Assessment of Knowledge, Attitudes and Barriers to Breast Cancer Screening Among Women Visiting Pathology Laboratories in Ibadan North Local Government Area, Oyo State, Nigeria

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Certification

This is to certify that MENE Lebari Pleasant with matriculation number LCU/PG/001852 carried out this research work titled, "Assessment of Knowledge, Attitudes and Barriers to Breast Cancer Screening among Women Visiting Pathology Laboratories in Ibadan North Local Government Area, Oyo State" in the Department of Public Health, Faculty of Public Health, Lead City University, Ibadan Oyo State, for the award of Master in Public Health (MPH) and that this has not been previously submitted.

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Dedication

This research work is dedicated to God Almighty

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Even though the above-mentioned institutions and persons have assisted in the process of this research work, I alone stand responsible for the errors (if any) found in the work.

Abstract

Breast cancer is a common disease in women and also an issue of public health concern. Early detection of breast cancer in women increases post-diagnosis survival rates and lowers breast cancer morbidity and mortality as the stage at the time of diagnosis is one of the primary contributing factors to its prognosis. A facility-based, cross-sectional study was designed to assess the knowledge, attitude and barriers to breast cancer screening among women visiting pathology laboratories in Ibadan North LGA. Purposive sampling technique was used to recruit 176 women visiting pathology laboratories for this study. A cluster sampling procedure involving multistage sampling was used to recruit the participants. A self-administered questionnaire was designed to elicit information on socio-demographic, knowledge, attitude, screening practices and barriers to breast cancer screening. Data was analyzed using SPSS (Version 23.0). The result of the study showed that the study participants (72%) had good knowledge on breast cancer. More than half of the participants (57%) had negative attitude towards screening, only 24 (14%) had good breast cancer screening practices and the Chi square test showed that "it is unacceptable to touch my breast ($p = 0.2$), feeling shy to uncover my breast ($p = 0.5$), it is embarrassing to tell people about ($p = 0.4$), feeling worried about what the doctor may find (39%) and stigma following cancer diagnosis (38%)" are the barriers associated with breast cancer screening. The study participants have good knowledge, negative attitude and fair breast cancer screening practices. There is need for policy guidelines that will enhance adequate training of Nigerian women on the cost and benefits of early detection of breast cancer through screening, this will address the barriers associated with screening, thereby improving attitude and practice and reduce the overall morbidity and mortality.

Keywords: Breast Cancer, Pathology Laboratories, Barriers

Word Count: 290

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Chapter One

Introduction

1.1 Background to the Study

Breast cancer is a malignant tumor in the glandular tissues of the breast[1]. These tumors, which are also referred to as carcinomas are the result of a process known as carcinogenesis, which is essentially the process of transforming normal cells into neoplastic cells by causing permanent genetic alterations, most frequently to the cell repair genes and leading to an uncontrolled cell proliferation process[2]. This makes it possible for a single abnormal cell to divide more quickly than it would normally[3]. The pathologic outcomes of breast carcinomas are metastasis to distant important organs like the lungs, liver, bones, and brain, diversion of normal breast tissues, and abnormal growth of the breast over time[4]. Breast cancer continues to be one of the most prevalent cancers in women, with over 1.7 million new cases identified in 2012[5]. Breast cancer is a significant global public health issue as a result[6].

Worldwide there are two hundred and twenty-six million (260 million) instances of breast cancer, the most prevalent type of cancer worldwide, reported in 2020[5]. In both industrialized and developing nations, it is the most typical form of cancer in women and a significant public health concern[5].

Breast cancer was projected to have caused 168 690 cases and 74 072 deaths in Africa in 2018[7]. Breast cancer accounts for 28% of all cancer cases and 20% of all cancer-related deaths among women in Africa[8]. Incidence rates are still typically low in Africa, with estimates for the majority of the continent's nations falling below 35 per 100,000 women (as opposed to above 90-120 per 100,000 in Europe or North America)[9].

Breast cancer is the most prevalent female malignancy in Nigeria, and the majority of female patients have advanced illnesses[10]. It is not surprising that it is one of the main causes of cancer death[10–12.] In Nigeria, the five-year survival rate for breast cancer is between 11-25%, compared to 90% in the US; this difference is due to the accessibility of treatment and the use of screenings for early diagnosis [13–14]. Chemotherapy and radiation therapy are typically either not generally accessible or too expensive in low- and middle-income nations. When chemotherapy is affordable, surgery is still the most popular form of treatment[15, 16.] However, considering that surgery is more affordable and accessible than adjuvant therapy, the initial goal should be to maximize the advantages of surgical treatment by early detection.

1.2 Statement of the Problem

According to studies, breast cancer is the second most common reason for cancer-related fatalities in both industrialized and developing nations.

Nigeria which is a lower-middle-income country has breast cancer as its most common malignancy among women. This accounts for 22.7% of all new cancer cases[17].

According to Morounke, Nigeria has an estimated breast cancer prevalence rate of 116 per 100,000 population and 27,840 new cases each year[18]. The estimated breast cancer data is likely to be erroneous since cancer statistics data is gathered from cancer registers kept by some hospitals[19.]

Due to late diagnosis and discovery of breast cancer, mortality rates are greater in poorer nations. Lack of understanding of genetic breast cancer risk factors has also been cited as a cause. Additionally, there are societal issues such as a lack of understanding about the illness and a presumptive negative attitude toward mammography and other screening procedures as well as breast self-examination (BSE) and clinical breast examination (CBE). This help to explain why women do not have a good understanding of breast cancer. To achieve early

presentation among women, there is a need for information and enlightenment[20]. The higher mortality rate can also be attributed to the lack of screening facilities and the routine use of early detection techniques like mammography[21].

1.2 Justification of the Problem:

Globally, the annual incidence of breast cancer is increasing; it accounts for 12% of all new instances of cancer and 25% of all cancers in women[22]. For both patients and the general public, breast cancer is a serious health issue. The most common malignancy among women is breast cancer and its prevalence is expected to rise by 1-2% each [23]. Breast cancer accounts for 23% of all female cancers globally, making it the most prevalent disease in women. In the course of their lives, one in every eight women born today will be given a breast cancer diagnosis. Due to longer life expectancies, expanding urbanization, and younger women adopting western lifestyles, the incidence rate of breast cancer is quickly rising in emerging countries [24]. With a mortality rate of 43% as opposed to 30% in industrialized nations, developing countries account for almost 50% of all breast cancer cases[5]. On the other hand, early discovery of breast cancer increases survival rates, treatment options, and opportunities for particular treatments. Theoretically, a stage breast cancer diagnosis may result in a 95% survival rate[25]. Therefore, breast self-examination, clinical breast examination and other screening modalities done systematically and regularly may likely reduce late stage breast cancer diagnosis.

1.4 General Aim and Objectives of the Study

The main objective of this research is to assess the level of knowledge, attitudes and practices to breast cancer screening among women visiting pathology laboratories in Ibadan North Local Government Area, Oyo State.

Specific Objectives

The objectives of the study are to;

I. Assess knowledge level on breast cancer among women visiting pathology laboratories in Ibadan North Local Government Area, Oyo State.

II. Assess the attitudes towards breast cancer among women visiting pathology laboratories in Ibadan North Local Government Area, Oyo State.

III. Assess practices of breast cancer screening among women visiting pathology laboratories in Ibadan North Local Government Area, Oyo State.

IV. Determine the barriers to breast cancer screening and early detection among women visiting pathology laboratories in Ibadan North Local Government Area, Oyo State.

1.5 Research Questions

1. What is the knowledge level on breast cancer among women visiting pathology laboratories?
2. What are the attitudes towards breast cancer among women visiting pathology laboratories?
3. What are the practices of breast cancer screening (based on some modalities) among women visiting pathology laboratories?
4. What are the barriers to breast cancer screening and early detection among women visiting pathology laboratories?

1.6 Significance of the Study

It is crucial to evaluate the level of knowledge, attitudes, and practices around breast cancer to develop an action plan and lower the mortality and morbidity rate related to breast cancer

among Nigerian women. Accurate data and statistics on cancer are scarce or non-existent because of the unknown disease burden in Nigeria[26]. The findings of this study will aid in developing an action plan and policy guidelines as well as lowering the prevalence, incidence, and mortality rates of breast cancer among women in Nigeria.

Since Nigerian women frequently visit pathology laboratories in Oyo state, it is crucial to undertake a study to determine their level of awareness, attitudes, and practices about breast cancer. The conclusions and recommendations of the study would be useful to Nigerian policymakers as they develop and put into practice ways to enhance breast cancer screening, early detection, and treatment. Since the majority of the literature on the subject comes from industrialized nations, it was anticipated that research from a developing nation like Nigeria, which has diverse socioeconomic and cultural variables, would also add to the body of knowledge already available on the subject. The current study will be used as a source of information for other studies in the relevant fields.

1.7 Operational Definition of Terms

Breast Cancer: Is a malignant growth that begins in the tissues of the breast and is characterized by abnormal cells multiplying in an uncontrolled manner.

Breast Self-examination: A diagnostic technique regularly performed by a woman on her breast to check for lumps or other changes.

Clinical Breast Examination: A physical exam of the breast performed by a health care provider to check for lumps or other changes

Cancer Diagnosis: Involves imaging, pathology, hormone status and staging to confirm the occurrence of breast cancer in a patient.

Health Promotion: Combination of educational and environmental support for action and condition of living conducive health.

Incidence: Frequency with which breast cancer cases appear in a particular group of people at a specific place and time.

Screening: Examination involving diagnostic techniques or physical test to detect the presence of breast cancer.

Stigma: An attitude or feeling of disgrace by those affected by breast cancer.

Surveillance: careful observation of a group of people for detection of the presence of breast cancer.

Early Detection: Refers to identifying an illness before any symptoms appear.

Breast Cancer Screening Methods: Are methods used to detect the disease before any symptoms appear (like a lump that can be felt).

Anatomical Pathology: Will be used as pathology laboratory throughout this study.

1.8 Limitations of the Study

The limitation of this study is the sample size. This study was conducted only among women visiting pathology laboratories in Ibadan North LGA. This study covers only one local government area out of the 33 local government areas in Oyo state. This study was only carried out in Oyo state and cannot be used to generalize the outcome all over Nigeria.

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Chapter Two

Literature Review

2.1 Overview of Breast Cancer

Breast cancer is defined by the American Cancer Society as a malignant tumor that begins in the cells of the breast[27]. There will be 2.3 million women diagnosed with breast cancer in 2020, with 685 000 deaths worldwide. As of the end of 2020, 7.8 million women had been diagnosed with breast cancer in the previous five years, making it the world's most common malignancy[28]. Breast cancer is the most frequent type of cancer in women worldwide, and it is the second greatest cause of cancer death in American women, after skin cancer[29]. Global breast cancer rates vary, but wealthy countries such as Australia, England, and the United States have greater rates than developing countries such as Cambodia, Nepal, and Rwanda[30]. Despite the fact that women in developed countries have a higher lifetime risk of acquiring breast cancer, breast cancer survival rates in developed countries are higher due to early detection methods and improved breast cancer treatments[31]. The American Cancer Society projects 1.9 million new cancer cases and 608,570 cancer deaths in the United States in 2021[32]. Researchers estimate that one out of every eight women born today will be diagnosed with breast cancer based on current incidence rates[33]. The most frequent kinds of breast cancer, according to the National Cancer Institute, are ductal carcinoma and lobular

carcinoma. Ductal cancer develops in the lining of the breast milk ducts, whereas lobular carcinoma develops in the breast lobules or milk glands[34]. Between 50 and 75 percent of breast cancers develop in the milk ducts, with the remaining 10 to 15 percent beginning in the breast lobules, or milk glands[35]. Breast tumors, on the other hand, can be benign, which means they do not spread to other parts of the body and are not harmful. Benign tumors, like malignant tumors, can be excised, although they usually do not recur[36].

Breast cancer is classified into four stages: I, II, III, and IV, with each stage ranging from early to advanced dependent on the size of the tumor found[37]. Furthermore, breast cancer can be classified as non-invasive or invasive. Invasive breast cancer refers to cancer that has spread from its origin in the breast ducts or glands to surrounding normal tissue[38]. Invasive breast cancer cells may spread from the breast to other regions of the body via the lymphatic system or the bloodstream[39]. In the United States, one in every eight women (13%) may get invasive breast cancer over her lifetime. A projected 287,850 new instances of invasive breast cancer will be identified in women in the United States in 2022, coupled with 51,400 new cases of non-invasive (in situ) breast cancer[40]. Non-invasive breast cancer is referred to as ductal carcinoma in situ, and it is defined as abnormal cells that have formed inside the breast milk ducts but have not moved to adjacent tissue or other parts of the body[41]. In 2022, the United States is expected to have 1,918,030 new cancer cases and 609,360 cancer deaths, with lung cancer, the main cause of cancer death, accounting for nearly 350 fatalities each day. Incidence of female breast cancer increased slowly (by 0.5% annually) from 2014 to 2018, but prostate cancer incidence remained steady, despite a 4% to 6% annual increase in advanced illness since 2011[42].

Most diseases include warning signs or symptoms that indicate a serious health problem. Detecting a lump in the breast or underarm, irritation, redness, flakiness of breast skin,

discharge from the nipple, swelling or thickening of part of the breast, change in the shape or size of the breast, and any pain in the breast area are all warning signs of breast cancer (Centers for Disease Control and Prevention, [CDC][41]. Regular screenings such as BSE, CBE, and mammograms can reduce the risk of dying from breast cancer, particularly if an abnormality is discovered early[42]. To assess whether breast cancer is malignant, diagnostic procedures such as a physical exam, mammography, or other imaging tests, and/or the collection of a biopsy sample of breast or lymph node tissue are used. Breast cancer treatment options may include surgery, chemotherapy, radiation, hormone therapy, targeted therapy, and bone therapy. There are about 2.8 million breast cancer survivors in the United States[43].

2.2 Breast Cancer History

Breast cancer develops when the cells in the breast divide and expand uncontrollably, leading in the formation of a tumor[y72]. Breast tumors can be benign (non-cancerous) or malignant (cancerous) (cancerous). If cancer cells are not treated, they can migrate to the lymph nodes and then to other parts of the body, creating secondary tumors in organs such as the lungs and liver, as well as the bones[44].

It is one of the oldest known forms of cancer, with the earliest documented documentation in Egypt, by Smith Surgical Papyrus (3000-2500 B.C.) who described eight cases of breast tumors or ulcers treated by cauterization with a tool called "the fire drill." "There is no treatment," the inscription adds of the condition[45].

Although Smith's statement still applies today in many developing countries, including Nigeria, where late presentation of breast cancer patients is common, the opposite is true in developed countries, where death rates from the disease have been decreasing over the last twenty years, particularly for women under fifty years of age, due to earlier detection through screening, increased awareness, and improved treatments[46].

2.3 Breast Cancer Burden

Breast cancer is a serious public health issue worldwide, with over 1 million new cases identified each year, resulting in over 400,000 annual deaths and around 4.4 million women living with the disease[47].

It is the second most frequent cancer in the world, behind lung cancer, and the fifth leading cause of cancer deaths. However, it is the most frequent cancer in women, with an incidence rate that is more than twice that of colorectal and cervical cancer[48].

Breast cancer is defined by the American Cancer Society as a malignant tumor that begins in the cells of the breast[49]. In 2020, there will be 2.3 million new cases of breast cancer and 685 000 deaths worldwide. As of the end of 2020, 7.8 million women had been diagnosed with breast cancer in the previous five years, making it the world's most common cancer[50]. A total of 2,140 new instances of the disease were estimated to be detected in males, accounting for around 1% of all breast cancers and resulting in 450 deaths[521].

In Africa, the disease has surpassed cervical cancer as the most prevalent malignancy affecting women, and the prevalence appears to be increasing[52].

Breast cancer, for example, has surpassed non-lymphomas Hodgkin's and cervical cancer in Nigeria[53, 54]. According to cancer registries in the country, the disease's relative frequency among other female cancers was 35.3% in Ibadan, 28.2% in Ife-Ijesha, 44.5% in Enugu, 17% in Eruwa, 37.5% in Lagos, 20.5% in Zaria, and 29.8% in Calabar[55]. Except Eruwa and Calabar, the disease was ranked #1 among all cancers in all of the centres. Approximately two-thirds of women with the disease in the country are in advanced stages[56].

2.4 Breast Cancer Prevalence and Mortality Rates

A female living in the United States has a 1 in 8-lifetime risk of being diagnosed with breast cancer, compared to 1 in 11 risks in the 1970s[57]. Longer life expectancy, changes in

reproductive patterns, use of postmenopausal hormones, growing obesity rates, and increased breast screening rates are all likely contributors to the risk increase[58]. In terms of race and ethnicity in the United States, Caucasians and African Americans have a greater mortality risk from breast cancer.

American women outnumber Asian and Pacific Islander women in the prevalence of breast cancer[59]. However, Caucasian women have a higher breast cancer rate between the ages of 65 and 84, and African American women have a higher incidence rate before the age of 40, and so are more likely to die at an early age[60].

It is important to consider the prevalence of breast cancer in Nigeria, the study participants' home country. Breast cancer prevalence and mortality rates in Nigeria are becoming a growing public health concern. Nigeria has an estimated breast cancer prevalence rate of 116 per 100,000 population and 27,840 new cases each year[72]. The estimated breast cancer data is likely to be erroneous since cancer statistics data is gathered from cancer registers kept by some hospitals[63]. Furthermore, a lack of breast cancer knowledge, as well as misunderstandings about breast cancer causes and treatment, are important reasons why most women with breast cancer do not seek early breast cancer screening/treatment until the disease has advanced to late stages[64].

The delay in obtaining preventative breast health care by Nigerian women is reflected in their record of having the highest breast cancer incidence rate of 4 per 100,000 population among African immigrant women living in the United States[65]. One of the key reasons they did not seek timely breast care services was a lack of breast cancer knowledge[66].

2.5 Types of Breast cancer

Breast cancer comes in a variety of forms and subtypes. Your doctor will first analyze the characteristics of the breast tumor to establish an appropriate treatment method, including:

• Whether the disease has spread beyond the breast.

• The type of tissue in which the illness first manifested itself

The majority of breast cancers are adenocarcinomas. These tumors, which originate in glands or ducts that release fluid, are prevalent in many other frequent malignancies. Breast adenocarcinomas develop in milk-producing glands known as lobules or milk ducts[70].

The different forms of breast cancer are;

• Ductal invasive carcinoma

• Lobular invasive carcinoma

• Breast cancer with inflammation

• Paget's disease (breast cancer)

• A breast angiosarcoma

Tumors caused by Phyllodes

• In situ ductal carcinoma (DCIS)

• In situ lobular cancer (LCIS)

• HER2 gene status

Breast cancer that is triple-negative

• Breast cancer with metastasis

• Male breast cancer

2.6 Breast Cancer Forms That Are Invasive Vs. Non-Invasive

Breast cancer is classified into two types: invasive and noninvasive. Some plants develop slowly, while others grow quickly. A tumor's aggressiveness is determined by a variety of characteristics, including its biological makeup, size, stage, and so on. However, inflammatory breast cancer and angiosarcoma of the breast are the most aggressive kinds of breast cancer, while ductal carcinoma in situ, lobular carcinoma in situ, and phyllodes tumors are more slow-growing.

Certain breast cancer subtypes, such as triple-negative and inflammatory breast cancer, are also more likely to return after vigorous treatment. Many factors, including the original tumor's size, hormone-receptor status, and whether the disease had spread to the lymph nodes, may influence when and whether a given breast cancer recurs. Learn more about recurrence of breast cancer[74].

Invasive Breast Cancer Types

Most breast cancers are invasive, which means the cancer has progressed from the initial site to other areas of the body, such as neighboring breast tissue, lymph nodes, or elsewhere. Breast cancer cells that are invasive (infiltrating) break past normal breast tissue barriers and travel to other parts of the body via the bloodstream and lymph nodes. Invasive ductal carcinoma and invasive lobular carcinoma are the two most common kinds of invasive breast cancer[73].

Ductal Invasive Carcinoma

Invasive ductal carcinoma is the most common kind of breast cancer, accounting for around 70 to 80 percent of all occurrences. Invasive ductal carcinoma is a type of breast cancer that begins in a milk duct (the tubes in the breast that transport milk to the nipple) and spreads to other regions of the breast. It may spread to other places of the body or metastasis over time[75].

Lobular Invasive Carcinoma

The second most prevalent kind is invasive lobular carcinoma, which accounts for 5 to 10% of all breast cancers. Invasive lobular carcinoma begins in the lobules (where breast milk is produced) and spreads to surrounding breast tissue. It, like invasive ductal carcinoma, has the potential to spread. This malignancy, however, is more difficult to detect on mammograms

and other tests than invasive ductal carcinoma. One in in five women with invasive lobular carcinoma has invasive lobular carcinoma in both breasts[77].

Breast Cancer That Is Inflammatory

Inflammatory breast cancer, which can be seen in the ducts or the lobules, spreads more quickly than other types of breast cancer. According to the NCI, this fast-growing, aggressive malignancy accounts for 1 to 5% of all breast cancers in the United States. It takes its name from the inflammatory symptoms it generates, which are typically redness and swelling on the breast's surface. Because of these symptoms, it is frequently misinterpreted as a breast infection. According to the American Cancer Society, one out of every three individuals with this type of cancer is not detected until the disease has advanced and spread to other parts of the body. Inflammatory breast cancer has a decreased survival rate due to these factors[76].

Paget's Disease Breast Cancer

Paget's disease of the breast, also known as Paget's disease of the nipple, is a far less prevalent kind of breast cancer. According to the NCI, it primarily affects 1 to 4% of individuals who have been diagnosed with another kind of breast cancer. It grows in the skin of the nipple and areola, forming distinct tumor cells known as Paget cells[68].

The Breast Angiosarcoma

Angiosarcoma is a type of breast cancer that develops in the lining of lymph nodes or blood vessels. According to the NCI, it is extremely rare, accounting for approximately 1 to 2 percent of all sarcomas (including those located elsewhere in the body) [67]. Though angiosarcoma can affect anyone, it is most common in adults over the age of 70. It is commonly caused by problems from breast radiation therapy, however it may not arise for eight to ten years. Angiosarcoma is a form of cancer that spreads swiftly and is frequently identified after it has migrated to other parts of the body[67].

Tumors Caused By Phyllodes

Phyllodes tumors are uncommon and are discovered in the breast connective tissues. This form of tumour primarily affects women in their forties, while it can affect people of any age. People with Li-Fraumeni syndrome, an inherited genetic disease, are more likely to develop this type of tumor[82]. According to the ACS, around 25% of phyllodes tumors are malignant[69].

Adenoid cystic carcinoma, low-grade adenosquamous carcinoma, medullary carcinoma, mucinous carcinoma, papillary carcinoma, and tubular carcinoma are all rare kinds of invasive breast cancer.

Noninvasive (In-Situ) Breast Cancers

Breast cancer cells in situ are non-invasive and remain in a specific site of the breast, not spreading to neighboring tissue, lobules, or ducts.

In situ breast cancer is defined as cancer that has not progressed beyond the milk ducts or lobules. In situ malignancies are classified as ductal carcinoma or lobular carcinoma[70].

In Situ Ductal Carcinoma (DCIS)

According to the ACS, DCIS accounts for around 20% of newly diagnosed breast malignancies. DCIS begins as a tumor in a milk duct, which transports milk from the lobules, or glands, to the nipple. DCIS has not spread to the rest of the body. The likelihood of the tumor breaking through the ductal walls into the surrounding tissue and fat of the breast increases over time. However, thanks to advancements in diagnoses and therapy, the majority of individuals treated for DCIS, also known as stage 0 breast cancer, have a favorable outcome[89].

In situ lobular cancer (LCIS)

An LCIS is not technically cancer, but rather an alteration in the breast. Tens of thousands of small clusters of lobules generate breast milk in the breast. Inside these lobules, cancer-like cells may proliferate. LCIS tends to stay put and not spread. However, because LCIS increases your risk of invasive breast cancer, your care team may want to watch you in order to address any changes as soon as possible[77].

2.7 Stages of Breast Cancer

Breast cancer is classified into stages based on the size of the tumor and how far it has spread.

Tumors that are large or have spread to surrounding tissues or organs are in a more advanced stage than cancers that are tiny or are still contained within the breast. Doctors need to know the following information to stage breast cancer:

• Whether or not the cancer is invasive or non-invasive

• The size of the tumor

• The involvement of lymph nodes

• If the cancer has spread to nearby organs or tissue

Breast cancer is classified into five stages: 0 to 4[78].

Breast cancer in its early stages

DCIS is the first stage. DCIS cancer cells are restricted to the breast ducts and have not migrated to adjacent tissue.

Breast cancer in its early stages

• Level 1A. The primary tumor is no more than 2 centimeters (cm) broad. Lymph nodes are unaffected.

• Level 1B. Cancer has been discovered in adjacent lymph nodes. There is either no tumor in the breast or the tumor is less than 2 cm in size.

Breast cancer in stage 2

• Level 2A. The tumor is less than 2 cm in size and has spread to one to three surrounding lymph nodes, or it is between 2 and 5 cm in size and has not migrated to any lymph nodes.

• Level 2B. The tumor is 2 to 5 cm in size and has spread to 1 to 3 axillary (armpit) lymph nodes, or it is greater than 5 cm in size and has not migrated to any lymph nodes.

Breast cancer in its third stage

• Level 3A.

The cancer has progressed to 4 to 9 axillary lymph nodes or the internal mammary lymph nodes have expanded. Any size primary tumor can exist.

Tumors that are larger than 5 cm. The malignancy has spread to one to three axillary lymph nodes, as well as any breastbone nodes.

• Stage 3B: A tumor has infiltrated the chest wall or skin and may or may not have infiltrated up to 9 lymph nodes.

• Level 3C. Cancer is identified in axillary lymph nodes, lymph nodes near the collarbone, or internal mammary nodes in 10 or more cases.

Breast cancer in its fourth stage (metastatic breast cancer)

A tumor in stage 4 breast cancer can be any size. Cancer cells from it have spread to local and distant lymph nodes, as well as distant organs.

Your doctor's testing will establish the stage of your breast cancer, which will influence your treatment[80.]

Clinical Presentation

Early-stage breast cancer usually causes no symptoms when the tumor is tiny and curable, but when it does become symptomatic, it usually manifests as a painless breast lump[81].

Only a tiny percentage has non-lumpy symptoms including heaviness, unusual pain in the breast, chronic changes to the breast like thickening, swelling, redness, dimpling, ulceration, and nipples abnormalities such spontaneous bloody discharge, erosion, and inversion4. In underdeveloped nations, where late presentation is common, patients may also appear with an axillary mass and systemic symptoms such as fatigue, cough, musculoskeletal discomfort, and ascites[82].

2.8 Breast Cancer Diagnosis

Breast cancer diagnosis entails taking a thorough medical history, performing a thorough physical examination, and conducting detailed investigations. Family history and past medical history are frequently investigated, while physical examination includes probing of all breast quadrants, the nipple-areola complex, the axillary tail, and the axilla. Simple movements such as raising the arms high over the head and tensing the pectoralis muscles may help to highlight asymmetries and dimpling[79]. Investigations to aid in disease diagnosis include the following:

1. **Imaging**: These include mammography, ductography, ultrasonography, and magnetic resonance imaging (MRI). They can help with both breast cancer screening and diagnosis[83].

A. Mammography: the most useful test for distinguishing benign from malignant lesions and the one recommended for breast cancer screening[84]. A solid mass with or without stellate features, asymmetric thickening of breast tissues, and clustered microcalcifications are specific mammography abnormalities that support a diagnosis of breast cancer.

Mammography can also be used to guide interventional operations such as needle localization and biopsy[85].

B. Mammary ductoscopy (MD): This is a new endoscopic procedure that provides direct vision and biopsy analysis of the mammary ductal epithelium, which is where most malignancies begin. It may indicate early cancer when paired with ductal lavage and cytology[86-89]. The most common reason for ductography is nipple discharge, especially if the fluid contains blood[90]. Mammography is performed after a radiopaque contrast medium is introduced into one or more of the main ducts. Small filling flaws surrounded by contrast media are visible as intraductal papillomas. Cancers might manifest either as irregular lumps or as numerous intraluminal filling defects[91].

C. Ultrasonography: is a valuable tool for resolving ambiguous mammography findings, characterizing cystic masses, and proving the echogenic properties of certain solid abnormalities[92]. Fine-needle aspiration biopsy, core-needle biopsy, and needle localisation of breast lesions are all guided by ultrasound. It is highly reproducible and has a good patient acceptance rate, but it does not reliably detect lesions of 1 cm or smaller in diameter and is a poor screening test when used alone[93,94].

D. Magnetic Resonance Imaging (MRI): This imaging technology is non-invasive and non-radiating. Additional breast lesions were discovered while examining MRI as a method of defining mammography abnormalities. However, in the case of both a negative mammography and a negative physical examination, the likelihood of MRI detecting breast cancer is exceedingly low. There is currently a lot of interest in using MRI to examine the breasts of high-risk women and women who have just been diagnosed with breast cancer. In the first example, women with a strong family history of breast cancer or who possess known genetic abnormalities require early screening, however mammography evaluation is limited

in younger women due to increasing breast density. In the second case, a study of MRI of the contralateral breast in women with known breast cancer revealed that 5.7% of these women had a contralateral breast cancer[95-98].

2. Plain X-rays and Bone Scan: These help detect and diagnose metastasis, particularly to the bone[99]. MRI, PET (Positron Emission Tomography), CT Scans, and bone scans are not widely available in most developing-world hospitals, and when they are, the expense of these treatments renders them unaffordable for many patients. However, ultrasonography and X-rays are widely available, and many patients will receive these minimum tests in addition to the routine history and physical examination.

3. **Biopsy:** A variety of biopsy procedures can be used to get a definitive pathologic diagnosis of a breast lesion. Greater accuracy and information are achieved with a bigger biopsy sample, but at the expense of increased invasiveness. Ideally, needle biopsies should be conducted after imaging to assist eliminate imaging distortions owing to hematoma. The numerous needle biopsy procedures are classified into two categories:

a. Fine needle aspiration provides cytology, which allows for the identification of malignant cells but does not distinguish between in situ and invasive disease[100].

b. Histological tissue biopsy, which includes Trucut biopsy, Biopsy cut, and Mammotome. These larger tissue samples will enable for the differentiation of invasive versus in situ cancer[101].

2.9 Breast Cancer Risk Factors

The exact cause of breast cancer is uncertain. Furthermore, it is not known how risk factors lead cells to become malignant. Many risk factors are ubiquitous and well-known among women, but medical experts are still identifying specific risk factors related with this

disease[102]. There are various risk factors for breast cancer, some of which cannot be modified, such as age and gender. Although various risk factors may raise the likelihood of acquiring breast cancer, some women with many risk factors may never develop the disease, while others with no known risks develop it[103]. Approximately 80% of breast cancer cases have no identified risk factors, demonstrating that we still do not know enough about the disease's origin[104].

As previously said, a woman's age and gender cannot be changed, but other risk factors that women must consider include race, having a family history of breast cancer, and inheriting breast cancer genes[105]. Breast cancer affects women roughly 100 times more than males[106]. In comparison to the anticipated 232,340 new cases of invasive breast cancer in women, only 2,240 new cases of invasive breast cancer in men will be discovered[107]. Similarly, it is anticipated that 410 men would die of breast cancer in 2022, compared to 39,620 female breast cancer fatalities. Breast cancer is more likely to strike older women[108]. Caucasian women are more likely than African American, Hispanic, and Asian women to develop breast cancer[109]. However, African Americans are more likely than other racial groups to die from breast cancer[110].

Women who have a family history of breast cancer are more likely to get the disease themselves. However, the majority of women who get breast cancer have no family history of the disease. Changes in certain hereditary genes (including BRCA1 and BRCA2) raise the risk of breast cancer but account for fewer than 10% of all cases[111]. Women who have changes in these genes are more likely to develop breast cancer than women who do not have these abnormalities. Other risk factors for breast cancer identified by the American Cancer Society include:

1) Thick breast tissue

2) Early menarche

3) Postmenopausal hormonal therapy

4) Some forms of birth control

5) No or very late pregnancies

6) Not nursing

7) Early exposure to breast radiation,lobular carcinoma in situ,

8) Some benign breast diseases[112].

Some breast cancer risk factors can be reduced through easy lifestyle modifications such as keeping a healthy weight, engaging in regular physical activity, and limiting alcohol use. Although decisions made in adolescence can have an impact on future health and the possibility of acquiring breast cancer, there is still a lot to learn about possible hazards, especially since 8 out of 10 breast cancer cases had no identified risk factors[113].

According to research, being overweight or obese can raise a woman's risk of developing breast cancer. Obesity prevalence has more than doubled globally since 1980. According to the World Health Organization, 1.4 billion adults were predicted to be overweight in 2008, with 300 million obese. The United States ranks fourth among all countries in terms of obesity rate[114], and if current trends continue, an extra 500,000 cases of cancer will be diagnosed in the United States by 2030. Obesity is linked to an increased risk of the following cancers, according to the NCI: breast, colon and rectum, endometrial, esophagus, gallbladder, kidney, pancreas, and thyroid. According to a study that used NCI Surveillance, Epidemiology, and End Results (SEER) data, roughly 34,000 new cases of cancer in men and 50,500 in women were attributable to obesity in the United States in 2017[115]. Obesity caused a varying percentage of cases for each type, although it was as high as 40% for several cancers, notably endometrial cancer and oesophagal adenocarcinoma[116].

The stage of life at which a woman gains weight and becomes obese may influence the link between breast cancer and obesity. The weight increase during adulthood, most commonly between the ages of 18 and 60, has been consistently linked to a woman's risk of breast cancer after menopause. Many studies, according to the NCI, have linked overweight and obesity to an increased risk of postmenopausal breast cancer. Tumours that express both estrogen and progesterone receptors are at a higher risk, as are women who have never had menopausal hormone therapy (MHT) [117]. Obese women are likely to have a higher risk of postmenopausal breast cancer due to higher estrogen levels. After menopause, when the ovaries stop releasing hormones, adipose tissue becomes the primary source of estrogen. As a result, having more fat tissue and high estrogen levels in obese women may result in faster-growing estrogen-responsive breast cancers than in non-obese women[118].

Breast cancer has a multifaceted origin, and descriptive epidemiological data show that it is a disease of affluent societies that have adopted the Western lifestyle, which is defined by a high-caloric diet rich in animal fat and proteins mixed with a lack of physical activity. Regions that have had this lifestyle for a long time (North America, Northern Europe, and Australia) have reached a plateau with an incidence rate of 70 to 90 new cases per 100,000 population/year, whereas countries that have recently become industrialized and affluent have seen a significant increase in incidence and mortality[119]. Age, hereditary, dietary (diet and obesity), gynecological (oral contraceptives, hormone replacement therapies, endogenous hormone levels, age of menarche and menopause, parity and mammographic density), lifestyle (physical activity, smoking, and alcohol), oxygen reactive species, radiation, and environmental pollutants have all been identified as risk factors.

Breast cancer incidence is known to increase dramatically with age up to the age of 50, after which it increases slowly[120]. Hereditary factors are found in roughly one-fourth of all

occurrences of breast cancer, and they involve two types of genes: high and low penetrance genes. High penetrance genes with uncommon allelic variations, such as BRCA1/2, tumour protein 53 genes (TP53), and ataxia telangiectasia mutant gene (ATM). Low penetrance genes, such as those encoding enzymes involved in estrogen and carcinogen metabolism, as well as the detoxification of reactive oxygen species, such as P450 cytochrome and Gluthioone-S-transferases (GSTs), are more prevalent, and allelic variations give a low risk of breast cancer[121].

In terms of dietary carcinogens and anticarcinogens, the human diet comprises a wide range of natural carcinogens and anticarcinogens. Consumption of antioxidant-rich fruits and vegetables lowers the risk, whereas consumption of polyunsaturated fatty acids and meat raises the risk[122].

Obesity has been linked to an increase in estrogen levels as well as a risk in postmenopausal women, who get the majority of their estrogen through the conversion of androgens in adipose tissue as a result of aromatase enzyme activity[123]. Obesity, on the other hand, has been shown to have a protective effect in premenopausal women due to a longer period of regular ovulation, which suppresses estrogen levels. Physical activity is a lifestyle characteristic that has been linked to an increased risk of breast cancer. It is thought to be anti-cancer because it inhibits normal ovulatory cycles and increases the quantity of catechol-O-methylated estrogens[124].

Cigarette smoke is abundant in carcinogens and reactive oxygen species, making it a high-risk factor for breast cancer. Its role is debatable, as it has the potential to protect against cancer. Nicotine, which inhibits aromatase, may have an anti-estrogenic impact. Women who smoke also tend to enter menopause earlier than nonsmokers. Alcohol is another factor to

consider. Breast cancer is a risk factor for 15% of alcoholic women. It has been established that alcoholic women have higher estrogen levels than non-alcoholic women[125].

Oral contraception raises the risk of breast cancer but disappears after ten years, whereas hormone replacement therapy disappears after five years. However, breast cancer cases treated with hormone replacement therapy (HRT) are less progressed at the time of diagnosis and physiologically less aggressive than those who did not utilize such medication[126].

There is a link between endogenous estrogen levels and breast cancer. High levels of estrogen in the serum or urine, together with low levels of sex hormone binding protein (SHBG), resulting in a high bioavailability of free estradiol, indicating an essential role for endogenous and exogenous estrogens in the risk of breast cancer[127].

The degree of mammographic density is another powerful predictor of breast cancer risk. It has been reported that the risk is four to six times higher in women with more dense breasts than in those with less dense breasts. Evidence suggests that the aetiology of mammographic density may be attributable to steroid hormone exposure, as it declines with age, increases in women on tamoxifen, and reduces in women on hormone replacement therapy[128].

Environmental contaminants, like hormones, can interfere with the control of a vast family of nuclear hormone receptors, which in turn can regulate various cell cycle genes like TP53, Retinoblastoma (RB), and serine.

RAF threonine-protein kinase proto-oncogene via ligand-induced transcriptional activation.

These pollutants, which include pesticides, dyes, food preservatives, and other pollutants, are known as xeno-estrogens and can play a role in the aetiology of breast cancer by interfering with the function of endogenous estrogens. Ionizing radiation and a family history of benign breast cancer have also been linked to an increased risk of breast cancer[129].

Although the aetiology of breast cancer is unknown, various risk factors have been identified, including:

1. Gender: Being a woman is the single most important risk factor for breast cancer. It is largely a female disease, with a male-to-female ratio of 1:10053[130]. Male breast cancer represented less than 1% of all breast cancer cases and 0.1% of cancer death in the United States and other affluent countries[131]. In Africa, however, the situation may be different, as it has been claimed that males account for 5-15% of breast cancer cases in Uganda and Zambia[132].

2 .Age: Although breast cancer is uncommon before the age of 20, its prevalence increases with age. In contrast to the older age distribution in Caucasian women (usually 50-59 years, post-menopausal), breast cancer in Nigerian women has a relatively younger age profile (usually 38-48 years, pre-menopausal), similar to reports in other populations of black descent in the diaspora, with 12-15% of cases occurring below 30 years. The youngest recorded age of incidence was 16 years old from Lagos. Numerous ideas have been advanced to explain this discrepancy, including age at menarche, age of first delivery, parity, socio-demographic characteristics, body mass index, and underlying genetic differences, but none are satisfactory, implying that further research is required in this area[133]. Despite this, BSE is suggested monthly for women aged 20 and up as a screening tool for breast cancer detection. It has been reported that the frequency of practice is related to age.

3. Hormonal factors: estrogen has traditionally been the principal inducer of epithelial growth. As a result, factors that increase or decrease exposure to high or prolonged levels of this hormone are linked to an increased or decreased chance of developing breast cancer. Thus, while prolonged nursing and breast feeding lessen the risk of acquiring the condition, early

menarche, late menopause, contraceptive and exogenous estrogen use, nulliparity, and greater age at first term pregnancy all raise the risk.

4. Previous history of breast disease: A person with a history of breast cancer is more likely to develop the disease again. A woman with past invasive or ductal carcinoma in situ has a 0.5-1% per year risk of acquiring the disease, whereas a woman with atypical ductal or lobular hyperplasia has a four to five times higher risk[134]. Proliferative lesions without atypia, such as mild hyperplasia and sclerosing adenosis, have a somewhat higher risk (1.5-2%). Other non-proliferative alterations, such as palpable cysts, fibroadenomas, and duct papillomas, are not significantly related to an elevated risk[134].

5. Ionizing irradiation: Patients who underwent several fluoroscopies, radiotherapy for ankylosing spondylitis, Hodgkin's disease, or thymus gland enlargement, as well as survivors of atomic explosions, painters of radium watch faces, and X-ray technicians, had an increased incidence of breast cancer.

6. Environmental carcinogens: Exposure to organic chlorines in the environment, synthetic estrogens found in cosmetics, and phytoestrogens found in soybeans have all been proposed to increase the risk of breast cancer, even though evidence linking organic chlorines to the disease has remained inconclusive[135].

7. Risk factors associated with lifestyle: Alcohol and saturated fat-rich diets raise the risk, whereas smoking has not been shown to lower the risk. Height, obesity, a high BMI, and a sedentary lifestyle are other known risk factors for the disease, particularly in postmenopausal women[134].

8. Factors related to family history and genetics: A positive family history of breast cancer raises a woman's risk of developing the disease, and this risk is increased if the affected

family member is a first-degree relative with an early age of onset (usually under 50 years), if both breasts are involved, or if she has multiple primary cancers such as breast and ovarian cancers. The risk ratio for women with one, two, or three first-degree affected relatives has been reported to be 1.8, 2.9, and 3.9, respectively, when compared to women without affected relatives81. Breast cancer screening should begin at the age of ten years younger than the age at which the affected relative was diagnosed.

Breast cancer caused by a hereditary gene mutation, which accounts for about 5-10% of all breast cancers, is caused by an underlying gene mutation, primarily from two germlines BRCA-1 (50%) and BRCA-2 (32%), which are located on chromosomes 17q and 13q, respectively, and are inherited in an autosomal dominant fashion with varying penetrance[135].

These tumour suppressor genes are most typically found in the European Ashkenazi Jewish people and their descendants, which explains why they are so prevalent in the developed world. BRCA-1 is found in 0.1% of the general population in Europe and North America, compared to 20% in the Ashkenazi Jewish community, in 3% of the unselected breast cancer population and 70% of women with inherited early-onset breast cancer[123]. Breast cancer affects up to 50-87% of women who have a faulty BRCA-1 gene at some point in their lives. Carriers of this mutation have an elevated risk of ovarian and prostate cancer. BRCA2 mutations are found in 10-20% of high-risk families for breast and ovarian cancers, but only in 2.7% of women with early-onset breast cancer. Female carriers have a 25-30% lifetime risk of developing breast cancer. BRCA-2 is also a risk factor for male breast cancer, with carriers having a 6% lifetime probability of developing the disease. Other malignancies associated with BRCA-2 mutations include prostate, pancreatic, fallopian tube, bladder, non-Hodgkin lymphoma, and basal cell carcinoma.

2.10 Breast Cancer Prevention

Breast cancer screening is a strategy for women to discover cancer before it causes visible signs or symptoms. BSE, CBE, and mammography are the three most often used procedures for breast cancer prevention[138]. Tumors in the breast grow slowly, so by the time a lump is large enough to feel, it could have been growing for as long as ten years. The greatest overall preventive health plan for a woman against breast cancer is to lower her recognized risk factors as much as feasible. However, the multiple therapies available to women may not reduce the incidence of breast cancer, but they may aid in the early detection of breast cancer[137].

As young adults, women can begin assessing their own breasts for size, shape, and lumps using a breast self-exam (BSE). Educating young women about BSE may help to raise awareness and reduce cancer fears later in life. For younger women, performing BSE is a cost-effective way of detection. Younger women, on the other hand, should be instructed on the right procedure for detecting a breast anomaly[136]. Although BSE is a useful self-screening tool, research has indicated that it may serve a minor effect in detecting breast cancer when compared to a woman discovering a breast lump at random or a clinician discovering one during a clinical breast exam[139].

In contrast to BSE, CBEs are often administered in a clinical setting by a health professional such as a physician or nurse. As part of standard breast cancer screening, clinical breast exams can help detect cancers in women as young as 20. As a result, it is critical to note that CBEs are not a substitute for mammography in women aged 40 and up. Although most health organizations advocate CBEs, there is still doubt about false positive outcomes. False positives happen when a CBE finds a breast irregularity that looks like cancer but is subsequently shown to be benign[140]. Data from 290,230 women examined for breast cancer with CBE or mammography at regional health institutes in Ontario, Canada, were analyzed.

When CBE was paired with mammography, cancer detection rates and sensitivity were greater, but false-positive rates were higher[154]. However, combining CBE with mammography at yearly doctor's visits resulted in fewer breast cancer cases being missed. Furthermore, women screened at regional cancer centres that offered CBE were considerably more likely to have a first-degree relative with breast cancer (p.001), lower breast density (p.001), and be a current user of hormone therapy (p.001). Regular mammograms are most beneficial for women over the age of 40 in terms of detecting cancer early[141]. Breast cancer can be detected early by mammography, increasing the odds of survival. Mammograms are used to check for breast cancer in women who do not have any symptoms. Mammography is classified into two types: screening mammograms and diagnostic mammograms[142]. Mammogram screenings normally include two x-ray images of each woman's breast. Tumours can be discovered with x-ray pictures even when they cannot be felt 117. The NCI recommends that women above the age of 40 get a mammography every 1 to 25 years[143].

Early intervention is critical to improving breast cancer-related survival[158]. Women performing BSEs regularly are a key step in breast cancer prevention since any changes will be recognized and then investigated with a CBE and mammography. Clinical preventive maintenance is one of Healthy People 2020's leading health indicators, and cancer has been designated as a major focus area[158]. Early detection is critical for lowering the incidence and mortality rate of advanced-stage breast cancer. Since guidelines are for mammography screening to begin at age 40, younger women must perform BSEs, and have regular CBEs as preventive measures[145].

2.11 Preventive Approach to Breast Cancer

Primary Prevention

Breast cancer prevention is determined by risk factors, which are classified as modifiable or non-modifiable. Non-modifiable risk factors, such as genetic changes, advanced age, benign breast disease, and family and personal history, cannot be changed and significantly increase the risk of BC[146]. A healthy lifestyle can help to prevent modifiable risk factors. Furthermore, lowering endogenous hormone exposure reduces the need for oral contraception and hormonal replacement therapy for an extended time. Obesity, a sedentary lifestyle, alcohol consumption, and physical inactivity are all modifiable risk factors. These factors can be reduced by physical activity, healthy eating (eating more vegetables and fruits and less animal fat and proteins), and a normal body mass index, especially after menopause. All of these factors are strongly related to lowering the level of estrogen, which leads to a lower risk of BC[147].

Chemoprevention

Chemoprevention medications are used to reduce the risk of BC. Currently, the Food and Drug Administration has approved two available medications that help to reduce the risk of BC among the highest-risk group of women, raloxifene and tamoxifen. Chemoprevention medication works by inhibiting the Estrogen hormone within the body's tissue and acting similarly to estrogen hormone in other tissues[148].

Surgery for Prevention

One of the preventive measures to reduce the risk of BC in high-risk females (genetic changes in BRCA1 and BRCA2) is surgical breast removal, which can reduce the risk by more than 90%. Many females, in particular, who have preventive surgery will not be at risk of developing BC[149].

2.12 General characteristics of Breast Cancer

The Breast Lymph (Lymphatic) System

The lymph system is essential in breast cancer research since it is one method for breast cancer to spread and has multiple components. Lymph nodes are bean-shaped clusters of immune system cells linked by lymphatic veins. These vessels are similar to small veins, except instead of blood, they convey a clear fluid called lymph away from the breast. In addition to immune system cells, they contain lymph tissue fluid and waste products. Breast cancer cells have the ability to infiltrate lymphatic capillaries and develop in lymph nodes. The majority of lymphatic veins in the breast link to lymph nodes beneath the arm (axillary nodes). Internal lymph nodes are lymphatic veins that link to lymph nodes inside the chest, while supraclavicular and infraclavicular nodes are located above or below the collarbone[152].

There are various forms of breast cancer, some of which are quite rare. Currently, the ductal and lobular subtypes account for the vast majority of all breast malignancies worldwide. However, the ductal subtype accounts for the most majority of identified cases, accounting for approximately 40-75%[167]. Furthermore, numerous linear models of breast cancer genesis, transformation, and development, as shown, have been developed. The ductal subtype is represented by two models. Lerwill reported the first 'ductal' model as follows[150]:

It first recognizes flat epithelial atypia (FEA), followed by atypical ductal hyperplasia (ADH), and finally ductal carcinoma in situ (DCIS) as non-obligate precursors of advanced invasive and metastatic ductal cancer.

The second model proposed typical epithelial ductal hyperplasia (UDH) as an intermediate stage of progression between FEA and DCIS. Atypical lobular hyperplasia (ALH) and lobular carcinoma in situ (LCIS) were also considered as non-obligate precursor lesions to invasive lobular carcinoma128 in the case of lobular subtype[151].

2.13 Breast Cancer Treatments

Surgery

The primary goal of the surgical method is to eliminate cancer cells from the breast. There are numerous surgical procedures available, including mastectomy and lumpectomy. Mastectomy is performed by removing the whole breast. A lumpectomy, on the other hand, is the removal of the breast cancer cell and surrounding normal tissue. Mastectomy and lumpectomy are usually performed combined to remove lymph nodes and determine if the cancer has spread. Furthermore, a number of BC cases may necessitate a lymph node dissection. Another surgical procedure for women who are positive for BC is bilateral mastectomy, which involves removing the unaffected breast to prevent cancer recurrence[155].

Radiation Treatment

Radiation therapy is one of the most effective ways to treat cancer at every stage. Nowadays, it is critical to treat breast cancer at an early stage, particularly after surgery to remove the disease and surrounding normal tissue. Radiation therapy plays an essential role in improving local control of cancer and women's survival rates, particularly in metastasis instances[156].

Chemotherapy

The most essential method for treating BC and extending patients' lives. Chemotherapy is a medication that targets and kills cancer cells in the body. It is also linked to the cell division phase and works first on cells that divide quickly. Patients who have taken chemotherapy suffer from consequences that cause specific levels of behavioral problems when dealing with signs and symptoms[157].

Tactical Therapy

The new and more effective approach to treating BC is target therapy, which works only on specific cancer cells without harming normal breast cells. It is a medication that prevents the development of cancer metastatic by entering specific molecules involved in the progression,

growth, and metastasis of BC cells to other sites of the body. Trastuzumab, an approved medicine, is an antibody that acts on the protein human epidermal growth factor receptor 2 and is used to treat several forms of breast cancer[158].

Endocrine Therapy

Treatment of BC with endocrine or hormonal therapy that is hormone sensitive works by lowering the body's production of hormones or by inhibiting hormones from connecting to receptors within malignant cells. These drugs increase survival, decrease death, and improve prognosis. Tamoxifen, which has been used to treat BC with hormone receptor-positive cells for over thirty years, is one of the most often utilized medications[159].

Immunotherapy

Immunotherapy medication, which efficiently urges a patient's immune system to identify and destroy cancer cells, is one of the developed components in the treatment of BC. Checkpoint inhibitors are one sort of immunotherapy used to treat breast cancer. The drugs' job is to target this inhibitor support for a return immune system reaction against breast cancer cells[162].

2.14 Breast Cancer Screening

Breast cancer screening is an attempt to detect undiagnosed cancer at an early stage of development, when it can be controlled successfully[160].

Screening approaches for the disease include mammography, clinical breast examination (CBE), breast self-examination (BSE), ultrasound scanning, magnetic resonance imaging (MRI), and genetic testing[177]. The American Cancer Society suggested Mammography, Clinical Breast Examination, and Breast Self-Examination (which is optional) for routine breast screening in average-risk, asymptomatic women[161]. Women above the age of 40

should have annual mammography, annual CBE, and monthly BSE, whereas women between the ages of 20 and 39 should have three yearly CBEs and monthly BSE[164].

While annual screening mammography has been shown to reduce breast cancer mortality in women over the age of 50 by 20-39%, there is debate concerning its value as a screening tool in younger women (i.e., 40-49 years), leading to different recommendations about its usage in this age group. A yearly mammography assessment is recommended in people with high-risk factors beginning at the age of 40[165-166]. Given Africa's younger demographic pattern for breast cancer, it is unclear what role screening mammography should play in Africa.

2.15 Mammographic Screening on a Routine Basis in Nigeria

Even though routine breast cancer screening is not currently widely practiced in Nigeria, mammography as a routine screening method in Nigeria and other developing countries may not be feasible due to its high cost, skilled expertise requirement, lack of adequate breast cancer data, and relatively younger age of women who develop the disease[167]. Given that healthcare spending for chronic diseases in Nigeria competes with other basic needs such as the provision of basic amenities and infrastructure, as well as the control of several endemic communicable childhood diseases, any money invested in breast cancer screening must be justified by the benefit to the population. Various studies have also demonstrated that imaging tests indicated for early diagnosis of breast cancer (e.g., screening mammography) cannot be used frequently in countries with limited health-care resources[168].

Thus, until conditions in Nigeria and other developing countries allow for routine mammography screening, breast cancer screening initiatives must rely on a combination of BSE and CBE. Women can be taught monthly BSE procedures, and nurses, midwives, and other healthcare personnel can be trained to assist physicians with CBE5. Community Health Extension Workers (CHEWs) appear to be the most suitable category of healthcare providers

in the current Nigerian health system that can be trained to perform these dual functions, as they are the closest healthcare workers to individuals and families within the community and have formal training for PHC activities. Furthermore, it has been found that Community Health Workers (CHWs), as trusted members of the community, may assist in reducing obstacles to care caused by health beliefs and health values[169].

2.16 The Efficacy of Breast Cancer Screening

Early female breast cancer screening has been discovered as the most effective method of detecting precancerous alterations in the breast before they develop malignant[172]. Delays in early breast screening result in a high morbidity and mortality rate, as well as a large economic cost to the country[170]. Due to the devastating effects of delayed breast and cervical cancer screening on women in the United States, the government established the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) in 1990 to provide low-income, uninsured, and underserved women with access to timely breast and cervical cancer screening and diagnostic services[187]. Since its inception, the NBCCEDP has assisted about 12.7 million women in the United States in screening for breast and cervical cancer. In 2016, the program served 290,095 women with breast cancer screening and diagnostic services. In this group, 2,639 women were identified with invasive breast cancer, whereas 829 were found to have premalignant breast lesions[171]. Early breast cancer screening is a critical and lifesaving service that could save the lives of all women, particularly those at high risk of developing breast cancer[185]. According to the CDC, the majority of breast cancer deaths occur disproportionately among women who do not have a regular source of health care, women who do not have health insurance, and women who moved to the United States.

The goal of implementing the Affordable Care Act was to broaden the focus on health services and enhance access to preventive health care. Despite this, evidence suggests that

many women in the United States do not receive breast cancer screening services due to factors such as geographic isolation, limited health literacy, a lack of provider recommendation, a lack of health insurance coverage, a lack of self-efficacy, and inconvenient times to access services, language barriers, and a low-income level[175]. Breast cancer screening guidelines have been developed in the United States by the American Cancer Society (ACS), the United States Preventive Services Task Force (USPSTF), and the American College of Obstetricians and Gynecologists (ACOG) (ACOG). Their recommendations for starting breast self-examination, clinical breast examination, and mammography differ. The three organizations, however, suggest annual or biennial mammography breast screening in asymptomatic, average-risk women aged 40-49 years to 74 years.

This study followed the American Cancer Society's breast cancer screening recommendations, which state that women aged 40 to 54 should have an annual mammography and women aged 55 and beyond should have a biennial mammogram[176]. The American Cancer Society's breast cancer screening program focuses on detecting breast cancer early and receiving cutting-edge cancer therapy to avoid mortality. The significance of such emphasis stems from the fact that breast cancer that is detected early, when it is small and localized in the breast, is easier to treat successfully. As a result, for women at average and high risk of breast cancer, getting frequent screening services is the most reliable strategy to detect it early[177]. Breast cancer screening aims to discover breast cancer early, when signs such as breast lumps are not even palpable. The prognosis of therapy is more likely to be positive with such breast cancer screening and diagnosis than with recognizing the disease when symptoms are palpable in the breast tissues. ACS, on the other hand, advocates clinical breast inspection and breast self-examination, despite the fact that these are not considered evidence-based methods of early breast cancer detection[178].

2.17 Barriers to Breast Cancer Screening

The actual fear of breast cancer, an incorrect view of breast cancer screening, a lack of physician referral, and the cost of breast cancer screening are all typical reasons why women do not undertake breast self-exams, clinical breast exams, or have breast cancer screenings[179]. Low socioeconomic level, a lack of health insurance, race, and gender have all been related to poorer health status[180]. Religious and cultural beliefs have also been identified as barriers to breast cancer screening in African American women[181]. Nationally, women's breast cancer screening rates continue to rise, but barriers to screening remain for Middle Eastern and Latina women from low socioeconomic backgrounds[182]. Women living in low-income neighborhoods may benefit from health education programs that address breast cancer health disparities and improve understanding of screening methods[183]. Because ethnicity influences diagnostic breast cancer delay, there is a need to promote free programs that provide services for breast cancer detection and treatment to women living in low-income communities[184].

Fears of Breast Cancer

Understandably, women may experience fears or anxiety over the prospect of being diagnosed with breast cancer. However, these are potential dangers that might inhibit a woman from seeking preventive screening. An overwhelming level of anxiety and fear can have extreme ramifications on performing behaviors that promote breast health. Detecting cancer at early stages can be the deciding factor in a woman's survival rate. Many factors influence a woman's fears of breast cancer screening[185]. Women fear being diagnosed after a mammogram or other breast cancer screening test and developing breast cancer for the first time in their life. The fear of dying also has been a known cause of a delay in diagnostic evaluation in African American women[186].

In 2018, a qualitative study was conducted in Chicago among 29 low-income African American women aged 40 that examined breast cancer fear, breast cancer fatalism, and breast cancer screening[198]. About 69% of the participants could define mammography, and 76% of participants understood that having a mammogram could help detect a mass. Additionally, 55% of the participants reported having a mammogram within the last two years. Negative healthcare experiences, fear of the healthcare system, lack of transportation to medical appointments, and the need for childcare if diagnosed with breast cancer were noted concerns and fears among the participants. The women also expressed concerns about body image if the disease required surgery, radiation, or chemotherapy. As fears can paint a negative perception of healthcare in general, clinicians must be culturally sensitive and establish trust with patients to reduce fear toward breast cancer screenings[187].

Misinformation about Breast Cancer Screening

There are numerous myths about breast cancer that still affect how women view it. There are misconceptions about mammography, such as the idea that it causes breast cancer. Medical professionals face additional difficulties as a result of the notion that some races have a higher risk of developing breast cancer than other races[188]. Mammography has a reputation for being painful, which may discourage some women from getting it done. As awareness of breast cancer continues to rise, a number of strategies must be put into place to inform women about appropriate screening procedures that cater to various female demographics. Regarding variations in screening techniques according to geographic location, information is still scarce[189].

The attitudes of American Indian women in Kansas and Missouri toward breast cancer screening were investigated. Following this study, the participants thought that educating people about the specifics of mammograms, such as what to anticipate, the procedure itself,

why mammograms are crucial, and the most recent screening recommendations, would present a more favorable view of breast cancer screening practices. Younger women in the focus group felt there was a lack of exposure to suitable educational materials regarding breast cancer screening. Additionally, the 48 American Indian women aged 25-39 that were interviewed did not think that medical professionals were supplying appropriate information to encourage future screening. Additionally, participants said that native people avoided talking about mammography or breast cancer out of embarrassment and because they thought that, unless there was a family history of breast cancer, getting an annual mammogram was not important. The majority of interviewees reported having personal experience with breast cancer and/or mammography or knowing someone who had breast cancer when asked about screening methods. A BSE had been taught to over 83% of the sample, and a CBE to 85%. However, fewer than half (41.7%) of the participants claimed to have ever discussed breast cancer screening with a doctor.

Breast cancer is viewed differently by women in many ways, both positively and negatively. Women's awareness of breast cancer screening might range from complete ignorance to mastery. Younger women can view breast cancer as a benign condition, making compliance with BSE seem pointless. The rise and fall of breast cancer screening rates may be influenced by public perception of the procedure. Despite the fact that there are many myths about breast cancer held by women, eradicating inequities in breast cancer screening requires education and awareness campaigns. It is clear that a variety of false beliefs regarding the danger of breast cancer continue to affect women's perceptions[191]. For instance, many women claim to be "protected" by things for which there is no proof (such as having a positive attitude and low levels of stress). Similar to this, it is clear that frequent checkups are misunderstood.

Insufficient physical referrals or insurance

Both the individual with the disease and society as a whole incur high financial expenditures as a result of cancer[188]. Even patients with insurance must deal with unforeseen and unanticipated out-of-pocket costs. The age-standardized rate (ASR, per 100,000 people) went from 10,015 to 10,668 between 2006 and 2015, representing a 6.5% increase in the prevalence of cancer in the included nations. The disease burden associated with cancer-related DALYs reduced by 9.3% during the same time frame, from 16,200 to 14,700 DALYs[201]. In the included nations, the anticipated total direct expenses of cancer in 2015 were €58.0 billion, or 4.8% of all healthcare spending demonstrates that Germany (€21.4 billion) had the largest expenditure, followed by France (€13.3 billion), Italy (€9.4 billion), the United Kingdom (€8.1 billion), and Spain (€5.8 billion). Over the years 2006 to 2015, total cancer spending levels barely changed (CAGR of 0.4%) [218]. The entire cost of breast cancer was $16.5 billion, which was broken down into three categories: cancer incidence, healthcare costs, and survival[217]. More than 68,000 lives and 1.73 million life years would be saved annually if all Americans had access to healthcare[192].

One of the greatest expenses associated with illness is cancer treatment, and many Americans are unable to access essential medical care because they do not have health insurance[193]. Nearly 50 million Americans lacked health insurance, and individuals who are uninsured and from minority groups are more likely to be given a late-stage cancer diagnosis[193]. Treatment at this point is more expensive and involved. Poorer outcomes, more expensive medical care, and a greater cancer death rate have all been linked to late stage treatment. Anyone can experience great stress and pressure if they are either uninsured or have only inadequate health coverage. Once diagnosed, breast cancer can have a severe long-term financial effect and cause more women to put off getting medical care[194]. The NBCCEDP is a system that aids in giving women access to timely breast and cervical cancer screening and diagnostic services, as was previously mentioned[195]A person may decide to discontinue cancer therapy

early or decide not to receive it at all in some cases because the costs are so high, which can worsen the outcome[197]. In the battle to end cancer-related pain and mortality, lowering obstacles to cancer care is essential[198].

Learning Level

Understanding health information is greatly influenced by education level[196]. Low educational accomplishment is associated with an increase in cancer fatalities among minority communities, according to studies, says the CDC[199]. Low health literacy has grown to be a significant issue in the medical field. Limited health literacy has been noted as a problem in public health by Healthy People (U.S. Department of Health and Human Services[199]. In order to deal with this expanding issue, national goals and strategies were established[199]. The majority of adults—nine out of ten—find it challenging to use the general health information readily available in their communities, at medical facilities, and in the media[200]. The National Action Plan to Improve Health Literacy was established by the CDC in order to involve everyone in a multifaceted endeavor to develop a health-literate society[200]. Low health literacy patients frequently feel helpless and rely on unreliable health sources that could harm their health. Delivering high-quality, safe, and cost-effective healthcare services depends on having a strong understanding of health literacy, which is a crucial part of a person-centered care approach. Limited health literacy is caused by a variety of individual circumstances, but the best approach to create a health-literate society is to remove obstacles and enhance communication among public health experts, educators, and the media[200].

According to studies, one's likelihood of being aware of and informed about healthcare issues increases with education level[201]. The study led to the creation of the P.O.W. (Protect Our Women) program, which engaged African American communities and collaborated with local leaders to support outreach initiatives for BSE and mammography. By encouraging the

112 volunteers to seek treatment earlier and by offering educational materials on breast cancer, the study also hoped to lower mortality and disparities. Seventy-nine percent of study participants who finished it got mammograms, and nine percent of them had appointments for them within a month of the trial's conclusion[201]. By concentrating on three interest areas—adequacy of culturally appropriate materials, awareness of breast cancer detection, and use of mammograms—the results of this study successfully changed the attitudes and perceptions of 80% of the participants about the necessity of breast cancer detection methods. Participants claimed to be more inclined to get a mammogram and to comprehend the need of breast cancer screening[215]. Breast cancer is a disease that is extremely complex[202]. Health practitioners must connect with patients to learn what information is being sought, as well as how to effectively meet the requirements of women from varied backgrounds and educational levels, in order to develop a feeling of understanding. Medical personnel need to be aware that many patients need additional help. Additionally, when disseminating health information, health professionals should take care to understand each demographic population's literacy level and ensure that it is clearly interpreted. Women will be more likely to participate actively in their treatment plan and take preventive actions if they are informed about breast cancer and screening procedures[204].

Culture

Values, morality, and beliefs can frequently be determined by a person's cultural background. Many societies may not rely on conventional contemporary medicine but rather on spiritual or cosmological sources of healing power instead[208]. Among ethnic groups, there are cultural variations that have constituted obstacles to breast cancer screening[209]. In these situations, medical practitioners should be aware of the patient's culture and make a careful effort to treat them in a non-offensive and trustworthy manner. When compared to other ethnic groups, many African American women could think that one's cancer can be cured via prayer and

faith in God instead of receiving medical attention[210]. A woman's husband must approve a breast cancer screening procedure for his wife in Jordanian society[211]. Latina women think that touching the breasts should only be done for intimate purposes with their significant others186 and shouldn't be done during screening procedures. Latina women might not feel comfortable having male doctors perform breast screening exams on them or performing their own breast self-examinations[212]. Health professionals should find ways to integrate cultural customs with advised health behaviors in order to promote the patient's best possible health, even if it is crucial to respect one's own culture and practices[213].

2.18 Breast Self-Examination (BSE)

Breast self-examination (BSE) is a screening technique used to try and find breast cancer early on. The woman herself must examine and feel each breast to check for any lumps, deformities, or swellings[214].

Large randomized controlled studies indicated that BSE was not beneficial in preventing death and actually caused injury through unnecessary biopsies, surgery, and anxiety. BSE was formerly highly touted as a way to discover cancer at a more curable stage. BSE is discouraged by the World Health Organization and other organizations. Others adopt a neutral attitude and make no recommendations in favor of or against BSE[201].

Ways to Examine Self Breasts

Once a month, this quick process only requires ten minutes of our time. To be able to spot any recent changes, we need become familiar with our breasts' typical appearance and sensations[215].

What to Check during a Breast Exam

(a) Nipple direction: Any shift in a nipple's orientation, such as a turn inwards or at an odd angle.

(b) Bleeding or weeping from the nipples.

(c) Swelling or puckering of the black skin around the nipple (areola).

(d) Lumps: While the majority of lumps are unimportant, your doctor should be consulted if any lumps, whether new or old, grow in size.

(e) Thickened tissue: a sudden alteration in the size or shape of thick tissue, which is frequently present in the upper and lower portions of heavy breasts.

(f) A bump on the breast's exterior.

(g) "Orange peel" skin: Anywhere on the breast, particularly enlarged pores may be a sign that a tumor is obstructing the channels that transmit lymph fluid.

(g) Ample skin.

(h) Swelling: in the armpit, above the breast, or in the upper arm[216].

Time Frame for Breast Checks

The week after their cycle, the young females should inspect their breasts once a month. On the first of each month, a woman's breasts should be examined after menopause, if she is pregnant, or if she is nursing.

Three Simple Steps for Breast Self-Examination

The simple procedures for breast self-examinations are described below along with figures[218].

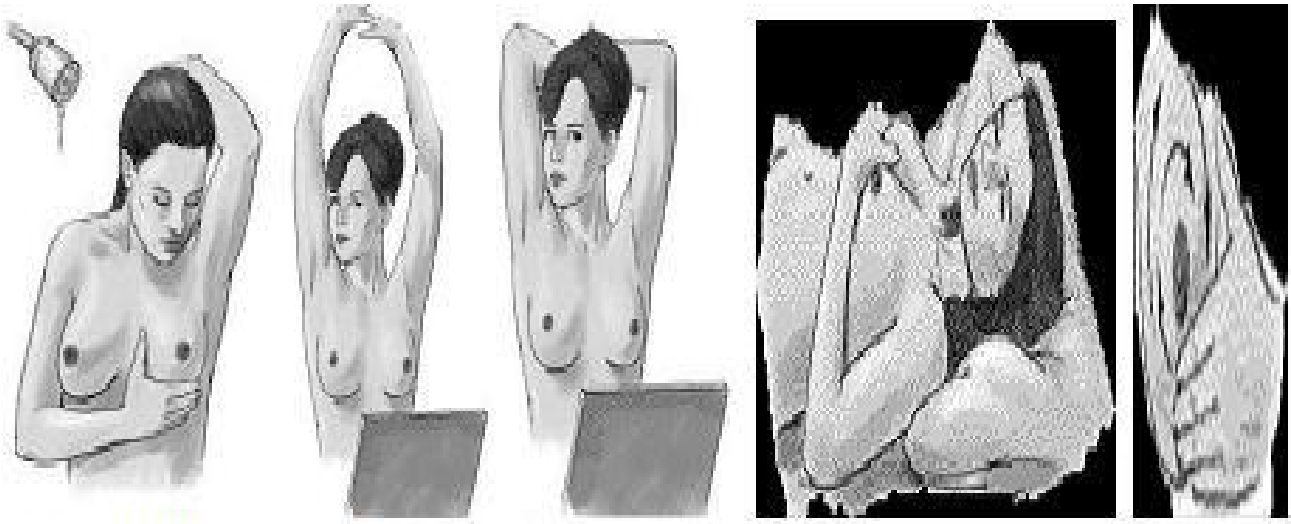
1. In the shower or bath: Fingers glide over moist skin more easily, so gently stroke each breast in a circular motion with the flat of our hand. Look for any thickening, hard knots, or lumps.

2. Hands together in front of a mirror in the shower or bath, the woman should examine her breasts while slowly rotating her upper body from side to side and holding her arms at her sides. Women can use this to assess the form of their breasts.
3. Hands on Head: The female can place her hands on her head and examine her breasts, particularly the underside, for dimples or bulges. Dimples that appear in both breasts and are the same size and form are generally thought to be innocuous. The woman should extend her arms above her head and recheck for any changes, particularly in the nipple area.

Last but not least, women should place their hands on their hips and firmly press down while keeping their shoulders back and their chest muscles extended. The women should look for any physical changes.

You should twist your upper body from side to side throughout each of these four stages. Regular inspection will allow you to determine what is typical for you.

4. When lying down, the female should position her right arm behind her head and arrange a pillow or folded towel behind her right shoulder. She should gently press in little circular motions around a fictitious clock face using the flat of her left palm. Move in a circular circle beginning at the top of the breast at 12 o'clock until you are back at 12. She should then inch closer and repeat. It should take the woman at least four complete revolutions to complete the operation before she reaches the nipple. Repeat these steps with the cushion under the left shoulder and the left arm behind the head of the woman. Last but not least, lightly pinch each nipple with your thumb and index finger. Any secretion should be examined by your doctor, especially if it originates from a single pore.



Cleveland Clinic, 2021.

2.19 Knowledge, Attitude and Practice of Breast Cancer Screening

Two of the most important variables that lower the risk of the disease and improve the effectiveness of treatment and survival prospects are knowledge about metastatic breast cancer and routine examinations[219].

George T (2019), study found that although there is widespread knowledge of breast cancer, few women are familiar with mammography. Breast cancer screening is not recommended for older women with secondary education who are full-time housewives or self-employed outside the home[210].

According to a study on female teachers in Lagos, the vast majority of participants had solid understanding of breast cancer. BSE was the most popular method of detecting breast cancer, followed by CBE and mammography. Health education/awareness efforts are advised to maintain the current understanding and breast cancer screening practices[221]. Nearly 60% of the participants in Liese's study, which was carried out in Southwest Nigeria, agreed that breast cancer always had a fatal outcome. Around 10% of individuals thought breast cancer

was brought on by a spiritual attack, and more than 40% of people thought storing money in the bra causes breast cancer[222]. He came to the additional conclusion that community providers lack adequate knowledge of breast cancer.

Nigeria has the lowest breast cancer awareness rate in Africa, according to research on the subject[223]. According to the survey, 2 in 3 women were unaware of the possibility of a breast cancer cure, and 1 in 4 women were unaware of the disease's existence. The author hypothesized that lesser BC awareness was related to poorer educational attainment, unskilled occupation, low socioeconomic position, rural domicile, older age, being single, and in some environments, HIV positivity[223].

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Chapter Three

Methodology

3.1 Research Design

A facility-based cross-sectional was used to assess the level of knowledge, attitude, and barriers to breast cancer screening among women attending pathology laboratories in Ibadan North Local government area, Oyo state.

3.2 Population of the Study

The participants of this study constitute women attending both private and public pathology laboratories in Ibadan North Local government area, Oyo state.

3.3 Sample Size Determination

12% awareness level of cancer screening in Nigeria was adopted for the interest of this study[248].

Z= 1.96

P =12%

e = 0.05

Sample size = $\frac{Z^2 \times P (1 - P)}{e^2}$

$= \frac{1.96^2 \times 0.12 (1 - 0.12)}{0.05^2} = \frac{3.8416 \times 0.12 \times 0.88}{0.0025} = 162$

Sample size = 162 + 10% non-respondents

= 176

3.4 Sampling Procedure

Cluster sampling was used to recruit the participants of the study using a multistage sampling procedure.

Stage 1. Selected all pathology laboratories in Ibadan North LGA.

Stage 2. Stratified the pathology laboratories into public and private.

Stage 3. Selected one public and two private pathology laboratories within Ibadan North LGA. A purposive sampling technique was used for this study due to the limited number of study participants.

3.5 Description of Data Collection Instrument

The questionnaire was constructed by combining previously published studies related to this research.[224, 225,226,227.] The questionnaire contained four sections.

Section A: Information on the demographical characteristics of the respondents.

Section B - Assessment of the general knowledge of respondents regarding breast cancer and breast cancer screening.

Section C - Assessment of the respondent's attitude toward breast cancer screening and self-examination.

Section D - Assessment of breast cancer screening practices.

Section E - Assessment of the barriers towards breast cancer screening.

3.6 Data Collection

Data was collected using self-administered questionnaire constructed by combining previously published studies. Data was collected on socio-demographic characteristics of the respondents, knowledge, attitude, screening practices and barriers to breast cancer screening. Except for the section on socio-demographic characteristics, most of the questions were designed to elicit "yes", "no" or "don't know" answers.

Participants were recruited by the researcher and two research assistants who had a one day training session prior to commencement of the study on the concept of the research and how to administer the questionnaire. Data was collected in September 2022 within a two week period (7th to 21st of September 2022). During the period of this study, an average of 30 women visited the pathology laboratories per day. The purpose of the study was introduced orally to the participants and informed signed consent obtained, before administering the questionnaire. Written permission to use the selected pathology laboratory facilities for this study was also obtained.

3.7 Data Analysis

All data collected were cleaned and entered into the statistical package for social sciences (SPSS) version 23.0. Data were analyzed using a simple frequency and results were presented using tables and charts. A Chi-square test was used to test the association between knowledge and barriers to breast cancer screening among women.

3.8 Ethical Approval

Ethical approval for this study was sought from Lead City University Research and Ethics Committee and the Oyo state ministry of health research and ethical committee. Informed consent was also administered to the respondents of this study, clearly stating that all participation is voluntary with the right to accept, reject or withdraw from the study at any time. Strict confidentiality of all information obtained from the respondents was maintained throughout the study.

Endnotes

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Chapter Four

Results and Discussion of Findings

4.1 Socio-demographic Data Analysis of the Respondents

Table 1 shows the demographic profile of the respondents. A total of 176 females in the age group less than 20 and above 60 years participated in the study. Sixty-two (35.2%) of them were students, nine (5.1%) were housewives, thirty-three (18.8%) were business women and seventy-two (40.9%) were working women. Most of the respondents were married one hundred and two (58.0%) followed by sixty-seven (38.1%) that are singles. Fsurthermore, the majority of the respondents were Christians one hundred and thirty-four (76.1%). From their profile in table 1, most of the respondents one hundred and twenty-one (68.8%) were educated as they had tertiary education.

Table 4.1 showing Socio-demographic Data Analysis of the Respondents

Characteristics	**Frequency (%)**
Age groups (yr.)	
<20	39(22.2)
20_39	95(54.0)
40_59	34(19.3)
>60	8(4.5)s
Marital Status	
Single	67(38.1)
Married	102(58.0)
Divorced	2(1.1)
Widowed	3(1.7)
Separated	2(1.1)
Education	
No_Formal_Education	5(2.8)
Primary	4(2.3)
Secondary	38(21.6)

Tertiary	121(68.8)
Others	8(4.5)
Occupation	
Working Woman	72(40.9)
Business Woman	33(18.8)
Housewife	9(5.1)
Student	62(35.2)
Religion	
Christianity	134(76.1)
Islam	39(22.2)
Traditional	3(1.7)

4.2 Assessment of the General Knowledge of Respondents Regarding Breast Cancer and Breast Cancer Screening

About one hundred and sixty-two (92%) of the participants responded 'Yes' to have heard of breast cancer. Though one hundred and one (57.4%) participants commented that they do not know the cause of breast cancer. 91 (51.7%) responded that breast cancer occurs commonly in older people. Furthermore, in assessing the participant's knowledge of breast cancer screening, the most of the participants think breast cancer can be inherited 89(50.6%), breast cancer is curable when detected early 142(80.7%) and breast cancer is preventable 137(77.8%). About half of the respondents 86(48.9%) believe that traditional healers can treat breast cancer and more than half 98(55.7%) also believed that personal hygiene decreases breast cancer risk. Also, majority of the participants 129(73.3%) were of the opinion that breast cancer is a spiritual problem.

Table 4.2 Showing Knowledge of respondents regarding breast cancer and breast cancer screening

Knowledge	No N (%)	Yes N (%)
Have you ever heard of breast cancer?	14(8.0)	162(92.0)
Do you know what cause breast cancer?	101(57.4)	75(42.6)
Do you think breast cancer occur commonly in older women?	85(48.3)	91(51.7)
Do you think breast cancer can be inherited?	87(49.4)	89(50.6)
Do you know think breast cancer is curable when detected early?	34(19.3)	142(80.7)
Do you think breast cancer is preventable?	39(22.2)	137(77.8)

If you notice a change in your breast would you contact a health care professional first?	18(10.2)	158(89.8)
Can a traditional healer treat breast cancer?	90(51.1)	86(48.9)
Any woman is at risk of breast cancer?	41(23.3)	135(76.7)
Personal hygiene decreases breast cancer risk	78(44.3)	98(55.7)
Breast cancer is a spiritual problem	129(73.3)	47(26.7)

The knowledge score achieved in this study is very high; the mean score range of the respondent's knowledge is 8.14. The total score was categorized as poor knowledge (score of 0–3), fair knowledge (score of 4–7), and good knowledge (score of 8–11). Overall assessment of their knowledge revealed the majority of the respondents 126(72%) have good knowledge, 39(22%) have fair knowledge and 11(6%) have poor knowledge (Table 4.2).

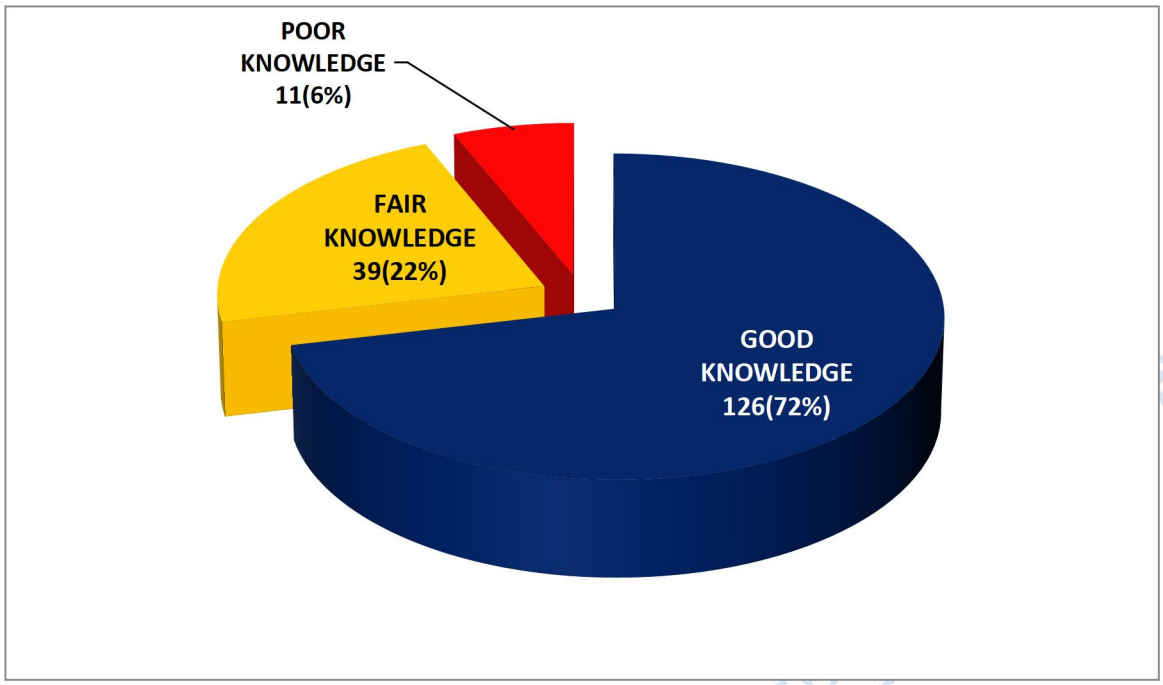

Figure 4.1: Overall Knowledge Level

Field, 2022

To assess the knowledge of the respondents on breast cancer screening, the result shows that the majority of the respondents one hundred and twenty-four (70%) have heard of breast cancer screening (Table 4.2).

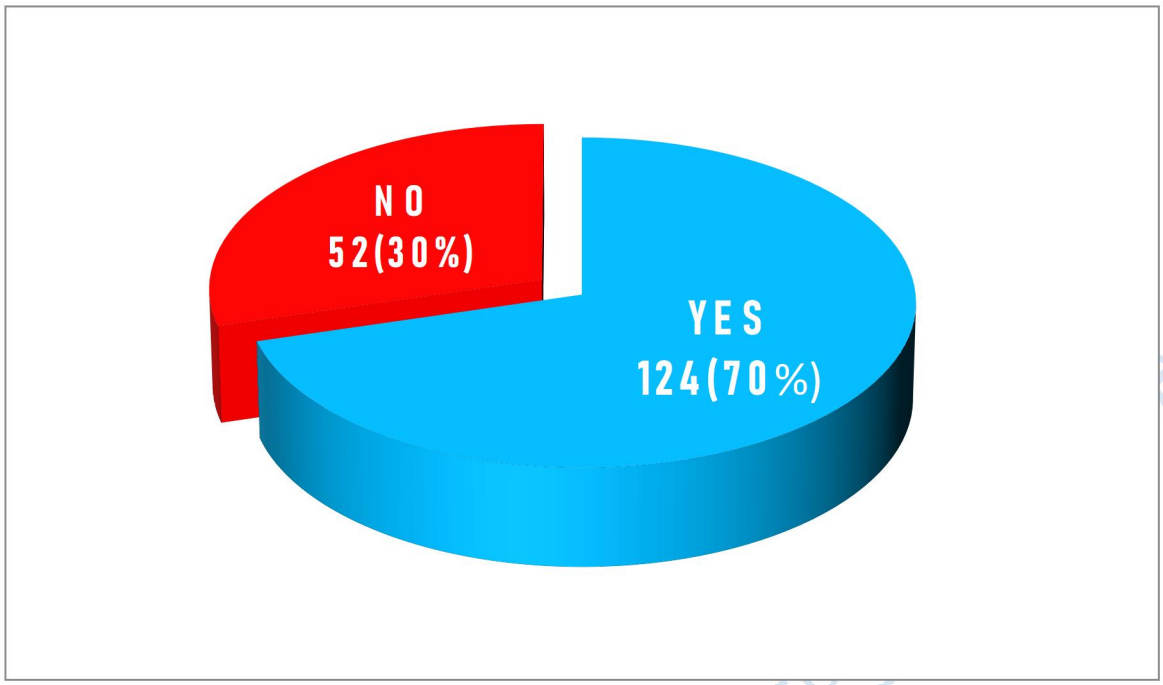

Figure 4.2: Awareness of Breast Cancer Screening

Field, 2022

4.3 Assessment on the General Practises of Respondents Regarding Breast Cancer Screening

Table 4.3 showed that most of the respondents 119(67.6%) can perform breast self-examination and confident in knowing what to look for in breast self-examination. Though, majority of them one hundred and fifty two (86.4%) have never been screened using

mammogram or ultrasound whereas twenty four (13.6%) of them have been screened with mammogram or ultrasound.

Table 4.3: Showing Respondents Practises Regarding Breast Cancer Screening

Practices	**No**	**Yes**
	N (%)	**N (%)**
Do you know how to perform breast self-examination?	57(32.4)	119(67.6)
Are you confident of knowing what to look for in breast self-examination?	57(32.4)	119(67.6)
Have you ever screened your breast for cancer using mammogram, or ultrasound?	152(86.4)	24(13.6)

Figure 4.3 showed that two third of the respondents 117(66%) had practiced breast self-examination with only sixty two (53%) out of 117 respondents who practiced breast self-examination frequently practiced breast self-examination while the remaining fifty-five (47%) seldom examine their breast (figure 4.4).

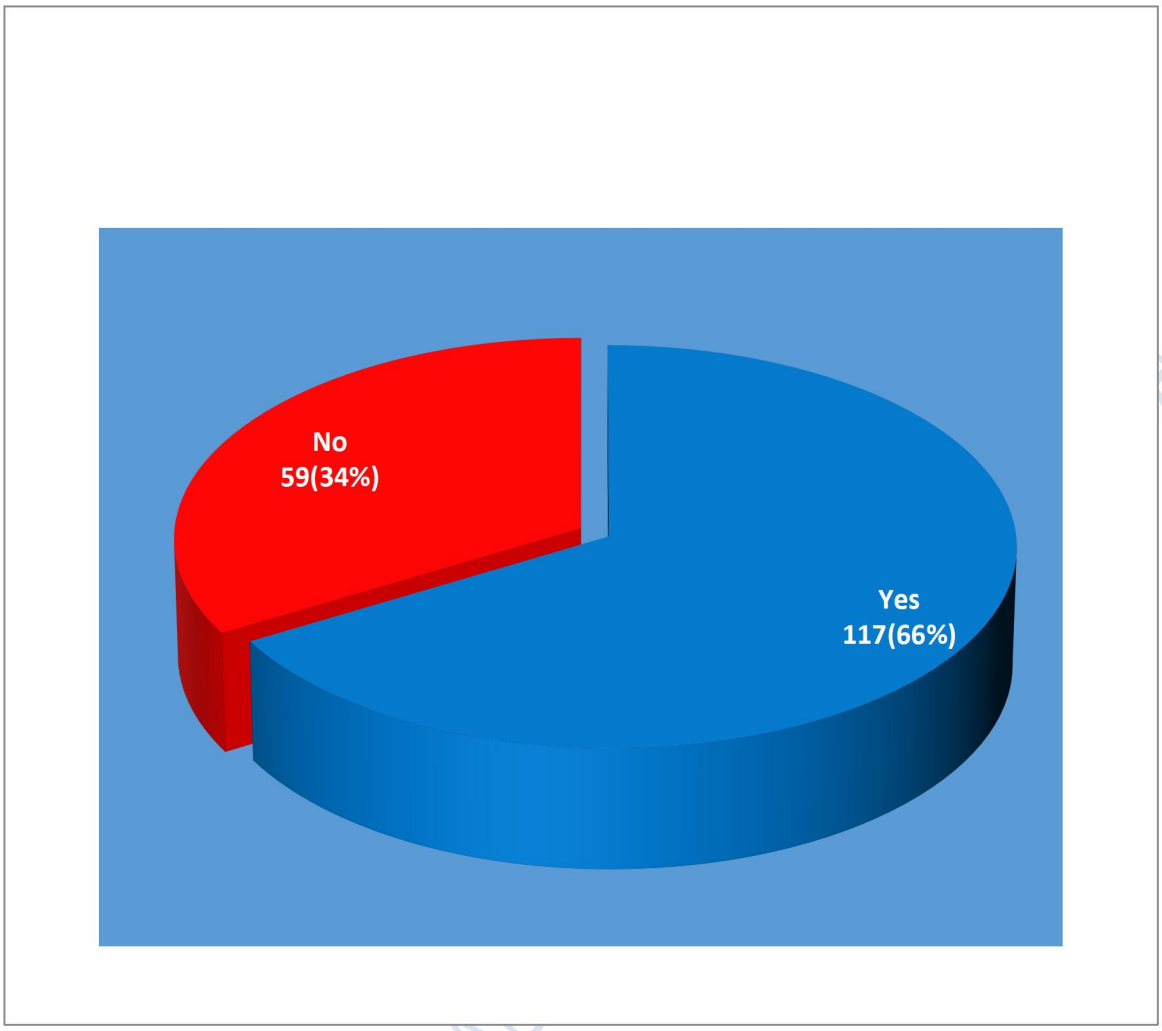

Figure 4.3: Respondents who had Practiced Breast Self-Examination

Field, 2022

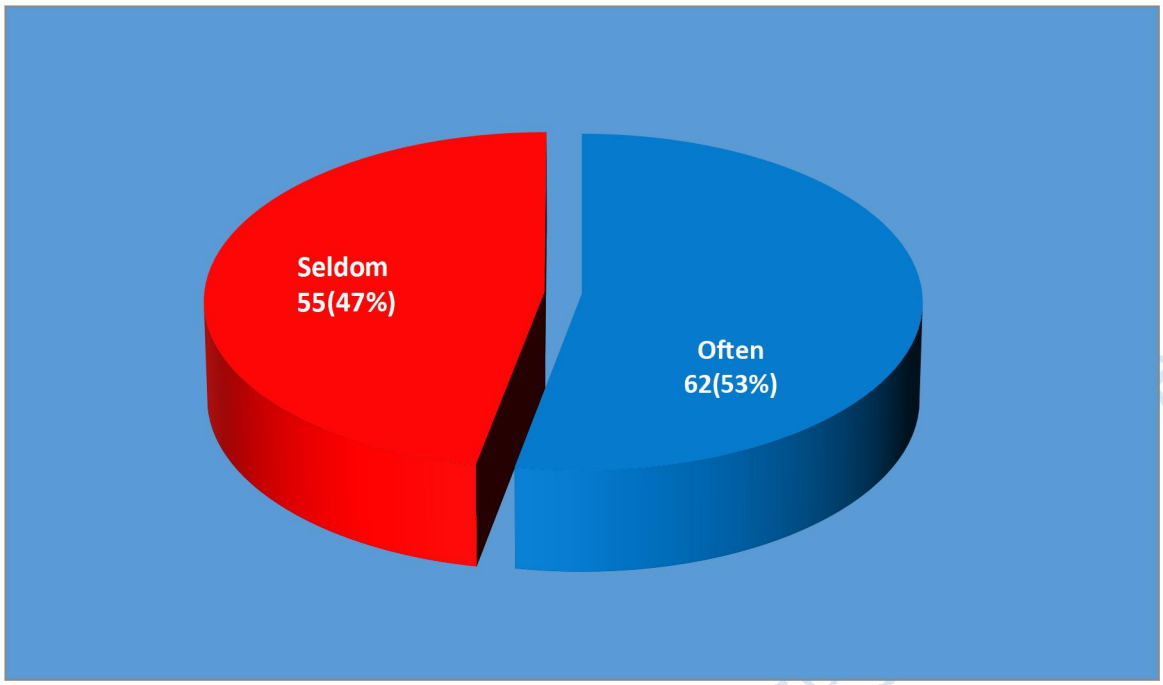

Figure 4.4: Frequency of the breast self-examination

Field, 2022

In addition, figure 4.5 explained that only few 23(13.1%) of respondents found abnormality in their breast while conducting breast self-examination and figure 4.6, showed that all the respondents who found abnormality in their breast reported to a health care professional immediately.

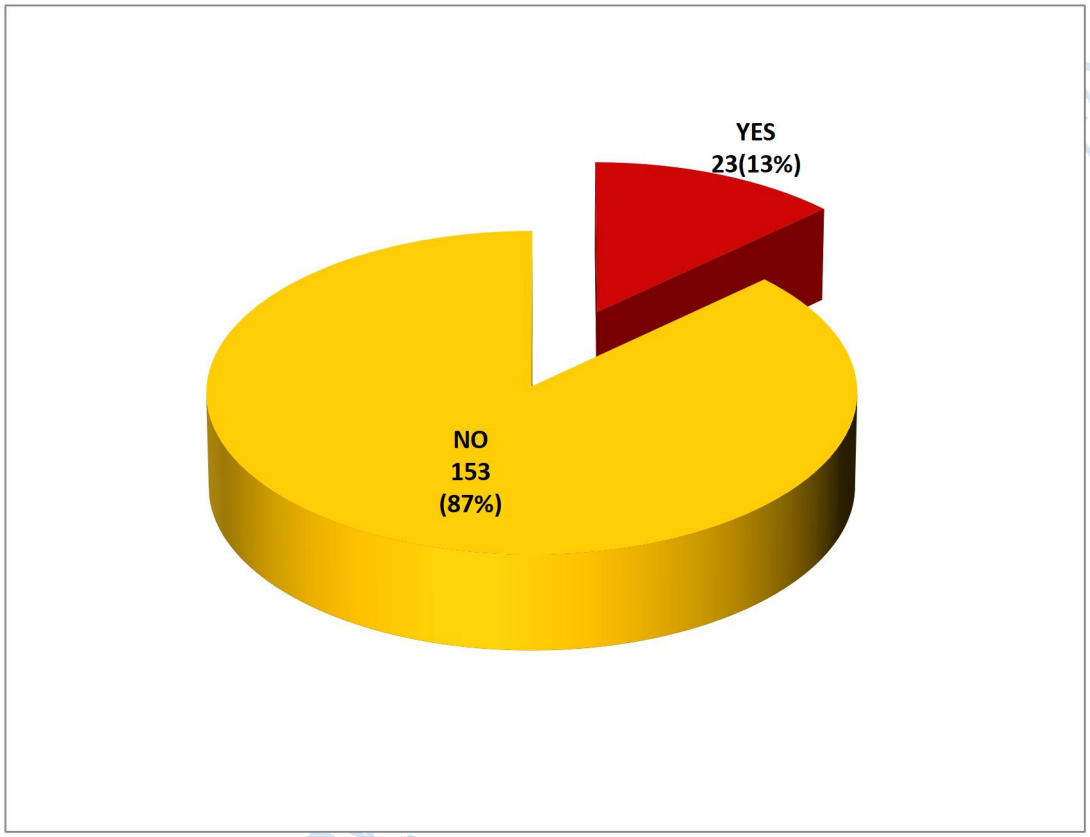

Figure 4.5: Presence of Abnormalities during Self Examination

Field, 2022

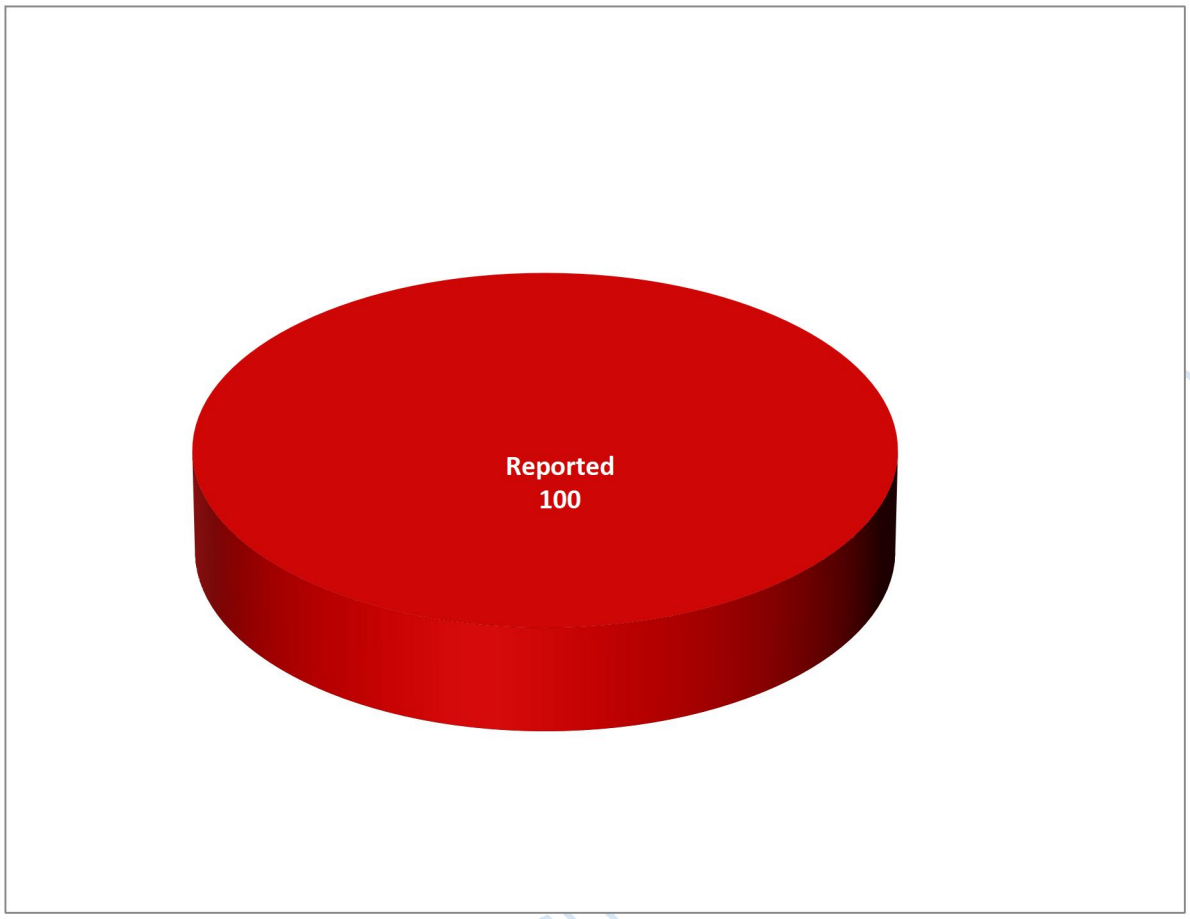

Figure 4.6: Those that reported to a health care professional immediately

Field, 2022

The practice score achieved in this study is very low. Overall assessment of their practice revealed the majority of the respondents 94(53%) have a fair practice score while one third 58(33%) have poorly practice breast self-examination and few of the respondents have a good breast self-examination practice (figure 4.7).

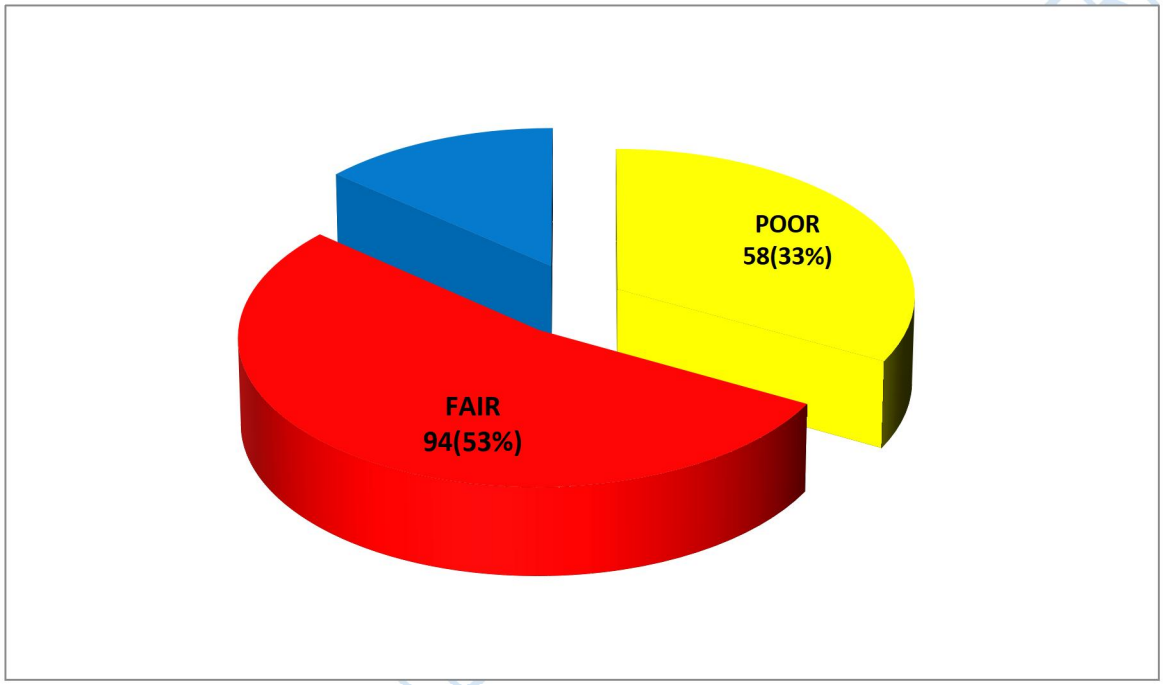

Figure 4.7: Overall BSE Practices

Field, 2022

4.4 Assessment on the Respondent's Attitude toward Breast Cancer Screening And Self-Examination.

In assessing respondent's attitude towards breast cancer screening and self-examination, majority of the participants one hundred and fifty-two (86.4%) responded "No" to the question if there were no reason to examine their breast. Furthermore, their attitude were also assessed as many of them 134(76.1%) were of the opinion that there is no need for periodic breast examination if there are no problem with the breast. Furthermore, from the result in table 4 and 5, it was perceived that their attitude towards the screening are related to being gender sensitive as majority of the participants 127(72.2%) reported to prefer female doctor for breast examination with p value <0.05, in addition, another significant reasons perceived for their attitude towards breast cancer screening is that seventy eight (44.3%) are of the opinion that early detection method have no effect on treatment (p value <0.05).

Table 4.4 Showing Respondent's Attitude toward Breast Cancer Screening and Self-Examination.

Attitudes	No N (%)	Yes N (%)
There is no reason to examine my breast	152(86.4)	24(13.6)
If there is no problem in the breast, periodic breast examination is not required	134(76.1)	42(23.9)
If I knew how to conduct breast self-examination and its benefits, I would have done it by now	63(35.8)	113(64.2)
Women prefer female doctor for breast examination	49(27.8)	127(72.2)
Early detection method have no effect on treatment	98(55.7)	78(44.3)

Table 4.5: Respondent's Perception on Screening and Its Effect on Their Attitude towards Breast Cancer Screening

Variables	Poor N (%)	Good N (%)	P value
Early detection method have no effect on treatment			
Yes	59(33.5%)	19(10.8%)	0.000
No	42(23.9%)	56(31.8%)	
Women prefer female doctor for breast examination			
Yes	45(25.6%)	4 (2.3%)	0.000
No	56(31.8%)	71(40.3%)	

Overall assessment of their attitude revealed the more than half of the respondents 101(57%) have a negative attitude towards breast screening while 75(43%) have positive attitude towards breast self-examination (figure 4.8).

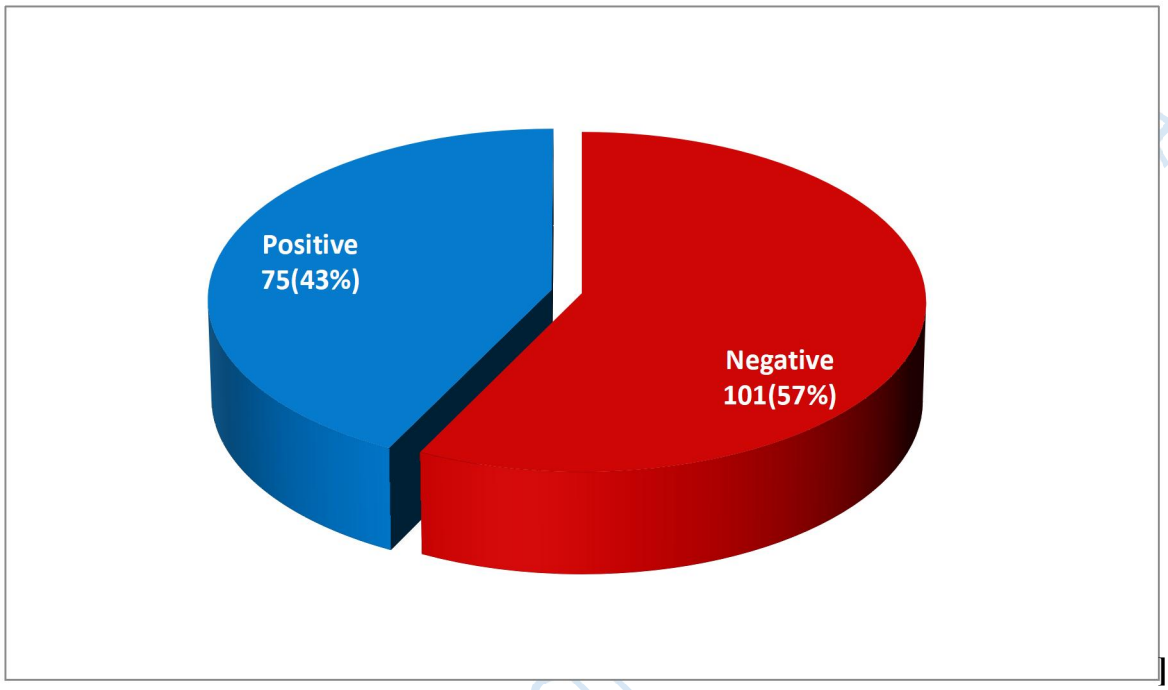

Figure 4.8: Overall Attitude to BSE

Field, 2022

4.5 Assessment on the Barriers towards Breast Cancer Screening

Figure 7, showed different barriers that might affect the breast cancer screening. 60 (34.1%) of the respondents reported "Yes" as it is unacceptable to touch their body, also 69(39.2%) reported that they are worried about what doctor might find, one third 59(33.5%) of the respondents also feel shy to uncover their breast. More so, 68(38.6%) also feel it is embarrassing to tell people about it, along with the stigma following the diagnosis of cancer. Only few had busy schedule as the barrier to the screening and almost half of the respondents reported that the awareness programs are deficient.

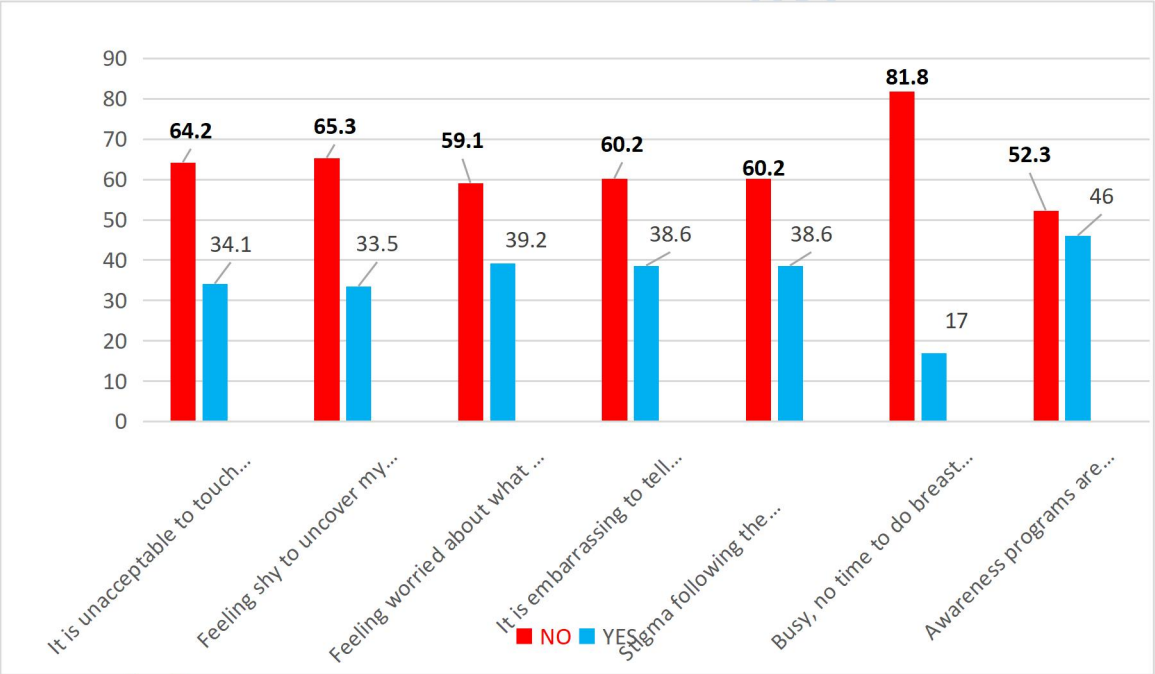

Figure 4.9: Barriers towards Breast Cancer Screening

Field, 2022

4.6 Association between Socio-Demographics and the Overall Knowledge

Among the respondents, 27(15.3%) of the participants aged <20 years had good knowledge, compared to 71(40.3%) aged 20 to 39 years (Chi-square = 10.928 p-value = 0.091). In addition, 76(43.2%) single had good knowledge compared with the divorced, widowed and separated 2(1.1%) (Chi-square=11.071 p-value= 0.198). In the same vein, 95(54.0%) respondents with tertiary education had good knowledge compared with 2(1.1%) respondents with no formal education (chi-square=30.716 p-value=0.000).

Furthermore, more than half respondents that are working women 54(30.7%) had good knowledge compared with 4(2.3%) of housewife (chi-square=16.935 p-value= 0.010). Majority of the Christian respondents 99(56.3) had good knowledge compared to other (chi-square=6.240 p-value=0.182).

4.6 Association between Socio-Demographics and the Overall Knowledge

Variables	Level of knowledge			Chi-square	p-value
	Poor Frequency (%)	Fair Frequency (%)	Good Frequency (%)		
Age					
<20	2(1.1%)	10(5.7%)	27(15.3%)		
20_39	5(2.8%)	19(10.8%)	71(40.3%)	10.928	0.091
40_59	3(1.7%)	5(2.8%)	26(14.8%)		
>60	1(0.6%)	5(2.8%)	2(1.1%)		
Marital Status					
Single	2(1.1%)	24(13.6%)	76(43.2%)		
Married	9(5.1%)	14(8.0%)	44(25.0%)		
Divorced	0(0.0%)	0(0.0%)	2(1.1%)		
Widowed	0(0.0%)	1(0.6%)	2(1.1%)	11.071	0.198
Separated	0(0.0%)	0(0.0%)	2(1.1%)		
Education					
No_Formal_Education	0(0.0%)	3(1.7%)	2(1.1%)		
Primary	2(1.1%)	1(0.6%)	1(0.6%)		
Secondary	6(3.4%)	8(4.5%)	24(13.6%)	30.716	0.000
Tertiary	2(1.1%)	24(13.6%)	95(54.0%)		
Others	1(0.6%)	3(1.7%)	4(2.3%)		
Occupation					
Working Woman	3(1.7%)	15(8.5%)	54(30.7%)		
Business Woman	6(3.4%)	3(1.7%)	24(13.6%)	16.935	
Housewife	1(0.6%)	4(2.3%)	4(2.3%)		0.010
Student	1(0.6%)	17(9.7%)	44(25.0%)		
Religion					
Christianity	6(3.4%)	29(16.5%)	99(56.3)		
Islam	4(2.3%)	9(5.1%)	26(14.8)	6.240	0.182
Traditional	1(0.6%)	1(0.6%)	1(0.6%)		

4.7 Association between Socio-Demographics and the Overall Practice

Among the respondents, 13(7.4%) of the participants aged 30-39 years had good knowledge, compared to respondents aged 60 years above in which none of them have good knowledge (Chi-square = 16.107 p-value = 0.13. Furthermore, 19(10.8%) respondents who had tertiary education had good knowledge compared with zero respondents with no formal education (chi-square=22.031p-value=0.005).

In addition, 16(9.1%) respondents that are working women had good knowledge compared with housewife and business women 2(1.1%) (Chi-square=13.958 p-value= 0.03).

Table 4.7 Association between Socio-Demographics and the Overall Practice

Variables	Level of Practice			Chi-square	p-value
	Poor Frequency (%)	Fair Frequency (%)	Good Frequency (%)		
Age					
<20	19(10.8%)	18(10.2%)	2(1.1%)		
20_39	28(15.9%)	54(30.7%)	13(7.4%)		
40_59	6(3.4%)	19(10.8%)	9(5.1%)		
>60	5(2.8%)	3(1.7%)	0(0.0%)	16.107	0.13
Marital Status					
Single	28(15.9%)	63(35.8%)	11(6.3%)		
Married	29(16.5%)	29(16.5%)	9(5.1%)		
Divorced	0(0.0%)	0(0.0%)	2(1.1%)		0.000
Widowed	1(0.6%)	0(0.0%)	2(1.1%)		
Separated	0(0.0%)	2(1.1%)	0(0.0%)	28.537	
Education					
No_Formal_Education	5(2.8%)	0(0.0%)	0(0.0%)		
Primary	2(1.1%)	2(1.1%)	0(0.0%)		
Secondary	1810.2%)	17(9.7%)	3(1.7%)		
Tertiary	29(16.5%)	73(41.5%)	19(10.8%)	22.031	0.005
Others	4(2.3%)	2(1.1%)	2(1.1%)		
Occupation					
Working Woman	20(11.4%)	36(20.5%)	16(9.1%)		
Business Woman	14(8.0%)	17(9.7%)	2(1.1%)	13.958	0.030
Housewife	5(2.8%)	2(1.1%)	2(1.1%)		
Student	19(10.8%)	39(22.2%)	4(2.3%)		
Religion					
Christianity	41(23.3%)	78(44.3%)	15(8.5%)		0.183
Islam	16(9.1%)	15(8.5%)	8(4.5%)		
Traditional	1(0.6%)	1(0.6%)	1(0.6%)	6.225	

4.8 Association between Knowledge, Attitudes and Practices

The results indicated that better knowledge was correlated significantly with better practices (r=0.369; p<0.05). Better practices were not correlated with positive attitudes (r=-0.097; >0.05). Overall knowledge was similarly not found to be correlated to positive attitude (r=0.097; p-value>0.05)

Table 4.8: Association between Knowledge, Attitudes and Practices

	Overall knowledge		Overall attitude		Overall practice	
	R-coefficient	P-value	R-coefficient	P-value	R-coefficient	P-value
Overall knowledge	-	-	0.097	0.201	0.369	0.000
Overall attitude	-0.097	0.201	-		-0.097	0.202
Overall practice	0.369	0.000	-0.097	0.202	-	

4.9 Association between Barrier and Practices Of Breast Cancer Screening

The results indicated that unacceptable touch of the respondent's body significantly correlated to better practice (r= 0.177, p-value=<0.05). Also, better practice was significantly correlated with the feeling shy to uncover breast by respondents (r=-0.182, p-value=<0.05). The embarrassment to tell people about the result was similarly found to be correlated to their practice of breast cancer screening (r=0.253; p-value=<0.05). In contrast, the other barriers were not significant.

Table 4.9: **Association between Barrier and Practices of Breast Cancer Screening**

Barriers	Overall Practice	
	R-coefficient	P-value
It is unacceptable to touch my body	-0.177	0.020
Feeling shy to uncover my breast	-0.182	0.016
Feeling worried about what a doctor might find	0.032	0.678
It is embarrassing to tell people about the result	-0.253	0.001
Stigma following the diagnosis of cancer	0.011	0.890
Busy, no time to do breast cancer screening	-0.007	0.925
Awareness programs are deficient	-0.055	0.474

4.10 Discussion of Findings

Findings of this study shows that 162 (72%) of the respondents have good knowledge of breast cancer, this is similar to a study conducted in Benin city Nigeria by Azubuike and Okwuokei which reported that 90.5% of the respondents knows about breast cancer[228] and another study conducted in Ogun state Nigeria by George et al which reported that 92% of the women had good knowledge about breast cancer[229]. Also Halmata et al, in a similar study conducted in the littoral region in Cameroon[230] reported that 96.3% were aware of breast cancer. Findings of this study is in contrast to a study conducted by Lui et al among women in Northern and Eastern china, which reported that 80.0% had poor knowledge of breast cancer[231].

In addition, this study showed that 70% of the respondents were aware of breast cancer screening and 66% had ever conducted Breast self-examination. This is in contrast with a study conducted among women in Ogbomoso South Local Government Area, Oyo State by Idowu et al, which reported that 36.7% had heard of breast cancer screening and 31.6% had performed breast self-examination[232]. This discrepancy may be due to the fact that the Ogbomoso study was community-based and only 29.5% had attained tertiary education, majority were less educated and having less access to health-related information which influences positive decision making.

This study also found that 53% of the respondents undergo routine screening for breast cancer, this finding is comparable to that of Awodele who conducted a study among nurses at Lagos state University teaching Hospital, Lagos Nigeria which found that 82% of the respondents routinely screen for breast cancer[233]. This is in contrast to a study conducted by Akpinar et al in Turkey among female healthcare professionals, where fewer participants 27.3% reported doing routine screenings[234].

This study showed that the overall screening practices was fair (53%) which is consistent with a previous study conducted by Abiola et al among female teachers in an urban Local Government Area in Lagos Nigeria[235] which reported 79.52%. This is in contrast with a study conducted by Dibisa et al among women in Ethiopia[236] which reported a very low overall screening practice (6.9%) and another Study conducted in Indonesia by Solikhah et al which reported (18.74%) [237.]

Among all our respondents, 57% of the participants in our study had a negative attitude toward breast cancer screening, this is in contrast with a previous study conducted by George et al among women in Ogun state Nigeria which reported that majority of the women that are familiar with mammography (90.2%) had favorable attitude towards breast cancer screening[229.] Another study conducted by Chaka et al in Ethiopia reported that majority of the women had negative attitude towards breast cancer screening (67.4%) [238]. Sharma conducted a similar study in Haryana India that evaluated women's attitudes regarding breast cancer screening, and the results revealed that 55% of the women had a favorable attitude toward breast cancer[239].

Breast cancer screening for Nigerian women was shown to be hindered by embarrassment, discomfort, modesty, and fear of detection[240]. This current study identifies a number of barriers that prevent responders from screening for breast cancer. The majority of the female participants in our study (60.2%) expressed a negative perception of the stigma associated with their diagnosis; this is comparable to the barrier identified in a study by Olasehinde in 2019[240].

A study conducted in Nigeria on Evaluating Current Practices, Perceptions, and Possible Barriers[240] also revealed that most respondents felt it was undesirable to touch their body

because the breast is a private portion of the body and because of other societal and religious issues this is similar to our result 64.2% of our respondents have such feeling

Endnotes

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Chapter Five

Conclusion

5.1 Summary of Findings

The overall findings of the study show that 162(72%) of the respondents had good knowledge of breast cancer. It also shows that more than half of the respondents 101(57%) have a negative attitude toward breast cancer screening. It also revealed that 94(53%) of the respondents have fair breast cancer practices and the Chis square test shows that "unacceptable to touch my body, feeling shy to uncover my breast, and it is embarrassing to tell people about are the barriers associated to breast cancer screening

5.2 Conclusion

This study shows that the respondents have good knowledge and people with more information approached breast cancer screening with a more positive attitude than people with less knowledge because they are aware of the necessity for breast cancer screening, they are more inclined to perform breast self-examination because they are aware that breast cancer can be treated if found in its earliest stage. More than half of the respondents had a negative attitude toward breast cancer screening and more than half of the respondents had fair breast cancer screening practices.

5.3 Recommendations

The recommendations include;

1. As breast cancer is the commonest cancer in Nigeria, more resources should be devoted to registration (Breast cancer registration) and documentation in cancer registries around the country so that the full incidence and prevalence can be determined.

2. Nigeria should have a breast cancer screening program that involves intensive training of all health workers at all levels on clinical breast examination.
3. Women should be trained/informed utilizing educational leaflets, posters, and fliers at every encounter with health care services (where time and recipient attention span are constraints) on breast cancer screening practices since knowledge not deficient. Emphasis should be on breast self-examination since one of the major barriers seen in this study is related to women not feeling good about someone else touching their breasts. The benefits of breast self-examination which is early detection and the cost of not practicing self-examination should also be emphasized. This should be done in English and basic local languages.
4. Adequate support of breast cancer research especially with regard to understanding its development and pathogenesis.

5.4 Contributions to Knowledge

The findings of this study have contributed to finding out the following:

1. This study assessed the knowledge level of the respondents on breast cancer screening is good.
2. The study showed that the respondent's attitude toward breast cancer screening is negative.
3. The study showed that their screening practices are fair
4. The respondent's barriers to breast cancer screening include "unacceptable to touch my body by myself, feeling shy to uncover my breast, and it is embarrassing to tell people about".

5.5 Suggested Areas for Further Research

1. A mixed study method of qualitative and quantitative should be adopted to access the knowledge attitude and barriers to screening among women visiting pathology laboratories in Ibadan north local government area, Ibadan, Oyo state.
2. For of generality, wider research covering southwest should be carried out.

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TELEGRAMS.....

TELEPHONE.....

MINISTRY OF HEALTH

DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION

PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No. .....

All communications should be addressed to the Honorable Commissioner quoting

Our Ref. No. AD 13/479/ 4456A

2nd September, 2022

The Principal Investigator,
Department of Public Health,
Faculty of Public Health,
Lead City University,
Ibadan, Nigeria.

Attention: Lebari Pleasant

ETHICS APPROVAL FOR THE IMPLEMENTATION
OF YOUR RESEARCH PROPOSAL IN OYO STATE

This is to acknowledge that your Research Proposal titled: "Assessment of Knowledge, Attitude and Barriers to Breast Cancer Screening among Women Visiting Pathology Laboratories in Ibadan North Local Government Area, Oyo State." has been reviewed by the Oyo State Ethics Review Committee.

2. The committee has noted your compliance. In the light of this, I am pleased to convey to you the full approval by the committee for the implementation of the Research Proposal in Oyo State, Nigeria.

3. Please note that the National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations, in line with this, the Committee will monitor closely and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of findings as this will help in policy making in the health sector.

Wishing you all the best.

OYO STATE HEALTH ETHICAL REVIEW COMMITTEE

Signature & Date

Dr. Abbas Gholahan
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethics Review Committee

Lead City University

Faculty of Public Health

Motto: Redefining Health

Ref: LCU/FPH/EXT/302 **Wednesday, August 17, 2022**

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

LETTER OF INTRODUCTION

I wish to inform you that the bearer is currently a Postgraduate student in the Faculty of Public Health, Lead City University, Ibadan.

The bearer is obliged to conduct research as one of the requirements for the award of a degree of Master in Public Health. In this regard, kindly accord any relevant information and assistance.

Thank you, and I look forward to your favorable support.

Best regards,

Dr. F. T. Akinsolu,
Head, Department of Public Health,
Lead City University, Ibadan.
Email: akinsolu.folahanmi@lcu.edu.ng
Contact Number: +2347033171050

Lagos-Ibadan Expressway, Toll Gate Area.
P.O. Box 30678, Secretariat, Ibadan Oyo State Nigeria.
publichealth@lcu.edu.ng
Tel: 02-7510682

Informed Consent Form

My name is Lebari Pleasant Mene. I am a postgraduate student of the department of Public Health in Lead City University, Ibadan Oyo state conducting research on **Assessment of Knowledge, attitude and barriers to breast cancer screening among women visiting pathology laboratories in Ibadan North Local Government area, Oyo State.**

I will need to ask you some questions. Please note that your answers will be kept very confidential. Your name will not be written on the form. The information you and other people give will be used by the Government to help find a solution to the problem of breast cancer and reduce its mortality and morbidity.

During this exercise, you will be given a questionnaire. Your honest answer to the questions will help to better understand what people think, their attitudes and barriers to breast cancer screening.

You are free to refuse to take part in this study. You have the right to withdraw at any given time if you choose to. I will greatly appreciate your help in responding to the survey and taking part in the study.

Consent: Now that the study has been well explained to me and I fully understand the content of the process, I will am willing to take part in the study.

…….. …….....

Participant's signature Date

Department of Public Health

Lead City University, Ibadan, Oyo State

Questionnaire

Dear respondent,

The researcher is a postgraduate student of the above-named University, conducting research on **Assessment of Knowledge, attitude and barriers to breast cancer screening among women visiting pathology laboratories in Ibadan North Local Government area, Oyo State.** The questionnaire is therefore designed to elicit information in relation to the variables being studied**.** All responses shall be highly appreciated, treated confidentially and used strictly for academic purposes. Kindly fill them as appropriate.

Thank you for your anticipated cooperation.

Section A: Socio-Demographic Information

Instruction: Please tick (✓) in the column as it applies to you in each of the following items

1. **Age:** 1. < 20 { } 2. 20 - 39 { } 3. 40 - 59 { } 4. > 60 { }

2. Marital status: 1. Single { } 2. Married { } 3. Divorced { } 4. Widowed { } 5. Separated { }

3. Occupation: 1. Working woman { } 2. Business woman { } 3. House wife { } 4. Student { }

4. Education: 1. No formal education { } 2. Primary { } 3. Secondary { } 4.Tertiary { } 5. Others { }

5. Religion: 1. Christianity { } 2. Islam { } 3.Traditional { }

Section B: Assessment on the General Knowledge of Respondents Regarding Breast Cancer and Breast Cancer Screening.

Instruction: Please tick (✓) the appropriate column that suits your response in the following statements.

S/N	Items	Yes	No	Don't Know
6	Have you ever heard of breast cancer?			
7	Do you know what cause breast cancer?			
8	Do you think breast cancer occur commonly in older women?			
9	Do you think breast cancer can be inherited?			
10	Do you know think breast cancer is curable when detected early?			
11	Do you think breast cancer is preventable?			
12	If you notice a change in your breast would you contact a health care professional first?			
13	Can a traditional healer treat breast cancer?			
14	Any woman is at risk of breast cancer			
15	Personal hygiene decreases breast cancer			

	risk			
16	Breast cancer is a spiritual problem			
17	Have you ever heard of breast cancer screening?			

Section C: Assessment on the respondents practices regarding breast cancer and breast cancer screening.

Instruction: Please tick (✓) the appropriate column that suits your response in the following statements.

S/N	Items	Yes	No	Don't Know
18	Do you know how to perform breast self-examination?			
19	Are you confident of knowing what to look for in breast self-examination?			
20	Have you ever screened your breast for cancer using mammogram, or ultrasound?			
21	Have you ever conducted breast self-examination?			
22	Should breast self-examination be performed more frequently?			
23	How frequent do you conduct breast self-examination?			
24	Have you ever found any abnormality in your breast while conducting self-examination?			
25	If yes to the question above, did you report to a health care professional immediately?			

Section D: Assessment on the Respondent's Attitude toward Breast Cancer Screening and Self-Examination.

Instruction: Please tick (✓) the appropriate column that suits your response in the following statements.

S/N	Items	Yes	No	Don't Know
26	There is no reason to examine my breast			
27	If there is no problem in the breast, periodic breast examination is not required			
28	If I knew how to conduct breast self-examination and its benefits, I would have done it by now			
29	Women prefer female doctor for breast examination			
30	Early detection method have no effect on treatment			

Section E: Assessment on the Barriers towards Breast Cancer Screening

Instruction: Please tick (✓) the appropriate column that suits your response in the following statements.

S/N	Items	Yes	No	Don't Know
31	It is unacceptable to touch my body			
32	Feeling shy to uncover my breast			
33	Feeling worried about what a doctor might find			
34	It is embarrassing to tell people about			
35	Stigma following the diagnosis of cancer			
36	Busy, no time to do breast cancer screening			
37	Awareness programs are deficient			