bivariate analysis between clinical breast examination and independent variables

Bivariate analysis between demographic variables and clinical breast examination showed significant associations between age (p-value <0.001), marital status (p-value <0.001), income (p-value <0.001), experience (p-value <0.001) and uptake of clinical breast examination. (Table 4.5)

Table 4. 4 Bivariate analysis of demographic variables and clinical breast examination.

Variable		**Clinical breast examination**		
	Yes N (%)	No N (%)	Chi square	p-value
Age			**32.71**	**<0.001**
20-29	8 (11.11)	64 (88.89)		
30-39	32 (38.10)	52 (61.90)		
40-49	9 (69.23)	4 (30.77)		
50-59	8 (72.73)	3 (27.27)		
Qualification			3.92	0.150
Certificate	25 (32.05)	53 (67.95)		
Diploma	18 (25.35)	53 (74.65)		
Degree	14 (45.16)	17 (54.84)		
Religion			0.72	0.447
Moslem	8 (40.00)	12 (60.00)		
Christian	49 (30.63)	111 (69.38)		
Marital status			**26.00**	**< 0.001**
Never married	3 (5.36)	53 (94.64)		
Ever married	54 (43.55)	70 (56.45)		
Income			**25.90**	**< 0.001**
<1500	26 (21.88)	93 (78.15)		
1501-2200	20 (42.55)	27 (57.45)		
2201-2900	11 (78.57)	3 (21.43)		
Experience			**20.42**	**< 0.001**
<1	2 (5.00)	38 (95.00)		
1-2	5 (33.33)	10 (66.67)		
3-4	8 (26.67)	22 (73.33)		
>5	42 (44.21)	53 (55.79)		

Source: Field work, July 2018

Bivariate analysis between knowledge of breast cancer risk factors and clinical breast examination (CBE) was not statistically significant. This suggests that a participant's uptake or otherwise of breast cancer screening is not influenced by her level of knowledge of breast cancer risk factors.(Table 4.6)

Table 4. 5 Bivariate analysis of knowledge of risk factors and CBE

Variable	**Clinical breast examination**			
	Yes N (%)	**No N (%)**	**Chi square**	**p-value**
Knowledge			1.43	0.489
Poor knowledge	7 (22.58)	24(77.42)		
Average knowledge	23 (33.33)	46 (66.67)		
Good knowledge	27 (33.75)	53 (66.25)		

Note: Poor knowledge is a score of 0 to 7, average knowledge is a score of 8 to 10 and good knowledge is a score of 11 to 15

Source: Field work, July 2018.

There was no association between clinical breast examination and the Health Belief Model constructs when bivariate analysis was conducted. (Table 4.7)

Table 4. 6 Bivariate analysis of health belief model constructs and CBE

Variable	**Clinical breast examination**			
Health Belief	**Yes N (%)**	**No N (%)**	**Chi square**	**p.value**
Self-efficacy			1.85	0.174
Low self-efficacy	42 (35.00)	78 (65.00)		
High self-efficacy	15 (25.00)	45 (75.00)		
Perceived benefits			1.04	0.308
Low perceived benefits	41 (34.17)	79 (65.83)		
High perceived benefits	16 (26.67)	44 (73.33)		
Perceived Barriers			2.32	0.313
Low perceived barrier	27 (33.75)	53 (66.25)		
Average perceived barrier	22 (33.85)	43 (66.15)		
High perceived barrier	8 (22.86)	27 (77.14)		
Perceived Susceptibility			1.56	0.459
Low perceived susceptibility	27 933.75)	53 (66.25)		
Average perceived susceptibility	22 (33.85)	43 (66.15)		
High perceived susceptibility	8 (22.86)	27 (77.14)		

Source: Field work, July 2018

3. Bivariate analysis between Mammography and independent variables

a).There were significant association between age (p <0.001), income (p <0.001), experience (p= 0.02) and mammography when the bivariate analysis was conducted between mammography and demographic variables (Table 4.8). This suggests that a participant's uptake or otherwise of mammography is influenced by her age, income and work experience.

Table 4. 7 Bivariate analysis between demographic variables and Mammography

Variable		**Mammography**		
	Yes N (%)	No N (%)	Chi square	p-value
Age			**58.22**	**< 0.001**
20-29	0 (0.00)	72 (100)		
30-39	2 (2.38)	82 (97.62)		
40-49	3 (23.08)	10 (76.92)		
50-59	6 (54.55)	5 (45.45)		
Qualification			0.79	0.708
Certificate	6 (7.69)	72 (92.31)		
Diploma	3 (4.23)	68 (95.77)		
Degree	2 (6.45)	29 (93.55)		
Religion			0.05	0.826
Moslem	1 (5)	19 (95)		
Christian	10 (6.25)	150 (93.75)		
Marital status			2.65	0.104
Never married	1 (1.79)	55 (98.21)		
Ever married	10 (8.06)	114 (91.94)		
Income			**26.37**	**< 0.001**
<1500	0 (0.00)	119 (100)		
1501-2200	7 (14.89)	40 (85.11)		
2201-2900	4 (28.57)	10 (71.43)		
Experience			**10.48**	**0.015**
<1	0 (0)	40 (100)		
1-2	0 (0)	15 (100)		
3-4	0 (0)	30 (100)		
>5	11 (11.58)	84 (88.42)		

Source: Field work, July 2018

b) Bivariate analysis did not yield significant associations between knowledge of breast cancer risk factors and mammography. (Table 4.9) This proposes that, a participant's uptake of mammography or otherwise, is not influenced her level of knowledge of breast cancer risk factors.

Table 4. 8 Bivariate analysis between knowledge of risk factors and Mammography

Variable	**Mammography**			
	Yes N (%)	**No N (%)**	**Chi square**	**p-value**
Poor	2 (6.45)	29 (93.55)	0.33	0.847
Average	5 (7.25)	64 (92.75)		
Good	4 (5.00)	76 (95.00)		

Note: Poor knowledge is a score of 0 to 7, average knowledge is a score of 8 to 10 and good knowledge is a score of 11 to 15

Source: Field work, July 2018

Bivariate analysis between mammography and the Health Belief Model Constructs yielded a significant association between mammography and perceived susceptibility. That is, an individual's assertion of her risk of developing breast cancer (Table 4.10).

Table 4. 9 Bivariate analysis between health belief model constructs and mammography

Variable	**Mammography**			
Health Belief Model constructs	**YES N (%)**	**NO N (%)**	**Chi square**	**p-value**
Self-efficacy			3.10	0.078
Low self-efficacy	10 (8.33)	110 (91.67)		
High self-efficacy	1 (1.67)	59 (98.33)		
Perceived benefits			3.10	0.103
Low perceived benefits	10 (8.33)	110 (91.67)		
High perceived benefits	1 (1.67)	59 (98.33)		
Perceived barriers			3.27	0.260
Low perceived barriers	2 (3.33)	58(96.67)		
Average perceived barriers	3 (4.62)	62 (95.38)		
High perceived barriers	6 (10.91)	49 (89.09)		
Perceived Susceptibility			**7.41**	**0.031**
Low perceived susceptibility	3 (3.75)	77 (96.25)		
Average perceived susceptibility	8 (12.31)	57 (87.69)		
High perceived susceptibility	0 (0.00)	35 (100)		

Source: Field work, 2018.

4.7 Multivariate analysis

In the first model, breast self-examination was the dependent variable. Demographic variables were entered in the first step as control variables. Age, which was not significant in the bivariate analysis was the only variable found to be significant in the regression at p = 0.005. Controlling for qualification, religion, marital status and experience, the odds of an older participant performing breast self-examination is increased by 48% compared to a younger participant. Knowledge of breast cancer risk factors was then added on for the second step. Age continued to be significant with the same odds ratio. (Table 4.11)

In the second model (Table 4.12), clinical breast examination was used as the dependent variable. Demographic variables were entered in the first step as the control variables. Age and marital status were found to be significant at p. values of <0.01 and 0.05 respectively. The older and married participants were more likely to partake in clinical breast examination. The odds of an older participant partaking in clinical breast examination is increased by 10% compared to a younger participant. The odds of a married participant receiving clinical breast examination is 11% increased, in a married participant compared to a non-married participant.

In step 2, when knowledge of breast cancer risk factors was added, age and marital status remained significant with increasing odds in both instances.

In step 3, when the health belief model constructs were added, age and marital status remained significant however, the odds reduced slightly. An association was seen between receipt of clinical breast examination and perceived average susceptibility (OR = 0.285). This means that the odds of a participant who believes that she has an average risk of developing breast cancer, receiving clinical breast examination is reduced by 72% compared to a participant who believes she has a low risk of developing breast cancer receiving clinical breast examination.

In model three (Table 4.13) uptake of mammography was used as the dependent variable. Demographic variables were entered as control variables. Only age was found to be significant (odds = 1.106 p.value <0.01). This implies that the odds of receipt of mammography is 10% increased in an older participant compared to a younger participant.

In step two, knowledge of breast cancer risk factors was added on. Age remained significant with increased odds. In step three, the health belief model constructs were added. None of the variables were found to be significant.

Model One

Table 4. 10 Hierarchal logistic regression of determinants of uptake of Self breast examination

	Step 1			Step 2		
VARIABLES	Odds Ratio	95% CI	p-value	Odds Ratio	95% CI	p-value
Age	1.48	1.13 - 1.94	**0.005**	1.50	1.13 - 2.00	**0.005**
Diploma	2.23	0.48 - 10.46	0.310	1.29	0.24 - 6.86	0.768
Degree	4.21	0.42 - 42.18	0.220	2.90	0.26 - 32.14	0.386
Christian	0.54	0.05 - 5.58	0.610	0.53	0.05 - 5.77	0.603
Ever married	0.94	0.19 - 4.57	0.940	0.84	0.16 - 4.35	0.804
1-2 years	0.22	0.03 - 1.47	0.120	0.14	0.02 - 1.18	0.070
3-4 years	0.57	0.05 - 6.49	0.650	0.45	0.03 - 5.90	0.540
> 5 years	0.24	0.02 - 2.41	0.220	0.15	0.01 - 1.96	0.149
Average knowledge				2.70	0.62 - 11.69	0.185
Good knowledge				4.70	0.99 - 22.33	0.050

Source: Field work, July 2018

Model Two

Table 4. 11 Hierarchal logistic regression of determinants of uptake of CBE

		Step 1			Step 2			Step 3	
VARIABLES	Odds Ratio	95% C.I	p-value	Odds Ratio	95% C.I	p-value	Odds Ratio	95% C.I	p-value
Age	1.11	1.04-1.18	**0.003**	1.11	1.04-1.19	**0.002**	1.14	1.06-1.23	**0.001**
Diploma	1.35	0.53-3.43	0.490	1.27	0.49-3.39	0.586	1.45	0.52-4.06	0.458
Degree	1.49	0.45-4.95	0.490	1.48	0.44-4.95	0.498	1.99	0.55-7.19	0.286
Christian	0.56	0.19-1.64	0.310	0.59	0.20-1.76	0.372	0.55	0.17-1.74	0.325
Ever married	5.56	1.31-23.70	**0.030**	5.68	1.33-24.25	**0.024**	5.32	1.23-22.92	**0.032**
1501 - 2200	1.12	0.43-2.93	0.173	1.01	0.37-2.70	0.260	0.88	0.32-2.44	0.430
2201 - 2900	3.25	0.62-17.30	0.171	2.70	0.49-15.03	0.270	2.07	0.34-12.54	0.290
1 - 2	4.43	0.62-31.75	0.250	4.68	0.65-33.84	0.237	5.82	0.75-45.25	0.162
3 - 4	1.86	0.29-11.77	0.720	1.92	0.30-12.19	0.710	1.75	0.26-11.87	0.761
>5	1.64	0.28-9.66	0.810	1.71	0.29-10.05	0.790	1.83	0.29-11.60	0.722
Average knowledge				1.80	0.54-5.98	0.330	1.72	0.48-6.14	0.394
Good knowledge				1.71	0.51-5.78	0.390	1.78	0.50-6.28	0.367
High self-efficacy							0.71	0.25-2.01	0.513
High benefit							1.07	0.36-3.14	0.856
Average barrier							1.88	0.61-5.75	0.272
High barrier							2.60	0.75-8.93	0.133
average susceptibility							0.29	0.10-0.83	**0.026**
high susceptibility							0.51	0.15-1.67	0.315

Source: Field work, July 2018

Model Three

Table 4. 12 Hierarchal logistic regression of determinants of uptake of mammography

VARIABLES	Odds Ratio	Step 1 95% C.I	p-value	Odds Ratio	Step 2 95% C.I	p-value	Odds Ratio	Step 2 95% C.I	p-value
Age	1.16	1.02-1.32	**0.027**	1.16	1.00-1.34	**0.048**	1.16	0.97-1.38	0.098
Diploma	1.01	0.09-11.39	0.994	0.60	0.04-8.81	0.707	0.63	0.03-15.52	0.777
Degree	0.65	0.04-10.55	0.762	0.66	0.03-12.95	0.782	0.57	0.18-17.73	0.749
Christian	0.18	0.01-4.40	0.291	0.12	0.00-4.80	0.263	0.09	0.00-6.00	0.256
Ever married	0.75	0.03-19.03	0.860	0.51	0.01-24.22	0.734	0.66	0.01-33.77	0.835
1501 - 2200	0.63	0.91-4.23	0.633	0.36	0.04-3.02	0.346	0.26	0.02-3.50	0.311
Average knowledge				1.05	0.15-7.52	0.960	0.77	0.08-7.02	0.815
High self-efficacy							0.26	0.01-7.71	0.437
High benefits							0.60	0.02-18.13	0.772
Average barriers							1.11	0.04-31.87	0.952
High barriers							0.87	0.02-45.04	0.946
Average susceptibility							0.79	0.04-17.68	0.880

Source: Field work, July 2018

4.8 Principal Component Analysis for Health Belief Model constructs

Tables 4.14 to 4.17 illustrates the results of the four health belief constructs analyzed by principal component analysis

Barriers scale

The first five components explain 73.6% of the variation in the barriers scale.

Table 4. 13 Barriers Scale

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	4.292	3.001	0.390	0.390
Comp2	1.291	0.345	0.117	0.508
Comp3	0.947	0.080	0.086	0.594
Comp4	0.866	0.171	0.079	0.672
Comp5	0.695	0.076	0.063	0.736
Comp6	0.619	0.010	0.056	0.792
Comp7	0.610	0.055	0.055	0.847
Comp8	0.555	0.123	0.050	0.898
Comp9	0.431	0.058	0.039	0.937
Comp10	0.373	0.053	0.034	0.971
Comp11	0.320	.	0.029	1.000

Source: Field work, July 2018

Self-efficacy scale

The first five components explain 78.4% of the variation in the self-efficacy scale

Table 4. 14 Self-efficacy scale

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.916	1.434	0.324	0.324
Comp2	1.482	0.488	0.165	0.489
Comp3	0.995	0.124	0.111	0.599
Comp4	0.870	0.081	0.097	0.696
Comp5	0.789	0.192	0.088	0.784
Comp6	0.597	0.085	0.066	0.850
Comp7	0.512	0.054	0.057	0.907
Comp8	0.459	0.079	0.051	0.958
Comp9	0.380	.	0.042	1.000

Source: Field work, July 2018

Benefits scale

The first 3 components explain 66.5% of the variation in the benefits scale

Table 4. 15 Benefits scale

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	1.980	0.876	0.330	0.330
Comp2	1.104	0.196	0.184	0.514
Comp3	0.908	0.044	0.151	0.665
Comp4	0.865	0.226	0.144	0.810
Comp5	0.638	0.134	0.106	0.916
Comp6	0.505	.	0.084	1.000

Source: Field work, July 2018

Perceived susceptibility

The first two components explain 89.9% of the variation in perceived susceptibility

Table 4. 16 Perceived susceptibility

Component	Eigenvalue	Difference	Proportion	Cumulative
Comp1	2.310	1.922	0.770	0.770
Comp2	0.388	0.085	0.129	0.899
Comp3	0.303	.	0.101	1.000

CHAPTER FIVE

DISCUSSION

Practice of breast cancer screening.

In this study, with mean age of participants being 32 ± 8 years, the nurses and midwives in this study were relatively young with many years of healthcare services to provide. Practice of breast self-examination was good. However, practice of preventive breast healthcare to prevent cancer by clinical breast examination and mammography was inadequate. Only 32% of participants had carried out clinical breast examination at least once in their lifetime and only 6% of participants had carried out mammography at least once in their lifetime. These results are similar to a similar study done in Morocco where only 26% of participants had received a Clinical breast examination in the previous year and 15% had received mammography at least once (Ghanem, Meriem, & Elkhoyaali, 2011). Another study done among nurses in Kumasi saw similar results. Only 21.1% of the participants had received a clinical breast examination in the previous year and only 10% of participants had received mammography in the previous 4years (Adofo & Akpaloo, 2013).

However, American College of Obstetricians and Gynecologists in their well woman program recommend that clinical breast examinations may be offered every 1 to 3 years in women 25 – 39 years and annually for women 40 years and above. The American Cancer Society recommends that women 40 – 44years may choose to do mammograms annually. Mammograms should be recommended annually for women 45years and above and every two years for women 55years and above. Clinical breast examination is a low cost screening procedure that can improve the detection of breast cancer when performed by a trained health worker. Research has shown that many aggressive breast cancers are detected by Clinical breast examination

(Provencher et al., 2016). Out of the 24 participants who were 40 years and above only 9 had ever received a mammogram. Research has shown that mammograms reduce mortality from breast cancer by 25 – 30% (Marmot et al., 2013)

The low uptake of breast cancer screening in the participants of this study may be due to the absence of a well-organized breast cancer screening program in the country.

Knowledge of breast cancer risk factors

17.2% of participants were found to have poor knowledge regarding breast cancer risk factors. This result varies from other studies done in developing countries, but similar to studies done in the developed countries. A study done among nurses in the United Kingdom reported majority of participants having good knowledge of breast cancer risk factors (Lavelle & Charlton, 1998) just as is seen in this study. However, a study done among nurses in Kumasi reported low knowledge of breast cancer risk factors among the nurses. Sixty three percent of the nurses were found to be ignorant of all the five risk factors asked or correctly answered only one question (Adofo & Akpaloo, 2013). In Karachi, Pakistan, a similar study done reported only 35% of nurses having good knowledge of breast cancer risk factors in contrast to the result seen in this study (Ahmed et al., 2006)

There was no difference seen in the knowledge of breast cancer risk factors among the participants working in the two different hospitals and their place of work, when a ttest was done. This means that knowledge of breast cancer risk factors was not influenced by a participant's place of work. The compulsory continuing professional development program which have been introduced by the Nursing and Midwifery council may be a contributing factor for nurses and midwives to have good knowledge about breast cancer risk factors.

Knowledge of breast cancer risk factors is essential to aid nurses and midwives give appropriate counselling and recommendations to their clients, especially those at high risk of developing breast cancer, most especially due to the absence of a well-organized breast cancer screening program in Ghana.

Health beliefs

Majority of the participants, 67% had low perceived self-efficacy. This implies that majority did not have confidence in their own ability to initiate steps to receive a clinical breast examination or mammography. Factors such as arranging for transportation, fear of what might be found and inability to pay for screening services contributed to the low self-efficacy to clinical breast examination and mammography among the participants. Most participants had salary less than ¢1500. Yet, it is important to note, that access to screening mammography in Ghana is determined by one's ability to pay for the service. Though clinical breast examination is free, the free service is limited to few specific facilities such as the breast clinic in Korle Bu teaching hospital and C&J hospital in Sakumono. In majority of hospitals and clinics, patients have to pay the recommended consultation fees. Research has shown that an important determinant to the uptake of breast cancer screening in Ghana is the cost of the service (Opoku et al., 2012).

Alarmingly, majority of participants, 67% believe that breast cancer screening is not beneficial. Majority of participants did not believe that screening will decrease their chances of dying from breast cancer, also, they did not believe that screening will benefit their families. This result contrast what was found in a similar study in Austin, Texas where majority of the participants reported high perceived benefits towards clinical breast examination and mammography (Todd, 2013). A similar study in Saudi Arabia reported all participants indicating that breast cancer screening is beneficial, which contrasts the results in this study (Rose & Fronda, 2017) . A

possible reason for the low perceived benefit score in this study is that, in the Ghanaian cultural setting, it is said that you don't go looking for diseases for yourself, thus if you screen, you project the image that you are seeking out diseases for yourself. Also, many Ghanaians explain illness in terms of spiritual details and maintain that fate plays a vital role in determining who becomes ill (Sarpong, 1985)

A third of participants had high perceived barriers towards breast cancer screening and a third had average perceived barriers towards breast cancer screening. This may indicate that many participants believed, that there were obstacles that prevented them from adopting breast cancer screening. This result is not similar to a study done in Texas where majority of participants reported low perceived barriers (Todd, 2013). In this study, many participants believed that breast cancer screening is time wasting, the health professionals who do the screening are rude and that screening mammography exposes them to unnecessary radiation. Others too said they simply cannot remember to schedule a breast cancer screening. In addition, they also believed that they had other problems more important than breast cancer screening, and thinking that breast cancer screening will be too painful. In addition, majority of the participants in this study were found to have low perceived susceptibility towards screening by Clinical breast examination or mammography.

Determinants of breast cancer screening

The study estimated that older participants were more likely to receive Clinical breast examination or mammography compared to younger participants. The odds of an older participant receiving Clinical breast examination or mammography was increased by 10% and 6% respectively, compared to a younger person. Differences in qualification, experience, income

and religion, did not influence a participants uptake of clinical breast examination or mammography.

Marital status was significantly associated with uptake of clinical breast examination or mammography. The odds of a married participant receiving clinical breast examination was increased by 31% compared to a non-married participant. This means that, controlling for all other factors, a married participant has 31% increased likelihood of performing breast cancer screening compared to a non-married participant.

Although the participants had good knowledge concerning breast cancer risk factors, it did not translate into uptake of breast cancer screening by clinical breast examination or mammography.

Interestingly, participants who had average perceived susceptibility were 71% less likely to receive clinical breast examination or mammography compared to participants who had low perceived susceptibility. A possible reason for this result may be due to fear of what may be found when they screen since they believe they have an average risk of developing breast cancer. However, on the whole, majority of the participants believed they had a low risk of developing the disease. Studies have shown that women tend to underestimate their actual risk for developing breast cancer (katapodi, 2009). Most women in the present study believed that they were not likely to get breast cancer in their lifetime. The perception of a low susceptibility/risk of developing breast cancer did not seem to promote breast cancer screening. Most participant believed that breast cancer screening was not beneficial and as such was not associated with clinical breast examination and mammography.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

Uptake of clinical breast examination and mammography was inadequate among the nurses and midwives in this study, since a majority did not believe that breast cancer screening is beneficial.

Knowledge of breast cancer risk factors was good; however, it did not translate into uptake of clinical breast examination and mammography. A change in the attitude of nurses and midwives towards breast cancer screening would most likely influence the information they give their clients/patients about breast cancer screening. Therefore, more context specific information must be made readily available to nurses and midwives to improve their attitude towards breast cancer screening.

It is noteworthy that of the four health belief constructs studied in this research, only perceived susceptibility to breast cancer development had an influence on a participant's uptake of breast cancer screening. Interestingly, the relationship was negatively associated, contrary to what was expected. A participant with an average susceptibility/risk of developing breast cancer was less likely to participate in clinical breast examination or mammography compared to a participant with a low perceived susceptibility.

6.2 Recommendations

It is essential, that the National Health Insurance Authority extend their services to include clinical breast examination and mammography, to reduce the burden of cost on the preventive procedures.

The Ghana Health Service should ensure the establishment of breast clinics at every clinic and hospital and hence prevent time wasting from long queues.

REFERENCES

Adofo, K., & Akpaloo, M. (2013). BREAST CANCER AWARENESS AMONG NURSES IN KUMASI GHANA : KNOWLEDGE , ATTITUDES AND PRACTICE, *2*(1), 7–13.

Ahmed, F., Mahmud, S., Hatcher, J., & Khan, S. M. (2006). Breast cancer risk factor knowledge among nurses in teaching hospitals of Karachi, Pakistan: a cross-sectional study. *BMC Nursing*, *5*(1), 6. https://doi.org/10.1186/1472-6955-5-6

Alexander, F. E., Anderson, T. J., Brown, H. K., Forrest, A. P., Hepburn, W., Kirkpatrick, A. E., … Shepherd, S. M. (1994). The Edinburgh randomised trial of breast cancer screening: results after 10 years of follow-up. *British Journal of Cancer*, *70*(3), 542–548. https://doi.org/10.1038/bjc.1994.342

Amin, S., Yazdani, Z. A., Jha, A., Sriram, D., Merchant, H., Parva, N. R., … Imtiaz, Z. (2017). Measuring knowledge and practice in relation to breast cancer screening in mothers in Pakistan, *6*(2), 81–87. https://doi.org/10.5430/jha.v6n2p81

Añorbe, E., & Aisa, P. (2003). Screening mammography. *Radiology*. https://doi.org/10.1148/radiol.2273021738

Auger, P., & Eckhardt, G. M. (2011). Values vs. Value. *Spring*.

Brennan, M. E. (2016). The role of clinical breast examination in cancer screening for women at average risk: A mini review. *Maturitas*, *92*, 61–63. https://doi.org/10.1016/j.maturitas.2016.07.011

Canbulat, N., & Uzun, Ö.¨ (2008). Health beliefs and breast cancer screening behaviors among female health workers in Turkey11This article was based on the masters' thesis of the first author under the supervision of the second author. *European Journal of Oncology Nursing*, *12*(2), 148–156. https://doi.org/10.1016/j.ejon.2007.12.002

Carelli, I., Pompei, L. M., Mattos, C. S., Ferreira, H. G., Pescuma, R., Fernandes, C. E., & Peixoto, S. (2008). Knowledge, attitude and practice of breast self-examination in a female population of metropolitan S??o Paulo. *Breast*, *17*(3), 270–274. https://doi.org/10.1016/j.breast.2007.10.010

Carey, L. A., Perou, C. M., Livasy, C. A., Dressler, L. G., Cowan, D., Conway, K., … Millikan, R. C. (2006). Race, Breast Cancer Subtypes, and Survival in the Carolina Breast Cancer Study. *JAMA*, *295*(21), 2492. https://doi.org/10.1001/jama.295.21.2492

Champion, V. L. (1999). Revised susceptibility, benefits, and barriers scale for mammography screening. *Research in Nursing and Health*, *22*(4), 341–348. https://doi.org/10.1002/(SICI)1098-240X(199908)22:4<341::AID-NUR8>3.0.CO;2-P

Champion, V. L., & Skinner, C. S. (2008). The health belief model. *Health Behavior and Health Education: Theory, Research, and Practice*, *4*, 45–65. https://doi.org/10.1111/j.1365-2648.2010.05450.x

Clegg-Lamptey, J., Dakubo, J., & Attobra, Y. N. (2009). Why do breast cancer patients report late or abscond during treatment in ghana? A pilot study. *Ghana Medical Journal*, *43*(3), 127–131.

Council, N. and M. (1996). Biennial conference on 22.

Darweesh, H. Al, Hadi, M. A., Madani, R. Al, & Mahsen, Z. Al. (2017). Reviving Nurses ' Role as Health Educators ; Breast Cancer in a Developing Country ., (January 2016).

Ghanem, S., Meriem, G., & Elkhoyaali, S. (2011). Knowledge of risk factors, beliefs and practices of female healthcare professionals towards breast cancer, Morocco, *8688*, 1–10.

Holwerda, V. L. (2000). The Health Belief Model and Self Breast Examination in Nurses.

Jemal, A., Bray, F., & Ferlay, J. (2011). Global Cancer Statistics: 2011. *CA Cancer J Clin*, *49*(2), 1,33-64. https://doi.org/10.3322/caac.20107.Available

Kamangar, F., Dores, G. M., & Anderson, W. F. (2006). Patterns of cancer incidence, mortality, and prevalence across five continents: Defining priorities to reduce cancer disparities in different geographic regions of the world. *Journal of Clinical Oncology*. https://doi.org/10.1200/JCO.2005.05.2308

Lemlem, S. B., Sinishaw, W., Hailu, M., Abebe, M., & Aregay, A. (2013). Assessment of Knowledge of Breast Cancer and Screening Methods among Nurses in University Hospitals in Addis Ababa, Ethiopia, 2011. *ISRN Oncol*, *2013*, 470981. https://doi.org/10.1155/2013/470981

Marmot, M. G., Altman, D. G., Cameron, D. A., Dewar, J. A., Thompson, S. G., & Wilcox, M. (2013a). The benefits and harms of breast cancer screening: An independent review. *British Journal of Cancer*, *108*(11), 2205–2240. https://doi.org/10.1038/bjc.2013.177

Marmot, M. G., Altman, D. G., Cameron, D. A., Dewar, J. A., Thompson, S. G., & Wilcox, M. (2013b). The benefits and harms of breast cancer screening: An independent review. *British Journal of Cancer*, *108*(11), 2205–2240. https://doi.org/10.1038/bjc.2013.177

Mittra, I., Mishra, G. A., Singh, S., Aranke, S., Notani, P., Badwe, R., … Shastri, S. S. (2010). A cluster randomized, controlled trial of breast and cervix cancer screening in Mumbai, India: Methodology and interim results after three rounds of screening. *International Journal of Cancer*, *126*(4), 976–984. https://doi.org/10.1002/ijc.24840

MOH. (2011). Ghana Human Resources for Health Country Profile Human Resources for Health Country Profile Ghana, 71.

National Center for Health Statistics. (2017). Health, United States, 2016: With Chartbook on Long-term Trends in Health, 314–317. Retrieved from https://www.cdc.gov/nchs/data/hus/hus16.pdf#019

NCCN. (2013). NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®) Breast

Cancer.

Nickson, C., Mason, K. E., English, D. R., & Kavanagh, A. M. (2012). Mammographic Screening and Breast Cancer Mortality: A Case-Control Study and Meta-analysis. *Cancer Epidemiology Biomarkers & Prevention*, *21*(9), 1479–1488. https://doi.org/10.1158/1055-9965.EPI-12-0468

O'Mahony, M., McCarthy, G., Corcoran, P., & Hegarty, J. (2013). Shedding light on women's help seeking behaviour for self discovered breast symptoms. *European Journal of Oncology Nursing*, *17*(5), 632–639. https://doi.org/10.1016/j.ejon.2013.03.012

Opoku, S. Y., Benwell, M., & Yarney, J. (2012). Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa. *The Pan African Medical Journal*, *11*, 28. https://doi.org/10.1038/nmat3328

Ozmen, V., & Anderson, B. O. (2008). The Challenge of Breast Cancer in Low- and Middle-income Countries – Implementing the Breast Health Global Initiative Guidelines. *Breast Cancer*, 31–34.

Petro-Nustus, W., & Mikhail, B. I. (2002). Factors associated with breast self-examination among Jordanian women. *Public Health Nursing*, *19*(4), 263–271. https://doi.org/10.1046/j.1525-1446.2002.19406.x

Polyak, K. (2007). Science in medicine Breast cancer : origins and evolution. *Cell*, *117*(11), 3155–3163. https://doi.org/10.1172/JCI33295.group

Provencher, L., Hogue, J. C., Desbiens, C., Poirier, B., Poirier, E., Boudreau, D., … Chiquette, J. (2016). Is clinical breast examination important for breast cancer detection ?, *23*(4), 332–339.

Roder, D., Houssami, N., Farshid, G., Gill, G., Luke, C., Downey, P., … Williamson, L. (2008). Population screening and intensity of screening are associated with reduced breast cancer mortality: Evidence of efficacy of mammography screening in Australia. *Breast Cancer Research and Treatment*, *108*(3), 409–416. https://doi.org/10.1007/s10549-007-9609-5

Rose, C., & Fronda, A. (2017). Perceptions , Beliefs , and Behaviors Toward Breast Cancer Screening of Filipino Women in Saudi Arabia.

Sarpong, P. A. (n.d.). 84 - April 1985 - Answering why - the Ghanaian concept of disease.pdf.

Seer. (2008). SEER Cancer Statistics Review 1975-2006 National Cancer Institute SEER Cancer Statistics Review 1975-2006 National Cancer Institute. *Cancer*, 1975–2006.

Service, G. S. (2014). *Accra metropolitan*.

Siegel, R. L., Miller, K. D., & Jemal, A. (2017). Cancer statistics, 2017. *CA: A Cancer Journal for Clinicians*, *67*(1), 7–30. https://doi.org/10.3322/caac.21387

Silvestre, M. A. A., Dans, L. F., & Dans, A. L. (2011). Trade-off between benefit and harm is crucial in health screening recommendations. Part II: Evidence summaries. *Journal of Clinical Epidemiology*. https://doi.org/10.1016/j.jclinepi.2010.09.008

Sørlie, T., Wang, Y., Xiao, C., Johnsen, H., Naume, B., Samaha, R. R., & Børresen-Dale, A.-L. (2006). Distinct molecular mechanisms underlying clinically relevant subtypes of breast cancer: gene expression analyses across three different platforms. *BMC Genomics*, *7*, 127. https://doi.org/10.1186/1471-2164-7-127

Stead, L. A., Lash, T. L., Sobieraj, J. E., Chi, D. D., Westrup, J. L., Charlot, M., … Rosenberg, C. L. (2009). Triple-negative breast cancers are increased in black women regardless of age or body mass index. *Breast Cancer Research*, *11*(2), R18. https://doi.org/10.1186/bcr2242

Stretcher, V., & Rosenstock, I. M. (1997a). The Health Belief Model. *Health Behavior and Health Education: Theory, Research and Practice*, 31–36. https://doi.org/10.1111/j.1365-2648.2010.05450.x

Stretcher, V., & Rosenstock, I. M. (1997b). *The Health Belief Model*. *Health Behavior and Health Education: Theory, Research and Practice*. https://doi.org/10.1111/j.1365-2648.2010.05450.x

Tavafian, S. S., Hasani, L., Aghamolaei, T., Zare, S., & Gregory, D. (2009). Prediction of breast self-examination in a sample of Iranian women: an application of the Health Belief Model. *BMC Women's Health*, *9*, 37. https://doi.org/10.1186/1472-6874-9-37

The American Cancer Society medical and editorial content team. (2016). American Cancer Society Recommendations for the Early Detection of Breast Cancer. Retrieved from https://www.cancer.org/cancer/breast-cancer/screening-tests-and-early-detection/american-cancer-society-recommendations-for-the-early-detection-of-breast-cancer.html

Todd, A. T. (2013). Predictors of Mammography Screening Use.

Torre, L. A., Bray, F., Siegel, R. L., Ferlay, J., Lortet-tieulent, J., & Jemal, A. (2015). Global Cancer Statistics, 2012. *CA: A Cancer Journal of Clinicians.*, *65*(2), 87–108. https://doi.org/10.3322/caac.21262.

Wald, N. J. (2001). The definition of screening. *Journal of Medical Screening*, *8*(1), 1. https://doi.org/10.1136/jms.8.1.1

Warner, E. (2011). Breast-Cancer Screening. *New England Journal of Medicine*, *365*(11), 1025–1032. https://doi.org/10.1056/NEJMcp1101540

World Cancer Research Fund International. (2015). Breast cancer statistics | World Cancer Research Fund International. Retrieved from http://www.wcrf.org/int/cancer-facts-figures/data-specific-cancers/breast-cancer-statistics

Yilmaz, M., & Durmus, T. (2016). Health Beliefs and Breast Cancer Screening Behavior among a Group of Female Health Professionals in Turkey. *Journal of Breast Health*, *12*(1), 18–24.

https://doi.org/10.5152/tjbh.2015.2715

APPENDICES

Appendix One: Informed consent form.

Background

My name is Abena Asamoabea Okoh, a student of the School of Public Health, University of Ghana, Legon. I am conducting a research on the topic: Breast Cancer Screening among nurses and midwives in Maamobi General Hospital and Achimota Hospital using the Health Belief Model

Purpose of the Study

The purpose of the study is to determine factors that influence uptake of breast cancer screening among nurses and midwives in Maamobi General Hospital and Achimota Hospital. I am conducting this study as an academic research in partial fulfilment for the award of Masters of Public Health degree.

Participants Role

The study involves administering questionnaire which require answering some questions or having some discussions on the factors that influence uptake of breast cancer screening among nurses and midwives in the Maamobi General Hospital and Achimota Hospital. Study participants will be female nurses and midwives who agree to part of the study and give informed consent, who do not have a personal or past history of breast cancer, who are in good health and not on maternity or annual leave. Your selection to participate in this research is as a result of you falling within this category of study participants.

Compensation

Your participation in the study will neither incur any financial costs. You will not be paid for participating. However, about 30minutes of your time will be taken to answer the questions. As a

form of appreciation, you will be given one ball pen if you agree to take part in this study. Your right to refuse to participate is voluntarily and as such you can withdraw from the study at any time.

Confidentiality

Any information you provide in this interview will strictly be kept confidential and will not be shared with any other person except the members of the research team. All information will be coded and will not include your name in any of our writings, as such, no one will be able to identify you by name.

Potential Risk / Benefit

There is no direct risk or benefit in participating in this study, although some of your time will be taken in administering the questionnaire. However, outcome of this study will serve as a reference for policy formulation by policy makers and program managers.

Voluntary Withdrawal

Your right to refuse to participate in this study is completely voluntary and where I get to a question which you feel reluctant to answer, just draw my attention to move on or can withdraw from the interview at any point. Be assured that your non-participation in this study will not prevent you or your family members from getting access to the services offered in this facility.

Data Storage and Usage

The data collected from participants will be kept safe and stored under lock and key. At the end of the study the findings will be shared with Ghana Health Service and the School of Public Health, University of Ghana, Legon.

I would like you to read this consent form and sign, if you agree to participate in this study.

Participants / participants only:

On my own accord, based on my understanding of what the study entails, hereby consent to be part of the study.

[ ] Please check box if you consent to recording of the interview.

Sign/Thumbprint…… Witness's Sign…….

Date……

Name of Researchers: ……..….

Researcher's signature…… Date……...

Appendix two: Questionnaires

Socio – demographic questions

Select the category which best describes you

Q. No	Questions	Categories
1	Age	Please state
2	What nursing or midwifery qualification do you hold?	Certificate in Nursing/Midwifery Diploma in Nursing/Midwifery Degree in Nursing/Midwifery Other (please specify)……
3	What is your religion?	Moslem Christian Traditionalist Other (please specify)
4	What is your marital status?	Single Married Cohabiting Divorced Widowed Other (please specify)
5	What is your average monthly income?	<1500 cedis 1501 – 2200 cedis 2201 – 2900 cedis
6	How long have you been in service	Less than 1 year 1 to 2 years 3 to 4 years Above 5 years

Questionnaire on knowledge of risk factors

Question	Answer (circle the correct answer)
1. Breast cancer is a communicable disease	1. Yes 2. No
2. The irritation of a tight bra can over time cause breast cancer	1. Yes 2. No
3. In some women being overweight increases the risk of developing breast cancer	1. Yes 2. No
4. A woman who bears her first child after the age of 30 years is more likely to develop breast cancer	1. Yes 2. No
5. Use of oral contraceptives increase a woman's risk of breast cancer	1. Yes 2. No
6. A hard blow to the breast may cause breast cancer later in life	1. Yes 2. No
7.Most breast lumps are cancerous	1. Yes 2. No
8. A woman, who has a first blood relative with breast cancer, is at higher risk of developing breast cancer	1. Yes 2. No
9. Breast feeding increases the chance of breast cancer	1. Yes 2. No
10.Breast cancer can be a result of a curse/evil eye	

Questionnaire on Health Beliefs.

Mammogram Self-Efficacy Scale (Champion, Skinner, & Menon, 2005)

For each question below, place an "X" in the box that best represents your opinion.	**Strongly Disagree**	**Disagree**	**Don't know**	**Agree**	**Strongly Agree**
You can arrange transportation to get screened for breast cancer.	☐	☐	☐	☐	☐
You can arrange other things in your life to have a breast cancer screening.	☐	☐	☐	☐	☐
You can talk to people at the screening center about your concerns.	☐	☐	☐	☐	☐
You can get screened for breast cancer even if you are worried.	☐	☐	☐	☐	☐
You can find a way to pay for breast cancer screening.	☐	☐	☐	☐	☐
You can make an appointment for breast cancer screening.	☐	☐	☐	☐	☐
You know for sure you can get breast cancer screening if you really want to.	☐	☐	☐	☐	☐
You know how to go about getting screened for breast cancer.	☐	☐	☐	☐	☐
You can find a place to have a breast cancer screen.	☐	☐	☐	☐	☐

Benefits Scale (Champion & Skinner, 2003)

For each question below, place an "X" in the box that best represents your opinion.	**Strongly disagree**	**Disagree**	**Don't know**	**Agree**	**Strongly agree**
My family will benefit if I am screened for breast cancer.	☐	☐	☐	☐	☐
If I get screened for breast cancer and nothing is found, I do not worry as much about breast cancer.	☐	☐	☐	☐	☐
Getting screened for breast cancer will help me find breast lumps early.	☐	☐	☐	☐	☐
If I find a lump through an annual breast cancer screening, my treatment for breast cancer may not be as bad.	☐	☐	☐	☐	☐
Getting screened for breast cancer is the best way to find a very small lump.	☐	☐	☐	☐	☐
Getting screened for breast cancer will decrease my chances of dying from breast cancer.	☐	☐	☐	☐	☐

Barriers Scale (Champion & Skinner, 2003)

For each question below, place an "X" in the box that best represents your opinion.	Strongly Disagree	Disagree	Don't know	Agree	Strongly Agree
I am afraid to have breast cancer screening because I might find out something is wrong.	☐	☐	☐	☐	☐
I am afraid to have breast cancer screening because I don't understand what will be done.	☐	☐	☐	☐	☐
I don't know how to go about getting screened for breast cancer.	☐	☐	☐	☐	☐
Getting screened for breast cancer is too embarrassing.	☐	☐	☐	☐	☐
Getting screened for breast cancer takes too much time.	☐	☐	☐	☐	☐
People doing breast cancer screenings are rude to women	☐	☐	☐	☐	☐
Getting screened for breast cancer exposes me to unnecessary radiation.	☐	☐	☐	☐	☐
I cannot remember to schedule a breast cancer screening.	☐	☐	☐	☐	☐
I have other problems more important than getting screened for breast cancer.	☐	☐	☐	☐	☐
I am too old to need a routine breast cancer screening.	☐	☐	☐	☐	☐
Getting screened for breast cancer is too painful.	☐	☐	☐	☐	☐

Perceived Susceptibility (Champion & Skinner, 2003)

For each question below, place an "X" in the box that best represents your opinion.	**Strongly Disagree**	**Disagree**	**Disagree**	**Don't know**	**Agree**	**Strongly Agree**
It is likely that I will get breast cancer.	☐		☐	☐	☐	☐
My chances of getting breast cancer in the next few years are great.	☐		☐	☐	☐	☐
I feel I will get breast cancer sometime during my life.	☐		☐	☐	☐	☐

Table 4. 17 Barriers Scale