UNIVERSITY OF RWANDA

KNOWLEDGE AND PRACTICE REGARDING BREAST CANCER EARLY DETECTION AMONG FEMALE HEALTH SCIENCES STUDENTS AT THE COLLEGE OF MEDICINE AND HEALTH SCIENCES

By

UWAMAHORO   Grace

College of Medicine and Health Sciences

School of Nursing

Master of Nursing

June 2017

KNOWLEDGE AND PRACTICE REGARDING BREAST CANCER EARLY DETECTION AMONG FEMALE HEALTH SCIENCES STUDENTS AT THE COLLEGE OF MEDICINE AND HEALTH SCIENCES

By

UWAMAHORO   Grace

Registration number: **216340039**

A dissertation Submitted in Partial Fulfillment of the Requirements for the degree of MASTER OF NURSING

In

THE COLLEGE OF MEDICINE AND HEALTH SCIENCES.

Supervisors: Dr MUKESHIMANA Madeleine

June, 2017

A. DECLARATION

i. Declaration by the student

I do hereby declare that this research report submitted in partial fulfillment of the requirements for the Master's degree in nursing, at University of Rwanda/College of Medicine and Health Sciences (UR/CMHS), School of Nursing and Midwifery, is my own original work and has not previously been submitted elsewhere. I do declare that complete list of references is provided indicating all resources of information quoted or cited.

UWAMAHORO Grace

ii. Declaration by the supervisor

Dr MUKESHIMANA Madeleine, in my capacity as Supervisor, I do hereby authorise the student to submit her **dissertation**.

Kigali, 12 June 2017

B. DEDICATION

This work is dedicated to Almighty God who helped me during this journey of education, UR/CMHS staff, all my classmates for the best moment and discussions we have had together and to my family members and my friends for their continuous sacrifice, advice, encouragement and valuable financial support they made for me until I am at this level of Master's degree in nursing.

C. ACKNOWLEDGEMENTS

D. ABSTRACT

Introduction and background: Breast cancer is the leading cause of cancer related deaths among women worldwide. Diagnosis of breast cancer at an earlier stage allows women more treatment choices and greater chance of long term survival. Breast self-examination (BSE) once a month contributes to a woman's heightened awareness of what is normal for her. It is recommended that women over the age of 20 years perform monthly breast self-examination to detect new lumps and other changes in their breast. In view of the fact that mammography is not readily available in resource limited countries like Rwanda, this study was designed to assess Knowledge and Practice of breast cancer preventive practices among female health science students of the College of Medicine and Health Sciences in 2017.

Methodology: A cross-sectional study design was used for this study. A sample size of 168 study subjects was selected randomly. Self-administered questionnaires were used to collect information. Data were analysed using SPSS version 21. Descriptive statistics such as frequencies and percentages were computed and findings were presented in form of tables and figures.

Results: A total of 168 respondents participated in the study, participants had low knowledge about preventive practices (19.1%). Level of practice was low too; about only 56 (33.3%) respondents had done breast self- examinations, from these only a third of them practiced monthly (n=18). Some causes reported by students who had poor BSE practice were absence of symptoms in the breast (38.4%) and lack of knowledge about steps of BSE (28.6%).

Conclusion and recommendation: Knowledge and practice of breast cancer preventive practices such as BSE was low. Being healthy was the major mentioned reasons for not doing BSE. The University of Rwanda is recommended to promote awareness about simple and cost effective methods such as BSE through emergence of groups in the University and celebrating days like breast cancer day.

E. TABLE OF CONTENTS

F. LIST OF TABLES

G. LIST OF FIGURES

LIST OF SYMBOLS AND ABBREVIATION

%:   Percentage

BC   Breast Cancer

BSE   Breast Self-Examination

CBE   Clinical Breast Examination

CMHS   College of Medicine and Health Sciences

GOR   Government of Rwanda

IOM   Institute of Medicine

IRB   Institutional Review Board

MFMER   Mayo Foundation for Medical Education and Research

MOH   Ministry of Health

REB   Rwanda Education Board

UR/CMHS   University of Rwanda/ College of Medicine and Health Sciences

UR   University of Rwanda

USA   United State of America

WHO   World Health Organization

LIST OF APPENDICES

CHAPTER ONE: INTRODUCTION

1.1. Introduction

Globally cancer is among the top leading cause of death. It was estimated that 8.8 million people died of cancer in 2015 and prevalence estimates for 2012 show that there were 32.6 million people alive who had had a cancer diagnosed in the previous five years. Approximately 70% of deaths from cancer occur in low- and middle-income countries (WHO 2017). Among women, breast cancer (BC) is the most common cause of mortality accounting for 16% of cancer deaths in adult women (Ferlay et al. 2010).

According to Mary Kaye (2016) "Cancer is a group of diseases that cause cells in the body to change and grow out of control. Most types of cancer cells eventually form a lump or mass called a tumor, and are named after the part of the body where the tumor originates".

Cancer of the breast   starts in the breast tissues which are consist of lobules, ducts and glands which are attached to breast nipples and the remaining parts are made up of connective, lymphatic and fatty tissues, (George, 2016). Knowledge and practice to the breast cancer prevention and early detection   plays a significant   part in decreasing morbidity of the illness.

1.2. Background

Breast cancer is the most common cancer among women in developed and developing countries (WHO 2016). In 2012, 1.7 million women were diagnosed with breast cancer and there were 6.3 million women alive who had been diagnosed with breast cancer in the previous five years in the world (IARC-WHO 2013). Breast cancer is the most common cause of death and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide. Incidence rate remains highest in more developed regions, but mortality is relatively much higher in less developed countries due to lack of early detection and access to treatment facilities (IARC-WHO 2015).

There are numerous risk factors associated with breast cancer. According to the American Cancer Society (2013), being a woman is the main risk factor that increases probability of developing breast cancer. Incidence of breast cancer and its death rates generally increase with age. Women with family history of breast cancer in a first degree relative are at increased risk and those with a history of breast cancer are at increased risk for developing a second breast

cancer (Lopez et al. 2015). Women who started menstruation early or went through menopause late have a slightly higher risk of breast cancer (Kelsey et al. 2013). It was found that obesity increases the risk of postmenopausal breast cancer (Kanker & Fonds 2016). Recent use of Hormonal Replacement Therapy (HRT) with combined oestrogen and progesterone increases the risk of developing breast cancer with higher risk associated with longer use (Chlebowski et al. 2013). Breast cancer typically produces no symptoms when the tumour is small, later on when it has grown, it could be represented by one or more of the following symptoms and signs: painless lump in the breast, lump under the armpit, breast pain, swelling or thickness of the breast's skin, spontaneous discharge of the nipple particularly if bloody and erosion or inversion in the nipple (American Cancer Society 2013).

Early detection and diagnosis can greatly increase chances for successful treatment and thus increasing awareness of the possible warning signs of the disease among the general public is a necessity (Mon et al. 2014). The three screening methods recommended for breast cancer include breast self-examination (BSE), clinical breast examination (CBE) and mammography. BSE is a cost-effective method of early detection of cancer of the breast especially in resource poor countries. More than 90% of cases of breast cancer can be detected by women themselves, stressing the importance of breast self-examination (BSE) is the key breast cancer detection mechanism (Meijer-van Gelder et al. 2013).

Breast Self-Examination (BSE) is a process whereby women examine their breasts regularly to detect any abnormal swelling or lumps in order to seek prompt medical attention. Breast self-examination, carried out once monthly, between the 7th and 10th day of the menstrual cycle, goes a long way in detecting breast cancer at the early stages of growth when there is low risk of spread, ensuring a better prognosis when treated (Kayode et al. 2015).

Although mammography is the best screening method, but in resource scarce countries like Rwanda, BSE should be promoted for early detection of breast cancer to prevent related morbidities and mortalities. Most healthcare facilities in Rwanda do not have advanced laboratory investigations for screening and diagnosing breast cancer. Thus, this research is essential and well-timed as breast cancer has increased by more than 20%, while mortality has increased by 14% since 2008 (IARC-WHO 2013). Although some breast cancer screening methods such as BSE are simple, quick and cost effective, it appears that many women have

limited knowledge about them and either performs it incorrectly or not at all. The purpose of this study was to evaluate the knowledge and practice of BSE among health science students of the College of Medicine and Health Sciences in order to generate data that may be useful in designing interventions aimed at creating knowledge of breast cancer screening methods and early detection.

1.3. Problem statement

Breast cancer is the most common cancer causing the largest burden of cancer deaths in women worldwide. It is a global health problem of both developing and developed countries (WHO 2016). Among women, breast cancer (BC) is the most common cause of mortality accounting for 16% of cancer deaths in adult women (IARC-WHO 2012). Breast cancer is major health threat in Rwanda too. According to Globocan 2012), breast cancer accounts for 8.7% of cancer related mortality in Rwanda.

Awareness and health seeking practices have been shown to be poor in many developing countries including Rwanda, necessitating the need for proper awareness programs (Montazeri et al. 2012; Khokhar 2014).This leads to a situation where most women with breast cancer are diagnosed in late stages due to lack of awareness on early detection and barriers to health services. A situation that can be reverted if adequate public health programmes are put in place.

Although breast cancer awareness programs are being carried out throughout Rwanda, these have not primarily targeted university students. We conducted this study to evaluate the knowledge and practices related to breast cancer prevention methods, among female health sciences students at the College of Medicine and Health Sciences.

1.4. Objectives

1.4.1. General objective

The purpose of this study was to determine the knowledge and practice regarding breast cancer early detection among female health sciences students at the College of Medicine and Health Sciences.

1.4.2. Specific Objectives

1. To assess the level of knowledge about signs, symptoms and risk factors of breast cancer among female students in health sciences.
2. To assess the level of knowledge about different methods of breast cancer prevention among female students in health sciences.
3. To determine the percentage of students who practice the methods of breast cancer prevention.

1.5. Research questions

1. What is the level of knowledge about signs, symptoms and risk factors of breast cancer among female students in health sciences?

2. What is the level of knowledge about different methods of breast cancer prevention among female students in health sciences?

3. What is the percentage of students who practice the methods of breast cancer prevention?

1.6. The Significance and justification of the study

Breast cancer, a critical health problem, is considered to be a progressive disease with a poor prognosis if detected late. Public education about the disease plays a pivotal role in early detection and subsequent improvements in prognosis. The present study assessed the knowledge and awareness about various aspects of prevention of breast cancer among health science students at the College of Medicine and Health Sciences.

The study findings will help decision makers in designing strategies for raising awareness and practice regarding breast cancer prevention among female students. Furthermore, this study opened gates for future research, especially investigating for factors related to poor knowledge and practice with regards to breast cancer prevention among university students.

1.7. Definition of the concepts

Knowledge: A familiarity, awareness, or understanding of someone or something, such as facts, information, descriptions, or skills, which is acquired through experience or education by perceiving, discovering, or learning (Oxford dictionary 2011).

Practice: the actual application or use of an idea, belief, or method, as opposed to theories relating to it (Oxford dictionary 2011).

Breast cancer: Breast cancer starts when cells in the breast begin to grow out of control. These cells usually form a tumour that can often be seen on an x-ray or felt as a lump. The tumour is malignant (cancer) if the cells can grow into (invade) surrounding tissues or spread (metastasize) to distant areas of the body. Breast cancer occurs almost entirely in women, but men can get breast cancer, too (American Cancer Society 2016).

1.8. Structure/Organization of the study

This study has six chapters. Apart from the current chapter which is the general introduction to the study, there is chapter two literature reviews which provides a detailed review on studies and theoretical framework pertaining breast cancer early detection. Then chapter three which describes the methodology of the study as well as research instruments. The chapter four is about presentation of results, chapter five provides discussion and then chapter six of the study is about conclusions and recommendations.

Conclusion

Breast cancer, a critical health problem, is considered to be a progressive disease with a poor prognosis if detected late. Several studies highlighted poor knowledge and practice of breast cancer among young people. Hence, this study was conducted to evaluate the knowledge and practices related to breast cancer with preventive methods, among health sciences students at the College of Medicine and Health Sciences.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

Breast cancer has become the most common cancer diagnosed in women (Kolahdoozan et al. 2010). This chapter reviews key literature on breast cancer covering various aspects including breast cancer and self-examination, awareness level of breast cancer among women, psychological stress of breast cancer patients, causes of breast cancer and preventive measures for breast cancer. This chapter sheds light to young women that self-screening is one of the important measure to prevent late diagnosis of breast cancer and after-math of breast cancer treatment.

2. 2. Overview on breast cancer

In general, cancer is a disease that largely affects the quality of life of the people (Cohen 2012). Breast cancer is a disease caused by the development of malignant cells in the breast. The malignant cells originate in the lining of the milk glands or ducts of the breast (ductal epithelium), defining this malignancy as a cancer. Cancer cells are characterized by uncontrolled division leading to abnormal growth and the ability of these cells to invade normal tissue locally or to spread throughout the body, in a process called metastasis (Lange-Otsuka 2014).

Researchers have shown that research does not know exactly what causes breast cancer, but they do know that certain risk factors are linked to the disease. A risk factor is anything that increases a person's chance of getting a disease such a cancer (Thompson 2012). Some risk factors such as alcohol can be controlled. Others, like a person's age or family history, cannot be changed. But having a risk factor, or even several, does not mean that a person will get the disease. Some women who have one or more risk factors never get breast cancer. Most women who get breast cancer do not have any risk factors which means all women are at risk of getting breast cancer (Thompson 2012).

Breast cancer is more hazardous among all other cancers which entails the five-year survival rate of about 85% and the ten-year for 71% (Imaginis 2005), however, early detection and effective treatment can lead to improved survival rate of breast cancer patients (American Cancer Society 2014). Screening helps in early detection of breast cancer as it is related to the perceptions of risk, benefit, and barriers through a reasoning process, but it is said that breast cancer screening

techniques are underused (Schootman & Jeffe 2013). However, screening participation will be effective in influencing breast cancer death only if the screening examination is performed in the stage when the breast cancer is detectable on the mammogram (Weiss 2011).

More than 90% of breast cancer patients seek medical attention only at advanced stages (Story et al. 2011) and in consequence almost all breast cancer cases are detected clinically. There are many screening methods like mammogram, breast self-examination, etc., which helps people in early detection but about 77% of the people were unaware of breast cancer screening methods (Özaras et al. 2010). To be noted, lack of knowledge about how to detect the disease at an early stage would potentially lead to misconceptions regarding its curability and the effectiveness of early detections (Dandash & Al-Mohaimeed 2017).

2.3 Risk factors of breast cancer

Breast cancer is an issue of concern for every woman in today's society. The National Cancer Institute found that being female is the highest risk factor for breast cancer as one out of eight women in the United States has a lifetime risk of developing breast cancer (American Cancer Society 2013). Korde, Calzone and Zujewski (2014) stated that: as with other cancers, "increasing age is one of the strongest risk factors". The incidence rates begin to increase between ages 35 and 39 years and plateaus at age 80 years. However, Shepherd & Mclnerney (2016) have stressed that younger women tend to experience a higher mortality from the disease.

Women who have a family history of breast cancer are at a higher risk for breast cancer than those without such a history. Women, who have an especially strong family history, that is, two or more first-degree relatives (a mother, daughter or sister) with breast cancer, particularly before menopause, have a greater than 50 percent chance of developing breast cancer. One of the main factors responsible for this elevated risk is an inherited genetic mutation (permanent changes in genetic material) called BRCA1 and BRCA2 (Fretcher 2016).

Thompson (2012), stated that if a woman has already had a personal history of cancer in one breast, she has a greater chance of developing a new cancer in the other breast. This is especially true if a woman has inherited BRCA mutations. A previous diagnosis of lobular carcinoma in situ (a localized tumor) is associated with a 10% to 30% greater breast cancer risk and a previous diagnosis of ductal carcinoma in situ is associated with 30% to 50% greater risk. (Fretcher 2016)

further indicated that breast cancer risk may be related to the total number of ovulatory menstrual cycles a woman experiences and the longest known exposures to sex hormones, particularly estrogens, in her lifetime. Risk is inversely related to early age at menarche (first menstrual period) before the age of 11 and increased with a late age at menopause (end of child bearing period) 55 years or older. Korde et al. (2014) are of the opinion that women who have never given birth are more likely to develop breast cancer after menopause than those who have given birth multiple times. The timing of a first pregnancy also appears to play a role with women who have their first full-term pregnancy at the age of 30 years or older having an increased risk of breast cancer as compared to women who give birth before age 30. Although this may not necessarily be a lifestyle choice, having a first child at an earlier age may decrease the risk.

Some studies have shown that breastfeeding slightly lowers breast cancer risk, especially if the breastfeeding lasts 1 to 2 years. This could be because breastfeeding lowers a woman's total number of menstrual periods, same as pregnancy. One study found that having more children and breast-feeding longer could reduce the risk by half. Breast-feeding policy should be emphasized to women without any contra-indication (Fretcher 2016).

Women who have had a prior breast biopsy that revealed a proliferative abnormality (excessive growth of the glandular breast tissue, also called hyperplasia) have an increased risk for breast cancer, particularly if the cells appear abnormal (atypical hyperplasia). Otherwise, benign breast conditions that are not proliferative (for example fibrocystic change or a noncomplex fibro-adenoma) do not increase the risk of a woman developing breast cancer. Any woman who undergoes a biopsy of a breast abnormality needs to fully understand the results, particularly if they impact the frequency of breast cancer screening (Fretcher 2016).

There are certain potentially modifiable lifestyle factors that represent an important class of risk factors for breast cancer. Obesity has been found to increase the incidence of breast cancer by up to two and half times in postmenopausal women. The risk seems to be higher if the extra fat is in the waist. Therefore, the use of red meats, especially those high in fat should be limited. Conversely, obesity appears to be protective in pre-menopausal women. This is likely due to an increase in anovulatory cycles, resulting in lower levels of circulating estrogens in young obese women (Shepherd & McInerney 2016).

On the other hand, physical activity is found to reduce the risk of breast cancer in women who are physically active compared with those who are inactive. Regular physical activity is emphasized as this may reduce the risk. Finally, moderate to heavy alcohol intake has been shown to confer significant increase in risk of breast cancer. Limiting alcohol consumption may reduce the risk. For those who drink, adding the vitamin folic acid to the diet may reduce the increase risk (Korde et al. 2014).

Shepherd & Mclnerney (2016) indicated that smoking is also identified as a risk factor for developing breast cancer and research findings have established that smokers have a 25% greater risk of dying from breast cancer than non- smokers. Breast cancer risk factor knowledge among women is important so that they can act as the most pragmatic solution to early detection and as a sign that information was disseminated among them.

2.4. Signs and symptoms of breast cancer

Knowing the signs and symptoms of breast cancer may help save women's lives. When breast cancer is discovered early, women have more treatment options and better chances for long-term recovery. The MFMER stated that the common sign of breast cancer is a lump which is single and firm or thickening in the breast. Most breast lumps are not cancerous and are often painless (MFMER 2016).

However, there is also a unique type of inflammatory breast cancer that does not produce a distinct mass or lump that can be felt within the breast. The lack of a lump or mass also makes inflammatory breast cancer difficult to detect by mammograms. Inflammatory breast cancer cells infiltrate the skin and lymph vessels of the breast. When the lymph vessels become blocked by the breast cancer cells the breast becomes red, swollen and warm. The skin changes are associated with inflammation can cause the breast skin to look like the skin of an orange. The appearance of the breast is similar to the other inflammatory conditions such as cellulites or mastitis. Other possible associate symptoms include a skin that is hot to the touch, pain and/or itchiness, ridges or thickened areas of breast, rash (entire breast or small patches) and veins on the skin surface becoming more prominent (Chie et al. 2013; Peintinger et al. 2013; Zotti et al. 2015).

The other possible associative symptoms include also enlarged lymph nodes under the arm or

above the collar bone on the affected side. Inflammatory breast cancer is diagnosed based upon the results of a biopsy. There are also other several signs and symptoms that can indicate breast cancer like nipple pain, nipples that appear inverted or flattened or spontaneous clear or bloody discharge from the nipple. This study makes it clear how crucial it is for women to make sure that they have regular screens and are investigating any breast changes that are new or unusual (American Cancer Society 2013). However, these signs and symptoms are also associated with other non-cancerous breast conditions. If a woman is experiencing these symptoms, it is important not to panic but to seek medical help for an evaluation (Patton 2012).

2.5. Early detection measures of breast cancer

2.5.1 Screening practices of women on breast cancer

Breast cancer screening refers to tests and examinations used to detect cancer, in people who do not have any symptoms. The goal of screening exams is to find cancers before they start to cause symptoms. Screening can lead to earlier diagnosis. The American Cancer Society (American Cancer Society 2013) is of the opinion that detecting breast cancer as early as possible improves the likelihood that treatment will be successful.

Screening is the boon for breast cancer patients ever which helps in diagnosing the breast cancer even before it occurs symptomatically (Bleyer & Welch 2012). The trials of screening strategies works well in indicating how screening saved lives along with the statement of over diagnosis harmfulness (Gøtzsche 2012). The population based approach for implementation of breast cancer screening is recommended as it aims to give each eligible individual an equal chance of getting benefited from with effective quality assurance (Lynge et al. 2012). Screening invitations is limited to women who are more than 50 years of age especially in European countries (Giordano et al. 2012). Most of the people especially the Arab Muslims perceive that the absence of symptoms and signs for indicating good health which makes them to deny the progression of early detection of breast cancers (Donnelly et al. 2013).

The major screening strategies considered in this study are mammography, Breast Self-Examination (BSE), and Clinical Breast Examination (CBE). These strategies help in identifying tumor. Speaking of which Mammography screening is the best method of screening which helps in early detection that reduces the breast-cancer mortality rates (Marmot et al. 2012).

a) Breast self-examination: this is something where women need to go for examining their breasts once in every month (Shin et al. 2012). The estimation of sensitivity and specificity during BSE have experienced growth (Suh et al. 2012) but however study conducted by Hackshaw & Paul, (2003) concluded that BSE is not efficient in reducing the mortality rate since there is no huge variation in mortality rates of those who practiced or undergone BSE. Looking deeply, it is quite an inexpensive strategy which is associated more with women who seeks medical care. It is the primary method of surveillance in- between mammograms in women 40 years and older (Lane et al. 2003). Monthly breast self-examination (BSE) should begin at an early stage of 20 to 39 years. Breast cancer risk is very low for women below 20s and gradually increases with age (American Cancer Society 2013).

BSE should be done monthly at a regular time when the breasts are not tender. In pre-menopausal women, the best time is 7 days after the start of menstruation. At this time, hormonal stimulation of the breasts is at its lowest point. In these women, nodularity and tenderness will be minimal. For women aged 15-49 years on oral contraceptives, the first day of a new package may be a helpful reminder. Women who have had hysterectomies should set a regular date for monthly BSE. The monthly date of a birthday or the first day of the month is common choice for many women (Suh et al. 2012).

BSE should be done in good light and should include inspection before a mirror and careful systematic palpation. The entire breast, axilla and clavicle should be examined. The woman should be taught the BSE procedure by a health care provider, using the woman's own hands on her breast. The nurse who is teaching BSE must emphasize that early detection enhances survival rates. BSE teaching techniques should include allowing time for the woman to ask questions about the procedure and to perform a return demonstration. The woman should be told what to look for, such as a lump, nipple discharge, nipple retraction, redness, pain or tenderness, dimpling of the skin or edema (Lee et al. 2015).

Some teaching techniques involve using silicone breast models that simulate normal and abnormal tissue to help women to identify problems. The woman should be shown the normal variations in her own breasts so that she will be able to detect changes. Women should also be taught how to check for the other main symptoms or any changes on the breasts as mentioned

earlier.

(b) Clinical breast examinations (CBE): it is the process of examining the breasts with the help of clinicians. Efficiency of examination of breasts by health professional is highly influenced by three major concerns like training and skills of the consultant, age of the woman, and size of tumor. CBE is very much effective in laying positive predictive value (Shahnazi & Khalili 2012). CBE should be done every three years from ages 20-39, then every year thereafter. This examination should be done by nurses or family doctors, as they are health professionals with expertise in this field (Albert & Schulz 2013). These health care providers look for the differences in size or shape of the breasts. The skin is checked for rashes or other abnormal signs. The nipples may be squeezed to check for any other fluid other than milk. They can check the entire breasts, axillaries and collarbones for lumps. The health care providers can check the lymph nodes near the breasts to see if they enlarged (American Cancer Society 2013).

c) Baseline mammography: Mammography screening is the best method of screening which helps in early detection that reduces the breast-cancer mortality rates (Marmot et al. 2012). Mammography is the most efficient way since it helps in diagnosing cancer at the asymptomatic stage. Say, when a breast cancer is identified in an asymptomatic stage the chance of treating in a positive direction is more. For instance, a recent study found that mammography screening reduces the mortality of breast cancer by an estimated fifteen percentage (Drukteinis et al. 2013). There is a necessity for investigating various methods to explore the quality and benefits of mammography screening (Autier et al. 2012).

Mammography should be done by the age of 40 and it should continue every one to two years for women 40-49, depending on previous findings. Mammogram is a picture of the breasts with X-rays. Mammograms show breast lumps before it can be felt through palpation. They can also show micro calcifications. Lumps or micro calcifications can be from cancer or pre-cancerous cells or other conditions. However, a mammography may miss some cancers and the result is called a "false-negative" and sometimes a mammogram may show things that turn out not to be cancer and result is called a false- positive. Therefore, mammogram is recommended to be done every year for women aged 50 and older (Drukteinis et al. 2013).

The newest improvement in mammography screening is called 'Tomosynthesis' which came into

practice to improve acceptance. It is especially helpful for the women who possess dense breasts. The major advantage of this tomosynthesis is lower recall rates and it also facilitates slight increase in cancer detection (Haas et al. 2013). Mammography screening has grown a step forward from plain-film to digital mammography. With the implementation, digital mammography higher test sensitivity for women aged fifty years and women with dense breasts has been experienced (Bluekens et al. 2012).

2.5.2. Awareness about breast cancer screening methods

The awareness and exercising of mammography screening was slightly higher in urban women when compared to their rural counterparts (Leung et al. 2014). It is because of the reasons like mobile access, awareness campaigns, education system, etc, (McDonald & Sherman 2012). On the other hand, women in remote areas have only limited access to alternatives and hence they just simply prefer dropping out the system which they feel as hostile rather than dealing with it (Todd & Stuifbergen 2012). Another reason for people for neglecting screening is related to the lack of physician recommendation (Othman et al. 2013).

It is necessary to create awareness so as to ensure a better screening of breast cancer (Fallowfield, 1995). For instance, creating awareness about early detection and screening practices by designing educational programs at the high school and college levels that will instill in young women (Shin et al. 2012). Luker, et al. (1996), also found that women with breast cancer sought and paid attention to information from medical books and journals. Another efficient way of disseminating information is targeting the mothers of young daughters and conveying the messages about adolescent breast cancer risk reduction, since they are the primary caretakers of children (Janicke & Finney 2013). It also helps in making precautions among young girls at a very early stage (Adzersen et al. 2013).

Information plays a vital role in influencing the decision making of women with breast cancer (Luker et al.2015). It is due to the fact that well-informed women would take a better decision which ensures their health and well-being (American Cancer Society, 2012). It is made easier, that preventive measures about all health issues including breast cancer is available online and since anyone with access to the internet can now obtain information instantaneously and interact with online discussions and make use of it in order to make avail effective treatment (Chou et al. 2013).

Conclusion

People need to understand that early detection of breast cancer save thousands of lives each year. Moreover, it is advisable to seek help from the health providers for taking advantage of the screening tests (American Cancer Society 2011). Breast cancer screening will lead to a long term positive health implication as once started in a early age it will continue into adulthood and even throughout life (Ludwick & Gaczkowski 2011). Practitioners need to provide evocative counseling about the breast cancer collectively progressed from personal experience and outside sources to increase the awareness level of early detection through proper screening of breast cancer (Wright et al. 2015).

2.6. Conceptual Framework

The researcher has elaborated a framework which reflects the study objectives as shown in the figure 2.1 below.
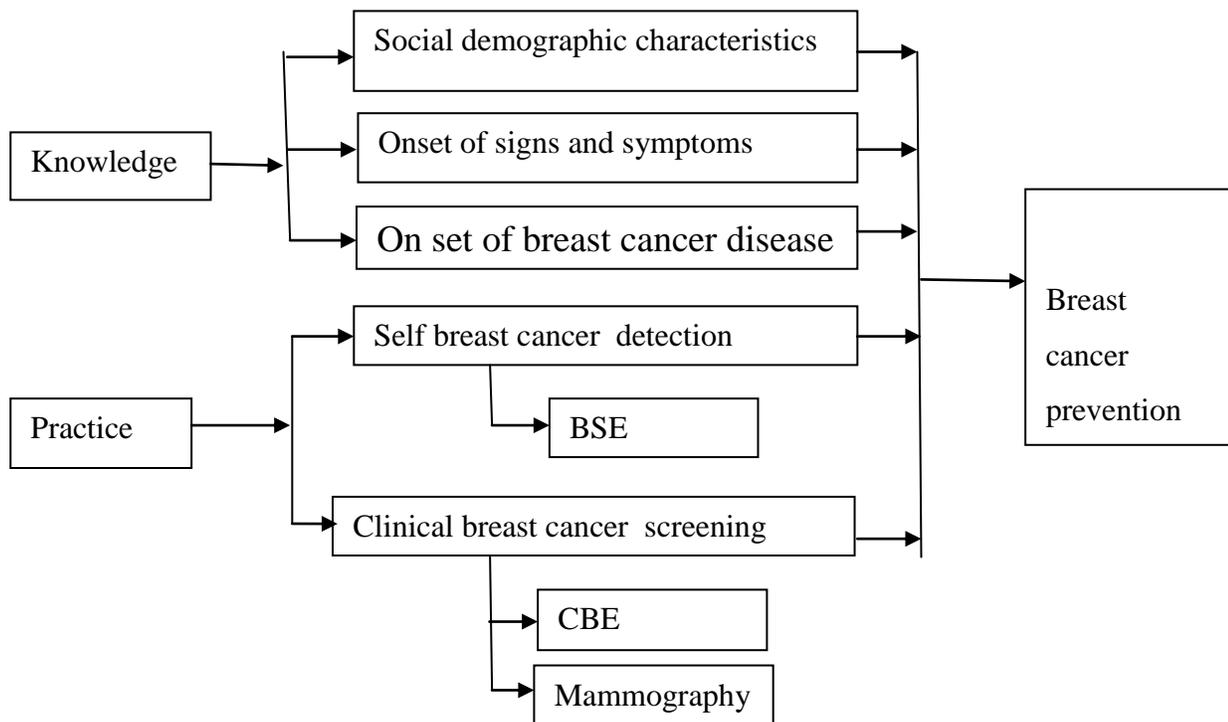

Figure 1.Illustration of the study conceptual framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes how the study was conducted in the School of Health Sciences, College of Medicine and Health Sciences. It describes the research design used in the study, including the pilot study, data collection (the population, sampling etc), ethical considerations and measures to ensure validity and reliability.

3.2. Study Design and Approach

A quantitative, non-experimental design was used for this study. This approach was selected in order to provide a complete picture and understanding of the awareness of health sciences female students regarding prevention of breast cancer (Vos & Strydom 1998).

The study is explorative in nature because the literature was explored in order to gain more insight and understanding of the concept "prevention", factors that impede prevention as well as knowledge of female health sciences students with regard to the usage of "preventive methods" of breast cancer. It is also descriptive and cross sectional because it described the phenomenon as accurately as possible by using statistical, quantitative results from a sample representing population (Polit & Hungler 2013) and the questionnaire were administered.

3.3. Study Area

The study was carried out at the University of Rwanda Located in Kigali City, Nyarugenge District. It focused to eight departments in Health Science Schools, College of Medicine and Health Sciences, University of Rwanda.

3.4. Population

A target population is defined as the entire group of people that is of interest to the researcher or in other words the entire group that meets the criteria the researcher is interested in studying (Burns et al. 2011). The accessible population in this study included all 296 female health sciences students over 21 years studying in the School of Health Sciences of the College of Medicine and Health Sciences at the time of our study.

3.5. Sample Size and sampling method

Sample size was measured by using Raosoft sample size calculator software (Raosoft 2004) based on total number of students doing health sciences by the time of study. Margin error of

5%, confidence level of 95% and response distribution of 50% will be used in calculating the sample size.

Raosoft sample size calculator was used to calculate the sample size using the estimated study population of 296 in number. Using 5% margin of error, with 95% of confidence level and response distribution of 50%; then the sample size needed for our study is 168 people. Below is the table indicating how the sample size was calculated using Rao soft sample size calculator:

Table 3.1 Sample size

The confidence level.	95 %	
The population size.	296	
The response distribution.	50 %	
The margin of error.	5 %	
The recommended sample size.	**168**	

3.6. Sampling Strategy

Multi stage sampling technique was used to select the respondents of the study. First, among the eight schools of the College of Medicine and Health Sciences at the University of Rwanda, the School of Health Sciences was selected randomly. Sample size was proportionally allocated for the selected departments based on number of females in each department and then simple random sampling was employed to select the study subjects.

16

Table 3. 2. Sampling strategy

Department	Number of female students	Sample size
Anesthesia	109	109*168/296=62
Biomedical laboratory sciences	114	109*168/296=65
Physiotherapy	73	109*168/296=41
Total	296	**168**

3.7. Data Collection Methods, Procedures and Instruments

3.7.1. Data collection instrument

A self-administered questionnaire was used as the research instrument. The questionnaire consisted of closed ended questions. The questionnaire was designed to describe the profile of female students in the School of Health Sciences and determine their level of knowledge and practice regarding prevention of breast cancer (see annex 1, Section B). The researcher compiled the questions from the available literature (books, journals and internet) with the help of the supervisor and other colleagues, who have experience in research design.

It had four sections: Section A is about demographic data; Section B assess the level of knowledge about signs, symptoms and risk factors of breast cancer among   students in health sciences; Section C explores the level of knowledge about different methods of breast cancer prevention among   students in health sciences and Section D determines the percentage of students who practice regularly BSE.

3.7.2. Data collection procedure

After getting the authorization (Ethical clearance) to collect data from Institutional Review Board (IRB); University of Rwanda/College of Medicine and Health Sciences, the Student researcher explained to the participants the study, its purpose, how they could take part in this study. After signing the consent form, data were collected using questionnaires to get opinions and information from the participants towards the breast cancer prevention. The questionnaires were consisted of close ended questions and written in English and they were filled by the respondents directly and collected.

3.7.3. Reliability and Validity of the instrument

3.7.3.1. Reliability

Reliability refers to the consistency with which an instrument measures the attribute (Polit-O'Hara & Beck 2016). As part of checking the reliability and validity of the research instrument, the researcher conducted a pilot study in the School of Health Sciences so as to test the feasibility of the questionnaire. The information obtained was used to improve the research instrument (Polit & Hungler 2015). Seventeen students were used in the pilot study and they were excluded from the sample of the population in the main study.

Reliability assisted the researcher to identify difficulties in the method and materials which were used and investigated the accuracy and appropriateness of the questionnaire (Burns & Grove 2015). Consequent to the pilot study, a question relating to recommended age for mammography which was omitted was later added. The questions were also crosschecked for any ambiguities or repetitions. All the minor problems that were identified were corrected and the questions were refined. In this study the validity and the reliability was tested through Cronbach's Alpha that was found in range of 0.7 to 1, which literally translates "acceptable reliability".

3.7.3.2. Validity

Validity refers to the degree to which the instrument measures what it is supposed to be measuring (Polit-O'Hara & Beck 2016). The self-administered questionnaire contained questions relating to the important aspects covered in the literature review. In order to ensure content validity, expert health professionals were asked to review the questionnaire and their opinions and suggestions were incorporated in the final version of the questionnaire (Brink et al. 2016).

3.8. Data Analysis and Presentation.

The collected data, after checking their completeness entered into SPSS version 21 for analysis. Descriptive statistics was used to see frequency and percentages of the characteristics. Results were presented in form of tables and figures.

3.9. Ethical Considerations.

During the study and throughout the research process, the several ethical aspects were taken into consideration. Permission to conduct the study was sought from the Institutional Review Board

(IRB) of the College of Medicine and Health Sciences. Moreover, the respondents were given the choice to withdraw from the study at any given time. This ensured informed consent and voluntary participation. In other words, none of the respondents was forced to provide information against her will. Confidentiality and anonymity were ensured because no names or other personal details were provided on the questionnaires. Confidentiality was further enhanced by ensuring that the information was kept private since only the researcher and the supervisor had access to the information. No information was disclosed or discussed with any irrelevant authority or third party.

3.10. Data Dissemination

All participants in the research will be given a report of the findings, and will be encouraged to comment on them. This will be done by availing the final copy in the College library to which students have access. Furthermore, the researcher assisted by the supervisor will work on the manuscript to be submitted for publication. A copy of this report will also be sent to the CMHS administration to make them aware of the results as well as key recommendations from this study.

CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1. Introduction

This chapter presents the findings and provides their interpretation focusing on knowledge and practices regarding breast cancer prevention among students in the School of Health Sciences. The findings presented in this chapter were obtained from a sample of population from University of Rwanda in College of Medicine and Health Sciences to answer research questions.

4.2. Demographic characteristics of respondents

This section presents the demographic characteristics of respondents. All sampled participants filled out the questionnaire, which translates a response rate of 100%. These variables include variables such as: gender; age categories, marital status.

Table 4. 1. Distribution of the study sample by socio-demographic characteristics (n=168)

Variable		Frequency	Percent
Age (Years)	18-25	68	40.5
	26-30	52	31.0
	31-35	26	15.5
	36 and above	22	13.1
Marital status	Single	112	66.7
	Married	52	30.9
	Divorced	4	2.4
Family history of breast cancer	Yes	27	16.1
	No	141	83.9

The table 4.3 above presents the distribution of study sample according demographic parameters. It is clear that the majority of the respondents, 68 (40.5%) were aged between 18 to 25 years, 52 (31%) were aged 26 to 30 years, 26 (15.5%) were aged 31 to 35 years and 22 (13.1%) were aged

36 and above. According to the marital status, the study found that the majority of respondents were single, which occupy about two third of respondents (66.67%), 30.95% were married and only 2.38% of participants were living with their partners.

4.3 Knowledge about signs and symptoms and risk factors for breast cancer
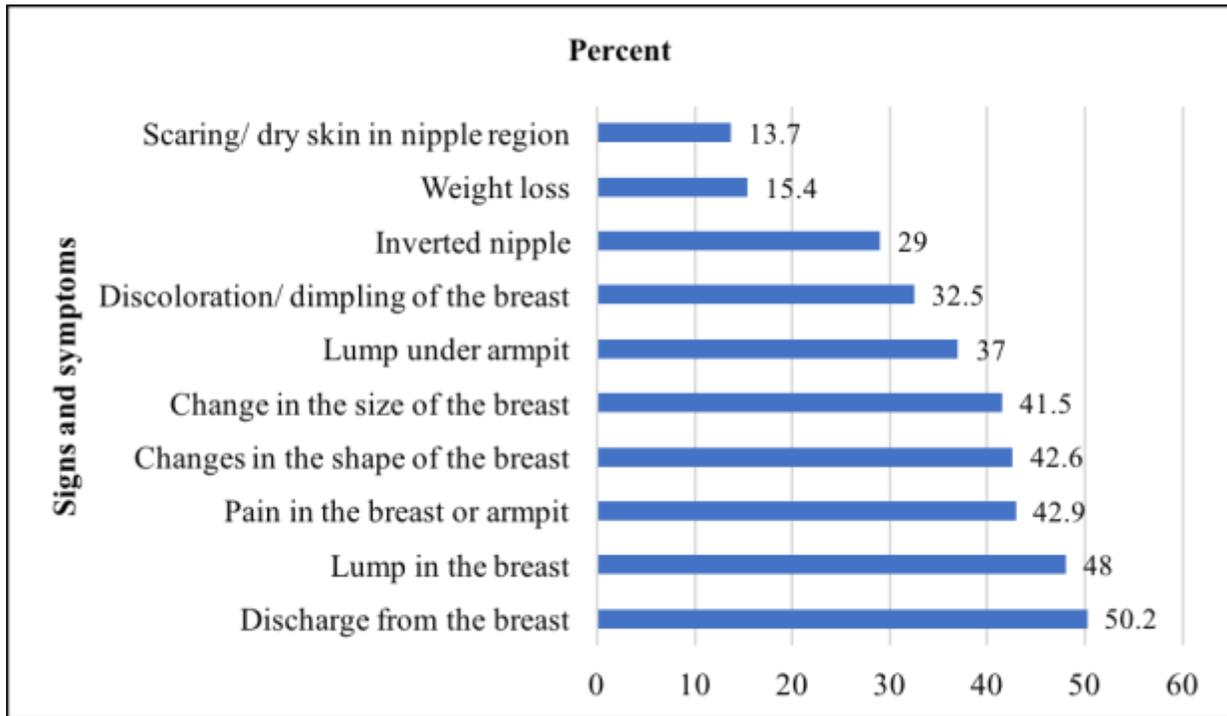
Figure 4. 1. Distribution of the study sample according to their knowledge about clinical presentation of breast cancer

The results showed that the most known sign of breast cancer among health sciences students in the current study was discharge or bleeding per nipple (50.2%). The next most known danger sign was presence of lump in the breast followed by changes in the shape of the breast or nipple (48% and 42.6% respectively). Only 13.7% of the participated students were aware that scarring/ dry skin in nipple region is a sign of warning for breast cancer (Figure 4.1).

Table 4. 2. Proportion of respondents having correct knowledge about risk factors of breast cancer

Risk factor	Frequency	Percent
Old age	122	72.6
Positive family history	140	83.3
High fat diet	65	38.6
Smoking	92	54.8
Race/ Ethnicity	27	16
Working class woman	17	10.1
Alcohol consumption	26	15.47
First child at late age	23	13.6
Early onset of menarche	64	38.1
Late menopause	64	38.1
Stress	12	7.1
Larger breast	12	7.1

The table 4.2 presents the proportion of respondents having correct knowledge about risk factors of breast cancer. The majority of the participants knew that positive family history of breast cancer, advanced age and smoking increases the risk (83.3%, 72.6%, and 54.8% respectively). Results revealed that more than third of the sample knew that early menarche, late menopause and eating food rich in fat are risk factors for breast cancer (all are nearly represented by 38%).
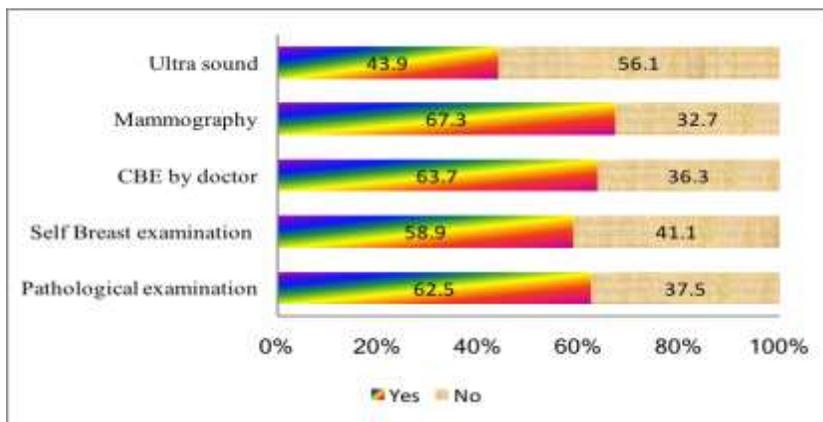

Figure 4. 2. Knowledge about Screening Methods of Breast cancer

Figure 4.2 depicts knowledge about screening methods of breast cancer. Most participants believe that mammography, CBE by a doctor and pathological examination are the most diagnostic tools for breast cancer with 67.3%, 63.7% and 62.5% respectively. Self-breast examination and ultrasound were the least screening methods mentioned by students with 43.9% and 58.9% respectively.

Table 4. 3. Percentage of respondents having correct knowledge about BSE, CBE

Questions	Yes		No	
	Frequency	**Percent**	**Frequency**	**Percent**
Knowledge about SBE				
Do you know at what age SBE should be started?	34	20.2	134	79.8
Do you know how to perform SBE?	35	20.8	133	79.2
Do you know how often CBE should be done?	31	18.5	137	81.5

Table 4. 4. Percentage of respondents having correct knowledge about BSE and mammography

Do you know how often SBE should be done?	Monthly	26	15.48
	Twice a year	56	33.33
	Once a year	10	5.95
	Don't know	76	45.24
Do you know the recommended age for mammography examination to start?	At 30 years	12	7.1
	At 35 years	19	11.3
	At 45 years	35	20.8
	Don't know	102	60.7

The table 4.4 and 4.5 shows the percentage of respondents having correct knowledge about BSE, CBE and mammography. Regarding knowledge about SBE 20.2% of respondents know the right age at which SBE should be started, while 20.8% of respondents know how to perform SBE. Furthermore, few participants (15%) of the participants knew that BSE is recommended to be done monthly. However, only 18.5% of the study sample knows when to attend a clinic for a CBE by a doctor. With regards to mammography, only 20.8% of participants know the recommended age it should be done. However, the majority of respondents (60.7%) don't know the recommended age for mammography.

4.5. Practice of the methods of breast cancer prevention
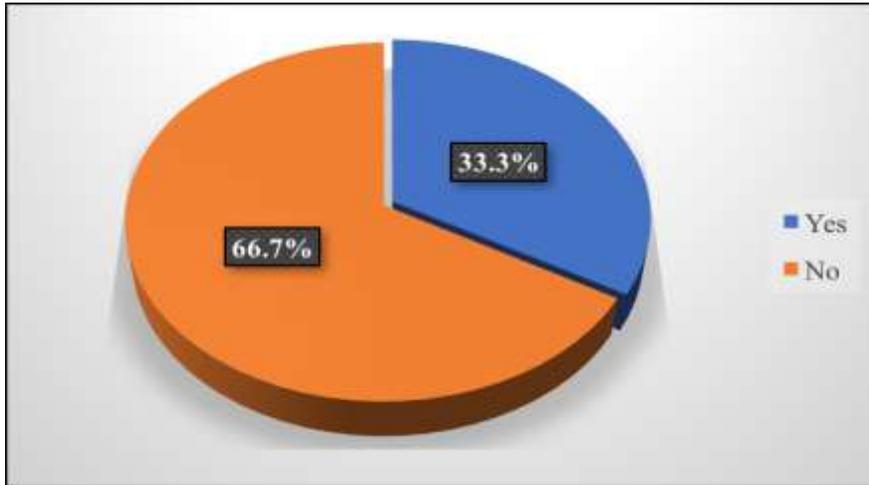
Figure 4. 3. Level of practice of Breast Self-Examination

Breast Self-Examination is one of method of breast cancer prevention, the figure illustrates that a third of respondents which represented by 56 (33.3%) practice BSE whereas two third of respondents which represented by 112 (66.7%) did not practice Breast Self-Examination.
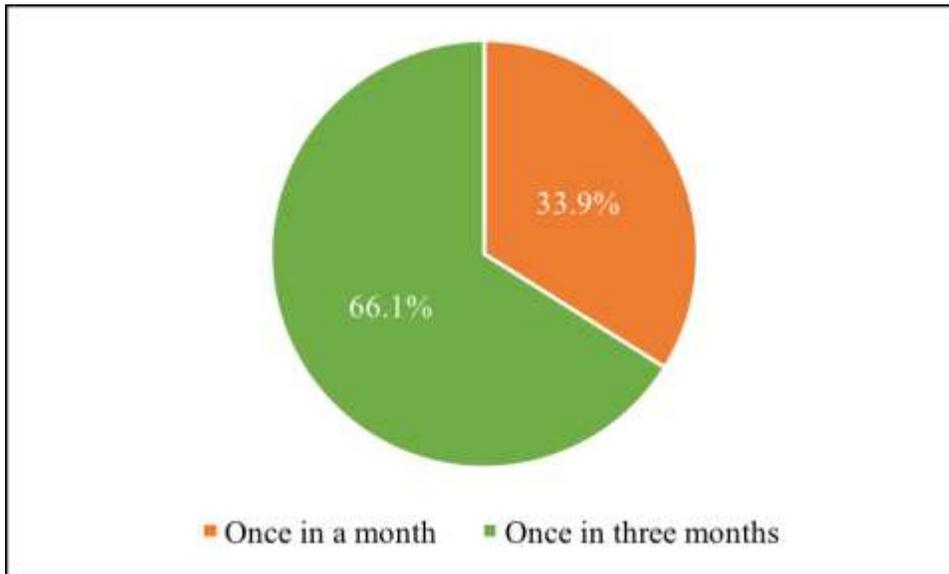
Figure 4. 4. Distribution of the study sample according to frequency of performance of BSE (n=56)

The figure 4.4 above distributes the study sample according to frequency of performance of BSE. The current study revealed that only 57(33.9%) of students reported that they

25

perform BSE regularly once per month while 111(66.1%) of them perform BSE once in three months.
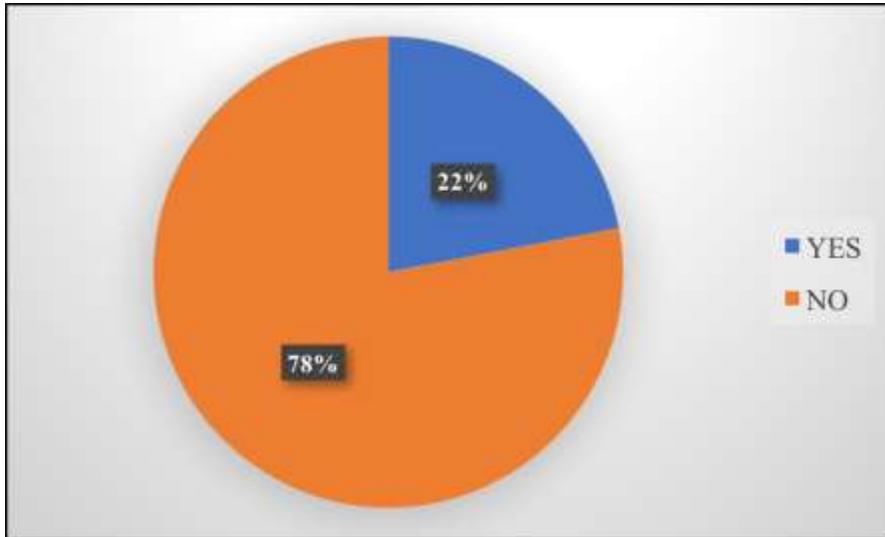
Figure 4. 5. Level of practice of Clinical Breast-Examination

The figure 4.5 shown that the mainstream of respondents 131(78%) did not practice clinical breast examination(CBE) whereas 37 (22%) of respondents practice, the study had to further investigation on the root cause of that high percentage of respondents who did not practice and those who practice Clinical Breast Examination as well.
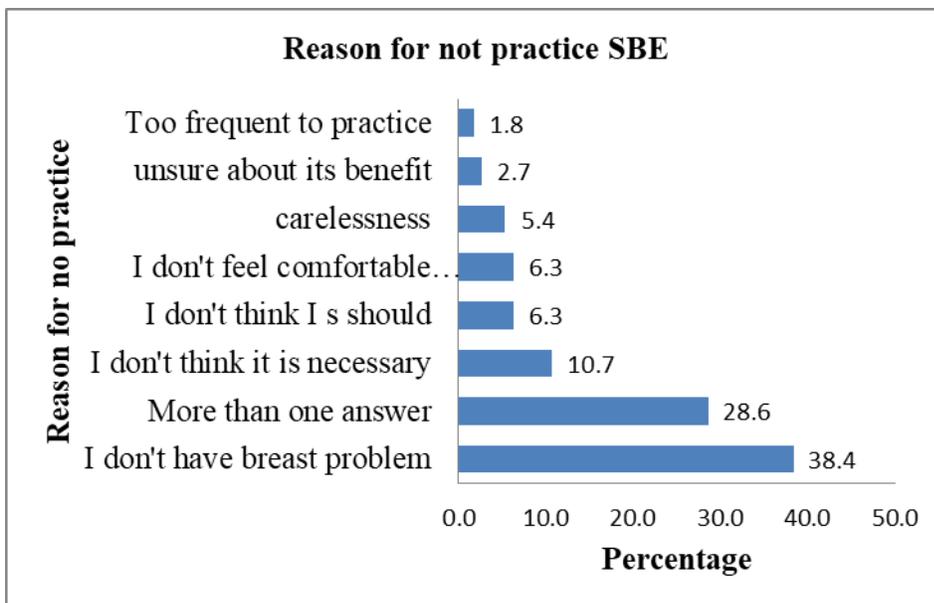
Figure 4. 6. Reason for not practice SBE

Among those who reported not practicing BSE, 43(38.4%) justified that poor practice because they do not have problems in their breasts and 32(28.6%) reported that they do not know how to do BSE.

CHAPTER FIVE: DISCUSSION

5.1. Introduction

Breast cancer is the most common cancer in women worldwide that is why women's awareness of breast cancer is crucial. The need to evaluate breast cancer awareness and practice of breast cancer prevention methods among female students who are going to be the future health personnel is necessary and recommended (Ahmad et al. 2011). The present study was conducted to determine knowledge and practice among health sciences female university students towards preventive methods and also to explore their knowledge about breast cancer focusing on risk factors and clinical presentation.

5.2 Knowledge about breast cancer

This study showed that, the respondents had general knowledge of breast cancer, particularly regarding its prevalence in Rwanda (54.2%), whether or not breast cancer is curable (69%) but few of them (38.7%) have good knowledge about the survival time. These findings are consistent with a study done in Nigeria where a better breast cancer knowledge level was obtained (Osime et al. 2008). This is expected considering the fact that they are health science students and must have acquired this knowledge during their education. Previous studies have reported the roles played by formal and non-formal education in health-related issues. However, our findings contrast with what was reported in studies done in Iraq, Saudi Arabia, Pakistan, Ghana, Ethiopia that reported low knowledge score among majority of the respondents (Alwan et al. 2012; Khokher et al. 2011; Akuamoah Sarfo et al. 2013; Nemenqani et al. 2014; Gebrehiwot et al. 2014).

The most widely known risk factors among participants were; family history (83.3%) and advanced age (72.6%). However, knowledge about other risk factors of breast cancer was inadequate as only 54.8% of the study sample knew that smoking increases the risk of breast cancer while a small percent of respondents recognize that early menarche, late menopause and eating food rich in fat (each was represented by 38%). Similarly; Shafei et al. (2015) indicated that more than two third of students agreed that family history, increasing age and history of breast cancer are the most risk factor for developing breast cancer in a study that was conducted

among female medical students with mean age of 21 years in the faculty of Applied Medical Sciences at Umm Al-Qura University.

In this study, nipple discharge or bleeding was the most frequent (50.2%) identified symptom of breast cancer among participants followed by presence of lump in the breast (48%) then change in the shape of the breast or nipple (42.6%). Inverted nipple was known as a warning sign of this disease by only 29% of the students. In agreement to our study results, Radi (2013) reported that breast lump (50.5%) and bleeding or discharge per nipple (47%) were the most common frequently identified symptoms in her study. This was consistent also with another study that was conducted among 247 university students in Al-Madina Al Muonawara region which reported that students were aware of painless lump in the breast or axilla (59.5%), bloody or any discharge from the nipple (42.9%) and inverted nipple (27.9%) (Habib et al. 2010).

With regards to breast cancer screening methods, this study revealed that most participants believe that mammography, CBE by a doctor and pathological examination are the most diagnostic tools for breast cancer with 67.3%, 63.7% and 62.5% respectively. Self-breast examination and ultrasound were the least screening methods mentioned by students with 43.9% and 58.9% respectively. These findings agree well with those published in a study conducted by Nemenqani et al. (2014) which found out that most of participants knew that CBE and mammogram are methods of early detection of breast cancer (76.2% and 66.7% respectively).

5.3. Practice of breast Cancer early detection methods

In this study, only 33.3% of the respondents have practiced BSE. Similarly, in a study done in different part of developing countries in Asia and Africa different times the practice toward BSE is low (Legesse & Gedif 2014; Alwan et al. 2012; Nemenqani et al. 2014; Ahmad et al. 2011; Okobia et al. 2006). But in a study in Nigeria and Ghana the practice of BSE is higher than this finding 80% and 76% respectively (Sudan & Oluwole 2008; Akuamoah Sarfo et al. 2013). Among those respondents who perform SBE, only 33.9 % of the respondents did it monthly. This finding is higher than the studies done in other parts of the world, in Saudi study 17%, Nigeria 50%, Ghana 31% in Mekelle 29.5%, West Gojjam Zone 14.4% practiced monthly basis (Nemenqani et al. 2014; Akuamoah Sarfo et al. 2013; Sudan & Oluwole 2008; Legesse & Gedif 2014; Azage et al. 2013). The variation is attributable due to the study setting, study participants

in our case majority of the respondents were young ages and may have no concern about breast cancer, in other way, the study participants were health professionals, there may have adequate knowledge about breast cancer through experience. In addition, due low sample size in case of study in Nigeria where sample size was 100.

Some causes reported by students who had poor BSE practice were; absence of symptoms in the breast (38.4%) and lack of knowledge about steps of BSE (28.6%). This is consistent with results from a study conducted by Nemenqani et al. (2014). Another study conducted at king Abdulaziz University in Jeddah revealed that 33% of Saudi nursing students at perform BSE monthly (Yousuf 2010). On the other hand, about 66% of the nursing students reported regular performance of BSE in a study conducted in Riyadh (Alsaif 2004). About 40% of participated subjects in Riyadh study learned facts regarding BSE in their nursing curriculum in contrast to medical students in our survey; this could explain the difference between findings of the present work and that Riyadh study (Alsaif 2004).

5.4. Limitations of the Study

During the conduct of this research some shortcomings were encountered. Due to time and other logistic constraints this study was conducted on a small sample. Although this might have not affected the results significantly, we believe that a study that comprises a large sample of students would capture the wide range of views and provide more generalizable estimates about knowledge and practice with regards to breast cancer prevention among female students.

CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

6.1. Conclusion

In conclusion, health science students had low knowledge and practice of breast cancer preventive methods particularly self-breast examination which is recommended to every woman. Most female health sciences students in our sample did not perform BSE or perform it irregularly. The major reasons for not doing BSE were thinking that they are healthy and not being informed. This might be an obstacle to screening program and early diagnosis of breast cancer. Therefore, more intensified awareness programs among health sciences students are necessary to keep in view their current status of breast cancer and different practices such as BSE knowledge.

6.2 Recommendation

We would like to recommend the University of Rwanda for further work that has to be done regarding increasing the level of knowledge among female students about breast cancer and screening methods such as BSE. This can be done through possible feasible methods like encouraging the emergence of groups in the university that will increase the peer education rate and providing templates and ceremonies through the media or celebrating day like breast cancer day and encouraging the students to explain their feelings freely to further increase the level of awareness.

REFERENCES

Adzersen, K. et al., 2003. Raw and cooked vegetables, fruits, selected micronutrients, and breast cancer risk: a case-control study in Germany. *Nutrition and*. Available at: http://www.tandfonline.com/doi/abs/10.1207/S15327914NC4602_05 [Accessed June 2, 2017].

Ahmad, S. et al., 2011. Knowledge, attitude and practice for breast cancer risk factors and screening modalities in staff nurses of Ayub Teaching Hospital Abbottabad. *Journal of Ayub Medical College, Abbottabad : JAMC*, 23(3), pp.127–9. Available at: http://www.ncbi.nlm.nih.gov/pubmed/23272453 [Accessed June 1, 2017].

Akuamoah Sarfo, L. et al., 2013. Knowledge, attitude, and practice of self-breast examination among female university students at Presbyterian University College, Ghana. *American Journal of Research Communication Sarfo American Journal of Research Communication American Journal of Research Communication*, 1(111), pp.395–404. Available at: www.usa-journals.com [Accessed June 1, 2017].

Albert, U. & Schulz, K., 2003. Clinical breast examination: what can be recommended for its use to detect breast cancer in countries with limited resources? *The breast journal*. Available at: http://onlinelibrary.wiley.com/doi/10.1046/j.1524-4741.9.s2.10.x/full [Accessed June 9, 2017].

Alsaif, A.A., 2004. Breast self-examination among Saudi female nursing students in Saudi Arabia. *Saudi medical journal*, 25(11), pp.1574–8. Available at: http://www.ncbi.nlm.nih.gov/pubmed/15573181 [Accessed June 1, 2017].

Alwan, N.A.S. et al., 2012. Knowledge, attitude & practice towards breast cancer & breast self examination in Kirkuk University, Iraq. *Asian Pacific Journal of Reproduction*, 1(4), pp.308–311. Available at: http://linkinghub.elsevier.com/retrieve/pii/S2305050013600986 [Accessed June 1, 2017].

American Cancer Society, 2013. Breast Cancer Facts & Figures 2013-2014. *Breast Cancer Facts & Figures*. Available at: https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/breast-cancer-facts-and-figures/breast-cancer-facts-and-figures-2013-2014.pdf [Accessed June 1, 2017].

Autier, P., Esserman, L. & Flowers, C., 2012. Breast cancer screening: the questions answered. . *Clinical oncology*. Available at:

http://search.proquest.com/openview/238fc1f9e178335ddfd650e31ff16052/1?pq-origsite=gscholar&cbl=536303 [Accessed June 2, 2017].

Azage, M., Abeje, G. & Mekonnen, A., 2013. Assessment of Factors Associated with Breast Self-Examination among Health Extension Workers in West Gojjam Zone, Northwest Ethiopia. *International journal of breast cancer*, 2013, p.814395. Available at: http://www.ncbi.nlm.nih.gov/pubmed/24298389 [Accessed June 1, 2017].

Bleyer, A. & Welch, H., 2012. Effect of three decades of screening mammography on breast-cancer incidence. *New England Journal of Medicine*. Available at: http://www.nejm.org/doi/full/10.1056/nejmoa1206809 [Accessed June 2, 2017].

Bluekens, A., Holland, R. & Karssemeijer, N., 2012. Comparison of digital screening mammography and screen-film mammography in the early detection of clinically relevant cancers: a multicenter study. *Radiology*. Available at: http://pubs.rsna.org/doi/abs/10.1148/radiol.12111461 [Accessed June 2, 2017].

Brink, H., Walt, C. Van der & Rensburg, G. Van, 2006. *Fundamentals of research methodology for health care professionals*, Available at: https://books.google.com/books?hl=en&lr=&id=YZnPYoA4Jk0C&oi=fnd&pg=PA1&dq=Brink,+H.+I.+(1999).+Fundamentals+of+Research+Methodology+for+Health+Care+Professionals.+Kenwyn:+Juta+%26+Company+Ltd&ots=9UIjxGqA_L&sig=ehVE3yMoK_e3oG8F2wwZ-A92klU [Accessed June 3, 2017].

Burns, N. & Grove, S., 2005. The Practice of Nursing Research, 5th edn. St Louis, MO. Available at: https://scholar.google.com/scholar?q=Burns%2C+N.%2C+%26+Grove%2C+S.+K.+%282005%29.+The+Practice+of+Nursing+Research.+5th+edition.+St.+Louis%3A+Elsevrer+Saunders.&btnG=&hl=en&as_sdt=0%2C5 [Accessed June 3, 2017].

Burns, S.M., Cowan, C.M. & Wilkes, R.G., 2001. Prevention and management of hypotension during spinal anaesthesia for elective Caesarean section: a survey of practice. *Anaesthesia*, 56, pp.794–798.

Chen, C. et al., 2012. Body image and its predictors in breast cancer patients receiving surgery. *Cancer nursing*. Available at: http://journals.lww.com/cancernursingonline/Abstract/2012/09000/Body_Image_and_Its_Predictors_in_Breast_Cancer.12.aspx [Accessed June 2, 2017].

Chie, W. et al., 2003. Quality of life of breast cancer patients in Taiwan: Validation of the Taiwan Chinese version of the EORTC QLQ-C30 and EORTC QLQ-BR23. *Psycho-Oncology*. Available at: http://onlinelibrary.wiley.com/doi/10.1002/pon.727/full [Accessed June 2, 2017].

Chlebowski, R.T. et al., 2010. Estrogen Plus Progestin and Breast Cancer Incidence and Mortality in Postmenopausal Women. *JAMA*, 304(15), p.1684. Available at: http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2010.1500 [Accessed June 1, 2017].

Chou, W., Prestin, A. & Lyons, C., 2013. Web 2.0 for health promotion: reviewing the current evidence. *American journal of*. Available at: http://ajph.aphapublications.org/doi/abs/10.2105/AJPH.2012.301071 [Accessed June 2, 2017].

Cohen, M., 2002. Coping and emotional distress in primary and recurrent breast cancer patients. *Journal of Clinical Psychology in Medical Settings*. Available at: http://www.springerlink.com/index/K3N319Q5ATRND9EF.pdf [Accessed June 2, 2017].

Dandash, K. & Al-Mohaimeed, A., 2007. Knowledge, attitudes, and practices surrounding breast cancer and screening in female teachers of Buraidah, Saudi Arabia. *Int J Health Sci (Qassim)*. Available at: http://publications.qu.edu.sa/journals/7/articles/365/public/365-597-1-PB.pdf [Accessed June 9, 2017].

Drukteinis, J., Mooney, B. & Flowers, C., 2013. Beyond mammography: new frontiers in breast cancer screening. *The American journal of*. Available at: http://www.sciencedirect.com/science/article/pii/S0002934313000910 [Accessed June 2, 2017].

Ferlay, J. et al., 2010. Global Burden of Breast Cancer. In *Breast Cancer Epidemiology*. New York, NY: Springer New York, pp. 1–19. Available at: http://link.springer.com/10.1007/978-1-4419-0685-4_1 [Accessed June 1, 2017].

Fobair, P. et al., 2006. Body image and sexual problems in young women with breast cancer. *Psycho-*. Available at: http://onlinelibrary.wiley.com/doi/10.1002/pon.991/full [Accessed June 2, 2017].

Gebrehiwot, H., Hailu, T. & Gidey, G., 2014. Knowledge and Attitude towards Breast Cancer among Mekelle University Female Regular Undergraduate Students, Tigray Region,

Ethiopia, 2013. *Scholars Journal of Applied Medical SciencesOnline) Sch. J. App. Med. Sci*, 2(2D). Available at: www.saspublisher.com [Accessed June 1, 2017].

Haas, B. et al., 2013. Comparison of tomosynthesis plus digital mammography and digital mammography alone for breast cancer screening. *Radiology*. Available at: http://pubs.rsna.org/doi/abs/10.1148/radiol.13130307 [Accessed June 2, 2017].

Habib, F. et al., 2010. Awareness and Knowledge of Breast Cancer Among University Students in Al Madina Al Munawara Region. *Middle East Journal of Cancer*, 1(4), pp.159–166. Available at: http://repository.taibahu.edu.sa/bitstream/handle/123456789/5729/Awareness and Knowledge of Breast Cancer Among University Students in Al Madina Al Munawara Region..pdf?sequence=1 [Accessed June 1, 2017].

IARC-WHO, 2012. GLOBOCAN 2012: Estimated Cancer Incidence, Mortality and Prevalence Worldwide in 2012. Available at: http://globocan.iarc.fr/Pages/fact_sheets_population.aspx [Accessed June 1, 2017].

IARC-WHO, 2013. International Agency for Research on Cancer. Latest world cancer statistics. Available at: https://www.iarc.fr/en/media-centre/pr/2013/pdfs/pr223_E.pdf [Accessed June 1, 2017].

Kanker, W. & Fonds, O., 2007. Food, nutrition, physical activity and the prevention of cancer: A global perspective. Available at: http://www.aicr.org/assets/docs/pdf/reports/Second_Expert_Report.pdf [Accessed June 1, 2017].

Kayode, F., Akande, T. & Osagbemi, G., 2005. Knowledge, attitude and practice of breast self examination among female secondary school teachers in Ilorin, Nigeria. *European Journal of*. Available at: http://www.academia.edu/download/34821623/37._Knowledge_Attitude_and_Practice_of_Breast_Self_Examination_among_secondary_school_teachers.pdf [Accessed June 2, 2017].

Kelsey, J., Gammon, M. & John, E., 1993. Reproductive factors and breast cancer. *Epidemiologic reviews*. Available at: https://www.ncbi.nlm.nih.gov/pubmed/8405211 [Accessed June 1, 2017].

Khokhar, A., 2009. Level of awareness regarding breast cancer and its screening amongst Indian teachers. *Asian Pacific journal of cancer prevention : APJCP*, 10(2), pp.247–50. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19537892 [Accessed June 2, 2017].

Khokher, S. et al., 2011. Knowledge, attitude and preventive practices of women for breast cancer in the educational institutions of Lahore, Pakistan. *Asian Pacific journal of cancer prevention : APJCP*, 12(9), pp.2419–24. Available at: http://www.ncbi.nlm.nih.gov/pubmed/22296394 [Accessed June 1, 2017].

Kolahdoozan, S. et al., 2010. Five common cancers in Iran. *Archives of Iranian medicine*, 13(2), pp.143–6. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20187669 [Accessed June 2, 2017].

Korde, L., Calzone, K. & Zujewski, J., 2004. Assessing breast cancer risk: genetic factors are not the whole story. *Postgraduate medicine*. Available at: http://www.tandfonline.com/doi/abs/10.3810/pgm.2004.10.1595 [Accessed June 9, 2017].

Lane, A. et al., 2003. Enhancing breast health in rural populations: clinical nurse specialist as the key. *Clinical Nurse Specialist*. Available at: http://journals.lww.com/cns-journal/Abstract/2003/11000/Enhancing_Breast_Health_in_Rural_Populations_.10.aspx [Accessed June 9, 2017].

Lee, C., Kim, H. & Ham, O., 2000. Knowledge, practice, and risk of breast cancer among rural women in Korea. *Nursing & Health Sciences*. Available at: http://onlinelibrary.wiley.com/doi/10.1046/j.1442-2018.2000.00063.x/full [Accessed June 9, 2017].

Legesse, B. & Gedif, T., 2014. Knowledge on breast cancer and its prevention among women household heads in Northern Ethiopia. *Open Journal of Preventive Medicine*, 4(1), pp.32–40. Available at: http://www.scirp.org/journal/PaperDownload.aspx?DOI=10.4236/ojpm.2014.41006 [Accessed June 1, 2017].

Leung, J. et al., 2014. Longitudinal patterns of breast cancer screening: mammography, clinical, and breast self-examinations in a rural and urban setting. *Women's Health*. Available at: http://www.sciencedirect.com/science/article/pii/S1049386713001102 [Accessed June 2, 2017].

Lopez, A. et al., 2001. Familial breast cancer: collaborative reanalysis of individual data from 52 epidemiological studies including 58,209 women with breast cancer and 101,986 women without the disease. *Lancet (London, England)*, 358(9291), pp.1389–99. Available at: http://www.ncbi.nlm.nih.gov/pubmed/11705483 [Accessed June 1, 2017].

Lynge, E. et al., 2012. Determinants of successful implementation of population-based cancer screening programmes. *European Journal of*. Available at: http://www.sciencedirect.com/science/article/pii/S0959804911004898 [Accessed June 2, 2017].

Marmot, M. et al., 2012. The benefits and harms of breast cancer screening: an independent review. *Lancet*. Available at: http://discovery.ucl.ac.uk/1480310/ [Accessed June 2, 2017].

Meijer-van Gelder, M.E. et al., 2001. Clinical relevance of biologic factors in male breast cancer. *Breast cancer research and treatment*, 68(3), pp.249–60. Available at: http://www.ncbi.nlm.nih.gov/pubmed/11727961 [Accessed June 2, 2017].

Mon, M.M., Mon, M. & Than, K.K., 2009. Women's awareness, knowledge and perceived magnitude regarding common female cancers in Yangon, Myanmar. *Asian Pacific journal of cancer prevention : APJCP*, 10(6), pp.1047–50. Available at: http://www.ncbi.nlm.nih.gov/pubmed/20192581 [Accessed June 2, 2017].

Montazeri, A. et al., 2008. Breast cancer in Iran: need for greater women awareness of warning signs and effective screening methods. *Asia Pacific family medicine*, 7(1), p.6. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19099595 [Accessed June 2, 2017].

Mowa, A., 2016. An exploration of knowledge, attitudes and practices and other breast cancer determinants influencing early detection among women in WIndhoek. Available at: http://repository.unam.edu.na/handle/11070/1853 [Accessed June 9, 2017].

Nagel, G., Schmidt, S. & Strauss, B., 2001. Quality of life in breast cancer patients: a cluster analytic approach. *Breast cancer research*. Available at: http://www.springerlink.com/index/w665275037211258.pdf [Accessed June 2, 2017].

Nemenqani, D.M. et al., 2014. Knowledge, attitude and practice of breast self examination and breast cancer among female medical students in Taif, Saudi Arabia. *Open Journal of Preventive Medicine*, 4(2), pp.69–77. Available at: http://www.scirp.org/journal/PaperDownload.aspx?DOI=10.4236/ojpm.2014.42011 [Accessed June 1, 2017].

Okobia, M.N. et al., 2006. Knowledge, attitude and practice of Nigerian women towards breast cancer: a cross-sectional study. *World journal of surgical oncology*, 4, p.11. Available at: http://www.ncbi.nlm.nih.gov/pubmed/16504034 [Accessed June 1, 2017].

Osime, O.C. et al., 2008. Knowledge attitude and practice about breast cancer among civil

servants in Benin City, Nigeria. *Annals of African medicine*, 7(4), pp.192–7. Available at: http://www.ncbi.nlm.nih.gov/pubmed/19623922 [Accessed June 1, 2017].

Othman, A. et al., 2013. Barriers for mammography among Non-adherent women in Jordan: a national survey. *Life Science Journal*. Available at: https://scholar.google.com/scholar?q=Othman%2C+A.%2C+Ahram%2C+M.%2C+Obeidat %2C+R.%2C+Obeidat%2C+N.%2C+%26+Tarawneh%2C+M.+%282013%29.+Barriers+f or+mammography+among+non-adherent+women+in+Jordan%3A+A+national+survey.+Life+Science+Journal%2C+10%28 4%29%2C+2268–2274.&btnG=&hl=en&as_sdt=0%2C5 [Accessed June 2, 2017].

Özaras, G. et al., 2010. Analysis of breast self-examination training efficiency in women between 20–60 years of age in Turkey. *Asian Pac J Cancer*. Available at: http://apocpcontrol.com/paper_file/issue_abs/Volume11_No3/799   breast   cancer.pdf [Accessed June 2, 2017].

Peintinger, F., Reitsamer, R. & Stranzl, H., 2003. Comparison of quality of life and arm complaints after axillary lymph node dissection vs sentinel lymph node biopsy in breast cancer patients. *British Journal of Cancer*. Available at: http://www.nature.com/bjc/journal/v89/n4/abs/6601150a.html [Accessed June 9, 2017].

Polit-O'Hara, D. & Beck, C., 2006. Essentials of nursing research: Methods, appraisal, and utilization.

Polit, D.F. & Hungler, B.P., 1999. *Nursing research : principles and methods*,

Radi, S.M., 2013. Breast Cancer Awareness among Saudi Females in Jeddah. *Asian Pacific Journal of Cancer Prevention*, 14(7), pp.4307–4312. Available at: http://koreascience.or.kr/journal/view.jsp?kj=POCPA9&py=2013&vnc=v14n7&sp=4307 [Accessed June 1, 2017].

Rossouw, J.E., Andrson, G.L., Prentice, R.., 2002. Risks and Benefits of Estrogen Plus Progestin in Healthy Postmenopausal Women: Principal Results From the Women's Health Initiative Randomized Controlled Trial. *JAMA: The Journal of the American Medical Association*, 288(3), pp.321–333. Available at: http://jama.ama-assn.org/cgi/doi/10.1001/jama.288.3.321 [Accessed June 1, 2017].

Schootman, M. & Jeffe, D., 2003. Identifying factors associated with disability-related differences in breast cancer screening (United States). *Cancer Causes & Control*. Available

at: http://link.springer.com/article/10.1023/A:1023091308625 [Accessed June 2, 2017].

Shack, L. et al., 2008. Variation in incidence of breast, lung and cervical cancer and malignant melanoma of skin by socioeconomic group in England. *BMC*. Available at: https://bmccancer.biomedcentral.com/articles/10.1186/1471-2407-8-271 [Accessed June 2, 2017].

Shafei, M.M. El, Gendy, H.A. El & Fawy, D.M. El, 2015. Norepinephrine versus ephedrine for the prevention of spinal anesthesia-induced hypotension in coronary artery disease patients undergoing knee arthroscopy. , pp.424–428.

Shepherd, J. & Mclnerney, P., 2006. Knowledge of breast cancer in women in Sierra Leone. *Curationis*. Available at: http://curationis.org.za/index.php/curationis/article/view/1105 [Accessed June 9, 2017].

Shin, K., Park, H. & Kim, M., 2012. Practice of breast self-examination and knowledge of breast cancer among female university students in Korea. *Nursing & health sciences*. Available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1442-2018.2012.00696.x/full [Accessed June 2, 2017].

Smith, L., Dalrymple, J. & Leiserowitz, G., 2001. Obstetrical deliveries associated with maternal malignancy in California, 1992 through 1997. *American journal of*. Available at: http://www.sciencedirect.com/science/article/pii/S0002937801701603 [Accessed June 2, 2017].

Story, H. et al., 2011. Improving outcomes from breast cancer in a low-income country: lessons from Bangladesh. *International journal of*. Available at: https://www.hindawi.com/journals/ijbc/2012/423562/abs/ [Accessed June 2, 2017].

Sudan, © & Oluwole, O.C., 2008. Omolase Charles Oluwole Practice Of Breast-Self Examination Awareness, Knowledge and Practice of Breast-Self Examination amongst Female Health Workers in A igerian Community. *JMS*, 3(2). Available at: http://www.sudjms.net/issues/3-2/pdf/3-Awareness, Knowledge and Practice of Breast-Self Examination amongst Female Health Workers in A Nigerian Community.pdf [Accessed June 1, 2017].

Suh, M., Atashili, J. & Fuh, E., 2012. Breast self-examination and breast cancer awareness in women in developing countries: a survey of women in Buea, Cameroon. *BMC research*. Available at: https://bmcresnotes.biomedcentral.com/articles/10.1186/1756-0500-5-627

[Accessed June 2, 2017].

Thompson, J.M., 2002. *Mosby's clinical nursing*, Mosby.

Vos, A. De & Strydom, H., 1998. Research at grass roots: A primer for the caring professions.

Weiss, N., 2011. The analysis of case-control studies of the efficacy of screening for recurrence of cancer. *Journal of clinical epidemiology*. Available at: http://www.sciencedirect.com/science/article/pii/S0895435610003021 [Accessed June 2, 2017].

WHO, 2016a. WHO | Breast cancer: prevention and control. *WHO*. Available at: http://www.who.int/cancer/detection/breastcancer/en/ [Accessed June 1, 2017].

WHO, 2016b. WHO | Breast cancer: prevention and control. *WHO*. Available at: http://www.who.int/cancer/detection/breastcancer/en/ [Accessed June 2, 2017].

WHO, 2017. WHO | Cancer Fact sheets. *WHO*. Available at: http://www.who.int/mediacentre/factsheets/fs297/en/ [Accessed June 1, 2017].

Williams, P., 2013. Breast cancer mortality vs. exercise and breast size in runners and walkers. *PloS one*. Available at: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0080616 [Accessed June 2, 2017].

Yousuf, S.A., 2010. Breast Cancer Awareness among Saudi Nursing Students. *JKAU: Med. Sci*, 17(3), pp.67–78. Available at: http://www.kau.edu.sa/Files/320/Researches/58588_28825.pdf [Accessed June 1, 2017].

Zotti, P. et al., 2000. The EORTC quality of life questionnaire-head and neck 35 in Italian laryngectomized patients. *Quality of Life*.

APPENDICES

QUESTIONNAIRE

Title of the study: knowledge and practices regarding breast cancer prevention among the students in health sciences at university of Rwanda/College of Medicine and Health Science.

Section A: Demographic data

1	How old are you	1)18-25 ☐ 2)25-30 ☐ 3) 30-35 ☐ 4)35- above ☐
2	Marital status	1)single ☐ 2) Married ☐ 3)Living with partner ☐ 4)Other (other, separated, Widow) ☐

3	Do you have any family history (1st Degree relation*) of Breast Cancer.	1) Yes ☐ 2) No ☐
4	Do you have any breast problem?	1) Yes ☐ 2) No ☐
5	Do you know the incidence of the breast cancer in Rwanda?	1) Yes ☐ 2) No ☐

*(1st degree relation like mother, sister)

** Incidence means number of new cases in a defined population.

SECTION B: ASSESSING THE LEVEL OF KNOWLEDGE, ABOUT SIGNS, SYMPTOMS AND RISK FACTORS OF BREAST CANCER AMONG HEALTH STUDENTS.

6. Please identify the factors which you think is a potential risk factors for developing breast cancer (more than one answer is desirable)

I.	old age	1) Yes ☐ 2) No ☐
II.	Positive family history?	1)Yes ☐ 2)No ☐
III.	High fat diet	1)Yes ☐ 2)No ☐
IV.	Smoking	1)Yes ☐ 2)No ☐
V.	Race/ Ethnicity	1)Yes ☐ 2)No ☐
VI.	Working class woman	1)Yes ☐ 2)No ☐
VII.	Alcohol consumption	1)Yes ☐ 2)No ☐
VIII.	First child at late age	1)Yes ☐ 2)No ☐
IX	Early onset of menarche	1)Yes ☐ 2)No ☐
X	Late menopause	1)Yes ☐ 2)No ☐
XI	Stress	1)Yes ☐ 2)No ☐

| XII. | Larger breast | 1)Yes |
| | | 2)No |

7. Please identify signs and symptoms which you think related to breast cancer.

II.	Lamp in the breast	1)Yes
		2)No
II.	Discharge from the breast	1)Yes
		2)No
III.	Pain or soreness in the breast	1)Yes
		2)No
IV.	Change in the size of the breast	1)Yes
		2)No
V.	Discoloration/ dimpling of the breast	1)Yes
		2)No
VI.	Ulceration of the breast	1)Yes
		2)No
VII.	Weight loss	1)Yes
		2)No
VIII.	Changes in the shape of the breast	1)Yes
		2)No
IX	Inversion / pulling in of nipple	1)Yes
		2)No
X	Swelling or enlargement of the breast	1)Yes
		2)No
XI	Lump under armpit	1)Yes
		2)No
XII.	Scaling/ dry skin in nipple region	1)Yes
		2)No

SECTION C: ASSESSING THE LEVEL OF KNOWLEDGE ABOUT DIFFERENT METHODS OF BREAST CANCER PREVENTION AMONG FEMALE HEALTH SCIENCE STUDENTS

8. Please identify the methods of diagnosis of breast cancer.

I.	Pathological examination of breast tissue by using FNAC (Fine Niddle Aspiration Cytology)	1)Yes ☐ 2)No ☐
II.	Self-Breast Examination(SBE)	1)Yes ☐ 2)No ☐
III.	Clinical Breast Examination by doctor	1)Yes ☐ 2)No ☐
IV.	Mammography	1)Yes ☐ 2)No ☐
V.	Ultra sound	1)Yes ☐ 2)No ☐

9.	You know at what age self-breast examination should be started	1)Yes ☐ 2)No ☐
10.	You know how to perform self-breast Examination(SBE)	1)Yes ☐ 2)No ☐

11. Do you know how often SBE should be done

(Tick the answer you think right)

1.monthly ☐

2. Twice a year ☐

3. Once a year ☐

4. Don't Know ☐

12. Do you know how often CBE should be done?

1. Yes ☐

2.No ☐

13. Do you know recommended age for mammography examination to start?

At the age of 30 ☐

At 35 ☐

At 45 year ☐

Don't know ☐

SECTION D: TO IDENTIFY THE PERCENTAGE OF STUDENTS WHO PRACTICE REGULARY THE SBE METHOD FOR BREAST CANCER PREVENTION.

14. Please give your perceived risk for developing breast cancer (Tick only one answer)

Not at risk ☐
Lower risk ☐
Medium risk ☐
Higher risk ☐
Don't know ☐

15. Do you think you have any risk factors? (Please tick only one answer)

None ☐
1 risk factors ☐
2 risk factors ☐
3 risk factors ☐
more than 3 risk factors ☐

16.	Do you think breast cancer is a curable disease	1.Yes 2.No
17.	Do you think long time survival (more than five year) is rare (due to breast cancer)	1. Yes 2.No
18.	Do you practice BSE(Breast Self-Examination)	1.Yes 2.No

(If yes then go to question no.20

19. If yes, then how often you practice Breast self-examination

Once in a month   ☐

Once in 3 month   ☐

20. At what age you started practicing BSE (Breast Self-Examination)

< 25 of age   ☐

25-30   ☐

30-35   ☐

>35 of age

21. If you don't practice SBE regularly then what are the reasons (Skip those who practice regularly, once in a mouth) one can answer more than one.

1. I don't have breast problem   ☐

2. I don't think I should   ☐

3. I don't feel comfortable doing this ☐

5. Carelessness   ☐

6. Too frequent to practice.   ☐

7. I don't think it is necessary.   ☐

8. Unsure about its benefit   ☐

9. Or, specify other reason……………………………………………………………………….

22.	Have you ever done your breast examination by any Doctor(Clinical Breast examination)	1.Yes ☐ 2.No ☐

23. (If Yes Frequency of examination)

Once   ☐

1-3 times   ☐

3-5 times   ☐

>5 times   ☐

24. (If not, Why do you reluctant to participate in CBE (Clinical Breast Examination)

a. Concern about extra money   ☐

b. Concern about extra time   ☐

C. Fear of out come   ☐

d. Too young to participate   ☐

e. No sign symptom of breast cancer   ☐

f. No one recommended   ☐

g. Unsure about the benefit   ☐

h. If other than specify……………………………………………………………………….

INFORMATION LETTER/SHEET

Dear   participant,

 I am   UWAMAHORO Grace and I currently studying a master's degree in oncology nursing within the department of Nursing. I am doing a study which titled on knowledge   and practice regarding breast cancer prevention among female   health science students   at college of medicine and health sciences

The purpose of this study   will be to assess the level of knowledge and practices regarding breast cancer prevention among female students at college of medicine and health sciences.

In order for my study to be successful, your participation will be highly appreciated

Team and conditions of the agreement: should you agree to participate in the study please note the following, your participation is voluntarily and the fulfillment of the self-report questionnaire will be conducted with respect for your privacy.

Your information will be treated with confidentiality   and will remain anonymous (you name will not be   mentioned to any one).

During the study your   free to withdraw from the study any time you feel uncomfortable the fulfilled   questionnaire will be used for analysis and all information will be kept and secure by the researcher at all times.

Thank you for your participation

Research Details:

Names: UWAMAHORO Grace

College of medicine and health sciences

Study in master degree in oncology nursing

Phone: 0788470291/ 0786662171

 Email: gmukiza@ ymail.com

CONSENT FOR PARTICIPATION IN RESEARCH PROJECT

I   …………………………………………………………………………….(full
names of participant) Here by confirm   that I understand the nature of the research project and I
voluntary consent to participate in the research project entitled-knowledge,   and   practice
regarding breast cancer prevention among female health sciences students   at   the   college of
medicine and health sciences .

I understand that I am at liberty to with draw from the project at any time should

I also desire.

Signature of participant

Date……………………………

ETHICAL CLEARANCE FROM CMHS/IRB

UNIVERSITY OF RWANDA — **COLLEGE OF MEDICINE AND HEALTH SCIENCES**

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 16/01/2017
Ref: CMHS/IRB/084/2017

UWAMAHORO Grace
School of Nursing and Midwifery, CMHS, UR

Dear UWAMAHORO Grace

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled *"Knowledge, Attitude And Practice Regarding Breast Cancer Prevention Among Students In The Allied Health Sciences/University Of Rwanda."*

Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.

Professor Kato J. NJUNWA
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:
- Principal, College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR

EMAIL: *researchcenter@ur.ac.rw*   P.O. Box: 3286, Kigali, Rwanda   WEBSITE: http://cmhs.ur.ac.rw/

50