Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as mediators of breast cancer treatment and outcomes.

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ABSTRACT

Background

Breast cancer is a global health problem affecting people worldwide. Breast cancer is a treatable disease, yet, it has taken many lives in countries like Nigeria. Nigeria has rated the country with the highest breast cancer mortality in Africa, calling for great attention. To effectively address and make a health care decision, the treatment experiences of breast cancer patients and the knowledge of the social and cultural context are essential as factors like sociocultural influence treatment and healing practices.

Aim

This study explored breast cancer patients' treatment experiences and investigated the impact of sociocultural factors as mediators of effects of breast cancer treatment outcomes in Oyo (Ibadan) and Lagos state (both in Nigeria).

Methods

A mixed-method design involving a systematic review, qualitative and quantitative research approach was adopted in this study. Data for the systematic review was obtained through a systematic literature search on CINAHL, PubMed Central and Discover databases. Articles that met the inclusion criteria were included in the study. The qualitative data was collected using face to face interviews, while the quantitative data was collected via questionnaire. Participants in the study were breast cancer patients from selected hospitals in the study areas. The systematic review was conducted to create a holistic picture of the already known. Sociocultural factors that impact breast cancer management in West Africa and identify the current gap in the literature that needs to be filled. The qualitative study was conducted, and its findings iteratively inform the quantitative data collection instrument. Data analysis for the systematic review was done using narrative synthesis. The qualitative and quantitative data were analysed using thematic and statistical analysis. A mediation analysis was conducted using a multiple regression model to investigate the impact of sociocultural factors as mediators of treatment outcome,

Results

The findings of this study provided evidence of the treatment experiences of breast cancer patients in Nigeria. In addition, the study identified sociocultural factors (cultural and religious beliefs, alternative treatment, family and societal support, body image and gender role) that impact breast cancer treatment. In the bivariate regression model, religion and family support showed a statistically significant association with the health-seeking behaviours of participants. Also, culture, alternative treatment and breast cancer stages were statically significant when regressed on quality of life. In the multivariate regression model, religion remained statistically significant in the health-seeking behaviour while alternative treatment and breast cancer stage at diagnosis remained statistically significant on quality of life. The findings also establish evidence on the effects of religion, stage of breast cancer at diagnosis, and alternative factors that mediate treatment outcomes of breast cancer in Ibadan and Lagos State, Nigeria.

Conclusion

There is a need to replicate this study in other parts of Nigeria to effectively address the impact of sociocultural factors on breast cancer treatment and outcomes in Nigeria. Nevertheless, the findings will build on this evidence and support the Nigerian Health Ministry in establishing a national policy for positive breast cancer treatment outcomes in Nigeria.

Operational definitions and abbreviations

CINAHL – Cumulative Index to Nursing and Allied Health Literature. CINAHL is a free full-text database giving access to open Access Journals in nursing and allied health sciences (Wright, 2015).

DCIS - Ductal carcinoma in-Situ

HSB - Health-seeking Behaviour – is the effort or decision by an individual towards finding support in achieving optimal wellness (Zhang, et al., 2020)

IBC- Invasive Breast Cancer

IDC - Invasive ductal carcinoma

ILC - Invasive Lobular Carcinoma

LCIS- Lobular carcinoma in situ

LMICs - Low and Middle-Income Countries are nations with low or middle economies.

MAR - Missing At Random - This is a type of missingness of data whereby the data is missing at random.

MCAR - Missing Completely at Random -This occurs in a dataset with data missing completely at random.

MNAR - Missing Not At Random- This is when data is not missing at random in a dataset.

MRI - Magnetic Resonance Imaging -

PMC - PubMed Central is a free full-text digital repository that archives publicly accessible full-text scholarly articles published within the life science and biomedical articles (Ossom-Williamson, & Minter, 2019).

Pragmatism - A philosophical assumption that integrates more than one research design. Pragmatists interpret the world and undertake research in many ways. It could be a qualitative point of view (interpretivism), quantitative (positionality), or both. (Kelly & Cordeiro, 2020)

QoL - Quality of Life: The general well-being of individuals

SCF – Sociocultural factors: Units within cultures and societies affect individuals' behaviours, feelings, and thoughts. The expression refers to social and cultural factors that depict common traditions, patterns, habits and beliefs prevalent in a group or population. (Vakkai et al., 2020).

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List of publications and presentations

- Vivian Chinonso Osuchukwu, Philip Emeka Anyanwu, Jonathan Ling and Catherine Hayes (2021) A systematic review of the impact of sociocultural factors on West African breast cancer diagnosis and management. *Archives of Clinical Case Studies and Case Reports* 2:261-274

- Nwokoroku, S., Neil, B., Dlamini, C. & Osuchukwu, V, (2022) A systematic review of the role of culture in the mental health service utilisation among ethnic minorities in the United Kingdom. *Global Mental Health (GMH) Journal.*

- Osuchukwu, V. C., Ling, J. & Hayes, C. (2022) Treatment experiences of breast cancer patients in Oyo and Lagos state Nigeria: a qualitative study. *Journal of Public Health in Developing countries. In press.*

- Anyaehie, T. E & Osuchukwu, V. C (2022) Knowledge, Attitude and Health-seeking behaviour of postgraduate students of health Sciences and Wellbeing Faculty of a North-East University, the United Kingdom towards blindness prevention from Glaucoma. *Archives of Clinical Case Studies and Case Reports. In press.*

- Osuchukwu, V.C., Ling, J. & Hayes, C. (2020) Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as mediators of breast cancer treatment and outcomes. *Presented at University of Sunderland 2020 Research Conference.*

- Osuchukwu, V.C., Anyanwu, P.E., Ling, J. & Hayes, C. (2020) A systematic review of the impact of sociocultural factors on breast cancer diagnosis and management in West Africa. Presented at the *Keystone Symposia Conference on Advances in Cancer Immunotherapy (EK1).*

1.0 CHAPTER ONE: INTRODUCTION

1.1 Introduction

This introductory chapter presents an overview of the study's background while highlighting the study's problem statement, the rationale of the study, the research question, research aims and objectives, and the research hypotheses. The structure of this thesis is also available in this Chapter One.

1.2 Background of the study

Breast cancer is an established global health issue affecting people from different regions (WHO, 2019; CDC, 2018). Breast cancer is the leading cause of all cancer-related death accounting for 15% of all causes of cancer-related deaths; hence, said to be the most common cause of cancer deaths (WHO, 2020). Breast cancer is the most common cancer in women, followed by cervical cancer (CDC, 2018). There is evidence that men have breast cancer, but the number of cases in women is 100 times higher than that of men (Siegel, 2017).

The burden of breast cancer is felt more by women, as being a woman is one of the uncontrollable risk factors (WHO, 2020). Women are at higher risk of breast cancer because of the high levels of hormones-oestrogen and progesterone (WHO, 2020; Liu, 2016). The presence of these hormones at older age creates a suitable environment for cancer cells to grow (Liu, 2016); hence getting older is one of the risk factors (CDC, 2018). According to WHO 2020, breast cancer occurs in women at any age after puberty, increasing the incidence rate in women 40years and above.

The problem of breast cancer becomes more worrisome since some of the risk factors are not controllable. Some of the risk factors of breast cancer include being a woman, reproductive history (early menstruation and late menopause), genetic mutation, getting older, having dense breasts, family history, previous diagnosis, physical inactivity, alcohol intake, use of combination hormone therapy, consumption of oral contraceptive pills and prior treatment with radiation. (WHO,2019; CDC, 2018, Brewer et al., 2017).

According to the World Health Organisation, in 2020, the global incidence of breast cancer will be over a 2.3million in 2020 and about 685,000 global deaths from breast cancer. Furthermore, according to Howlader et al., 2017, about 12% of women worldwide will develop breast cancer at some stage in their lifetime (Howlader et al., 2017).

Breast cancer which was earlier considered the disease of the developed world, is currently facing an increase in trend in the developing countries (WHO, 2019). Globalisation, the adoption of the western lifestyle and urbanisation were implicated in this trend (WHO, 2019). As a result, it has been reported that 50% of breast cancer new cases and 58% of breast cancer death occur in the developing world (WHO,2019).

Numerous studies have been conducted on breast cancer, ranging from incidence, prevalence, aetiology, risk factors, prevention, diagnosis, staging, prognosis, treatment, and outcomes (CDC, 2018; NHS England, 2017; Abdulrahman (Jnr) and Rahman, 2012). There has been improved knowledge, awareness, and management of breast cancer due to these studies; however, there is still limited published evidence of the impact of sociocultural factors as a mediator of breast cancer treatment and outcomes in developing countries.

In developing countries, the word breast cancer is considered a death sentence considering its survival rate of less than 15% (Wragg, 2016). This survival rate is very poor compared with countries like the U.K., with a survival rate of 83%. The mortality rate of breast cancer in developing regions like Africa is high compared with developed countries (WHO,2019). Geographical variations could affect care due to social and cultural context hence the difference in survival improvement in different world regions (Sharma et al., 2012).

Nigeria is the most populous country in Africa and is rated highest in breast cancer prevalence and incidence. (Sushma et al., 2017; Wragg, 2016). Although the incidence of breast cancer in Nigeria is low compared with some developed countries, Nigeria's high mortality rate is of great concern (Steven and Donatus, 2009). Nigeria is globally ranked with the highest breast cancer mortality rate (Azubuike et al., 2018). To tackle this problem of high mortality rate, all factors that could impact the treatment need to be explored and investigated; hence, further investigation on the impact of sociocultural factors on breast cancer is required.

Sociocultural factors are larger-scale forces within cultures and societies that affect thought, feelings, and behaviour (Kozenkwo, 2018). The set of beliefs, customs, practices, and behaviours within a population is called socio-culture (Kozenkwo, 2018, CDC, 2018). For example, health beliefs and health-related behaviours are influenced by culture, which influences the health information someone is exposed to and shapes their health perception and practice (Elewonibi and Belue, 2017).

According to Tetteh and Faulkner (2016) and Akarolo et al. (2010), sociocultural factors affect pre-and post-treatment breast cancer experiences. So, more research evidence is needed on the effect of sociocultural factors on breast cancer treatment outcomes in developing countries like Nigeria and Africa at Large.

1.3 Problem statement

The increasing prevalence of cancer and breast cancer remains a significant global health issue. Breast cancer alone constitutes 18% of all cancer cases in women (WHO, 2015). Globally in 2020, there were 2.3 million women diagnosed with breast cancer, making breast cancer the most common cancer diagnosed in women (WHO, 2022). Furthermore, a high proportion of breast cancer is seen in developed and developing countries (Public health England, 2018).

There is evidence that 56% of the newly reported cancer cases occur in developing countries. According to Warner, 2011, estimated that by 2030, 70% of all new cancer cases will occur in developing countries. In addition, the World health organisation estimated that more than 508,000 women died in 2011 due to breast cancer (WHO, 2013). Although the incidence of breast cancer is higher in developed countries than in developing countries, there is currently an increase in the trend of breast cancer in the developing world and the mortality rate from the disease calls for concern (WHO, 2015; Ghoncheh et al., 2015; Sushma et al., 2017).

The Age Standardized Mortality Rate (ASMR) of breast cancer is 12.9 (31) globally, with Africa recording the highest ASMR in the world (Azubuike et al., 2018). In 2008, Africa recorded 681,000 new cancer cases; Nigeria constituted 15% of all the new cases of breast cancer in Africa (Sylla & Wild, 2011). In addition, the cancer Atlas compiled by the American Cancer Society, the union of International Cancer Control (UICC), The World Health Organization, and the International Agency for Research on Cancer rated Nigeria as the country with the highest incidence of breast cancer in Africa (Wragg, 2016).

Irrespective of the high incidence rate of breast cancer in Nigeria and most African nations, there is still limited data on the present situation (Vanderpuye et al., 20017; Lancet, 2015). In Nigeria, breast cancer was previously referred to as a disease in developed countries. Still, unfortunately, due to the ongoing epidemiological transition, Nigeria is facing an increase in the trend of non-communicable diseases like breast cancer (WHO, 2015). As a result, breast cancer has become an epidemic which claims lives and leaves behind huge economic and socially detrimental consequences in Nigeria (Wragg, 2016). According to Centre Dharamshila (2013), the health care system in Nigeria is facing a serious problem with the continuous increase in the trend of breast cancer. In 2008, a rough estimate of breast cancer in Nigeria was 500,000 new cases annually, and more than 40% of the women population was affected; high incidence at the peak age of 42.6 years and more than 12% are less than 30 years of age (Okoye et al., 2008).

Between 2005 and 2009, southwestern Nigeria recorded 5,094 cancer patients registered at cancer registries in Lagos (60%) and Ibadan (40%); breast cancer accounted for about 20.2% (Adewole et al., 2011). Regardless of the high incidence of breast cancer in Nigeria, the mortality and survival rate are of great concern (Wragg, 2016). According to Wragg, 2016, majority of the breast cancer deaths (69%) occur in the developing world like Nigeria (Wragg, 2016). Osaro et al., 2011 recorded a 10% survival rate of breast cancer in Nigeria against 83% and 78% for ten- and five-year plans, respectively, in the U.K. and 87% for a five-year plan in Canada (Pizot, 2016; Benson, 2012).

Considering the low survival rate and the current breast cancer incidence rate of 64.6 per 100,000 women in Abuja, Nigeria (Jedy-Agba et al., 2012), there is a need to understand the impact of current treatment for breast cancer in Nigeria. Despite the globally standardised treatment procedures, the negative outcome of breast cancer leaves one with a question of what could be affecting the treatment outcome. Beyond the direct damaging effect of cancer, the ill effect of breast cancer depends on what treatment is instituted and how such treatment is delivered and received by the patients. Studies based on behavioural and neurobiological evidence have shown that the influence of treatment history and experiences transfers over time and therapeutic approaches (Kessner et al., 2014). Furthermore, breast cancer survivors face various problems due to the disease they suffered (Sushma et al., 2017); their experiences need to be fully explored in Nigeria to help patients who are currently undergoing treatment.

Understanding breast cancer patients' experiences is vital in facilitating optimal and individualised delivery of health care (Sushma et al., 2017; Hellerstedtt-Borjesson et al., 2016). According to Frank (2012), giving descriptive stories on the disease can complement medicine by teaching others how to live and manage the disease effectively (Frank, 2012). This research is essential as preventive education; standardised treatment does not still address the poor outcome of breast cancer in Nigeria. This study will be looking at the treatment experiences of breast cancer patients and how sociocultural factors like belief, and religion, among others, mediate breast cancer treatment and outcome.

Sociocultural factors affect pre-and post-treatment breast cancer experiences (Tetteh and Faulkner, 2018**).** Therefore, recognising mediators that affect treatment is very important in understanding the mechanism of impact of current treatment by maximising the potential of the treatment of specific aspects that are effective (Kraemer et al., 2002). Therefore, this study will identify those sociocultural factors that mediate the treatment outcome of breast cancer in Nigeria.

1.4 Rationale of the study

The ill effect of breast cancer depends on what treatment is instituted and how factors like sociocultural affect the treatment outcome (Hinzey et al.,2016; Tetteh and Faulkner, 2016; WHO, 2016). According to Agyemang et al., (2012), cancer care in a resource-limited setting like Nigeria can be influenced by social, cultural and economic factors.

Sociocultural effect on breast cancer treatment and outcome has been overlooked, and more research attention is needed in Nigeria and Africa at large (Tetteh et al., 2016). These sociocultural factors have been misunderstood and have led to a negative attitude toward the proper use of health services and treatment procedures (Ankarolo et al., 2010). Failures to adhere to treatment like mastectomy and chemotherapy by women due to their social beliefs about a woman's body have led to poor treatment outcomes (Odigie et al., 2010). Sociocultural factors affect pre-and post-treatment breast cancer experiences (Tetteh and Faulkner, 2016). Social and cultural beliefs about breast cancer can affect the treatment and outcome. It influences their experience, allocation of resources to manage the disease, and social construction of the illness (Deandrea et al., 2016). There is evidence of the impact of sociocultural factors on late presentation, screening and diagnosis of breast cancer (Hwang et al., 2017; Tetteh & Faulkner, 2016; Dodo et al., 2016). But there is a gap in knowledge on the impact of sociocultural factors on breast cancer treatment outcomes.

This research area is vital as preventive education efforts and globally standardised treatment procedures do not still address the poor outcomes of breast cancer in the Nigerian population. This study will focus on the treatment experiences of breast cancer patients and how sociocultural factors impact their treatment outcome of breast cancer in Nigeria.

1.5 Study Aim and objectives

1.5.1 Study Aim

The mechanism by which sociocultural factors affect treatment and outcomes of breast cancer has not been given adequate attention hence creating a gap in the literature on the impact of sociocultural factors on breast cancer treatment outcomes in Nigeria. Therefore, this research aims to explore the treatment experiences of breast cancer patients while identifying possible sociocultural factors that impact their breast cancer treatment and outcomes in Lagos (Lagos state) and Ibadan (Oyo state), Nigeria.

1.5.2 Research question

- What are the treatment experiences of breast cancer patients in Ibadan and Lagos, Nigeria?
- What are the possible sociocultural factors affecting breast cancer treatment and outcomes in West Africa?
- What major sociocultural factors impact breast cancer treatment outcomes in Ibadan and Lagos, Nigeria?
- Are there associations between the identified sociocultural factors (independent variables) and patients' treatment outcomes (dependent variables) in Ibadan and Lagos, Nigeria?

1.5.3 Research objectives

- To review the literature on sociocultural factors that impact breast cancer treatment and outcomes in West Africa using a systematic review.
- To integrate existing evidence on how the identified sociocultural factors influence breast cancer screening, diagnosis, treatments and outcomes in West Africa.

- To explore the treatment experiences of breast cancer patients in Lagos and Ibadan, Nigeria using a face-to-face in-depth interviews.
- To identify sociocultural factors and explore how they affect breast cancer treatment outcomes using face-to-face interviews with breast cancer patients in Lagos state and Ibadan, Nigeria.
- To survey sociocultural variables that impact breast cancer treatment outcomes using a semi-structured questionnaire.
- To test for the association between the identified sociocultural factors (Independent variable) and the patients' treatment outcomes (Dependent variables).
- To establish which of the identified sociocultural factors have a more significant impact on breast cancer treatment and outcomes.

1.6 Research Hypothesis

According to Frost (2021) and NEDARC (2010), any provisional statement to a research question subject to investigation is known as a hypothesis. A study can test an idea to establish an association between the independent and dependent variables (Sullian, 2016). In this study, the independent variables include the sociocultural factors that impact breast cancer management. The dependent variable is breast cancer treatment outcome, in this case, quality of life and health-seeking behaviours. We present concise statements usually in two possible versions in testing the hypothesis, known as the null hypothesis and the alternative hypothesis (Davis and Mukamal, 2006). The null and alternative hypotheses are concise statements of truth about the relationship between predictor and outcome variables (NEDARC, 2010). The null hypothesis ($H_{0.}$) views the lack of association between a predictor and an outcome; while alternative hypothesis states existence of association and can be represented using either of these symbol H_1 or $H_{.A.}$ (Davis and Mukamal, 2006). The alternative hypothesis will be represented with the symbol H.A. in this study.

Six hypotheses were tested in this study to ensure that the research questions are answered, and the study objectives are met. In testing the hypotheses for this study, the six steps according to NEDARC, 2010 was followed. These six steps include: specifying the null hypothesis, specifying the alternative hypothesis, setting the significant level, calculating the test statistic and corresponding p-values, and drawing to a conclusion (NEDARC, 2010).

1.6.1 Hypothesis statements

Hypothesis One

$H_0$1: There is no statistically significant relationship between participants' socioeconomic status and health-seeking behaviour.

H_A1: There is a statistically significant relationship between participants' socioeconomic status and health-seeking behaviour.

Hypothesis Two

H_02: There is no statistically significant relationship between participants' socioeconomic status and quality of life.

H_A2: There is a statistically significant relationship between participants' socioeconomic status and their quality of life.

Hypothesis Three

H_03: There is no statistically significant relationship between sociocultural factors and participants' health-seeking behaviour.

H_A3: There is a statistically significant relationship between sociocultural factors and participants' health-seeking behaviour.

Hypothesis Four

H_04: There is no statistically significant relationship between sociocultural factors and participants' quality of life.

H_A4: There is a statistically significant relationship between sociocultural factors and participants' quality of life.

Hypothesis Five

H_05: There is no statistically significant relationship between participants' stage of breast cancer at diagnosis and their health-seeking behaviour.

H_A5: There is a statistically significant relationship between participants' stage of breast cancer at diagnosis and their health-seeking behaviour.

Hypothesis Six

H_06: There is no statistically significant relationship between participants' stage of breast cancer at diagnosis and their quality of life.

H_A6: There is a statistically significant relationship between participants' stage of breast cancer at diagnosis and their quality of life

1.7 Structure of the thesis

This thesis is presented in chapters one to nine, with the reference list and appendices presented after the last chapter. As seen in Chapter One, this study was introduced with an overview of the problem statement, study's rationale, research questions, objectives, aims, and hypotheses. The Chapter Two of this thesis was on the literature review, where existing works of literature on the subject area were reviewed. In reviewing the current literature, evidence of the already known gaps in the research area was discussed. The theoretical framework adopted in this study was explained in the Chapter Three of this thesis. Chapter Four discussed the research methods (systematic review, qualitative and quantitative) adopted in this study. Also, the philosophical underpinning of the research methods was reported. Chapter Five reported the the systematic review and its findings. Chapter Six reported the qualitative study and the results, while Chapter Seven reported the quantitative study and its results. Chapter eight of this thesis is the discussion chapter. The results of the qualitative and quantitative study designs were compared with the findings of other researchers and how the study findings contributed to the existing literature in the study area. The final chapter in this thesis is Chapter Nine, where the recommendation from this study's findings and the study's conclusion were presented.

1.8 Contributions to the knowledge

- This research identified sociocultural factors that impact breast cancer treatment in Lagos and Ibadan, Nigeria
- The outcome of this study identified which of the sociocultural factors has the most significant impact on the treatment outcome of breast cancer in Lagos and Ibadan, Nigeria.
- This research also produced the first evidence on how sociocultural factors impact breast cancer treatment in Lagos and Ibadan, Nigeria.
- This study developed and validated a measurement instrument (questionnaire) that could be used to identify sociocultural factors that impact breast cancer treatment and outcomes in Nigeria and other developing countries.

1.9 Chapter Summary

The increase in breast cancer mortality rate, especially in developing nations like Nigeria, has burdened public health. This increasing trend in the mortality rate becomes more worrisome as breast cancer is a treatable condition. In Nigeria, different research has been conducted to address this trending issue with little attention to the impact of sociocultural factors on the treatment and management of breast cancer. Considering the role of the environment as a determinant of health, assessing the impact of sociocultural factors on breast cancer treatment outcomes in Nigeria is very important. This study explored the treatment experiences of breast cancer patients while focusing on sociocultural factors that impact their treatment. A total of six hypotheses were tested in the quantitative stance. This study identified sociocultural factors that mediate the breast cancer treatment outcomes in Lagos and Ibadan, Nigeria.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews existing literature on the topic under study. The followings were included in this chapter: overview of cancer, breast cancer and its epidemiology, treatment experience of breast cancer patients, sociocultural factors and breast cancer management, types of breast cancer, risk factors pf breast cancer, breast cancer diagnosis, staging, signs and symptoms, treatment and preventive measures.

2.2 Overview of cancer

Cancer is currently a global health challenge (WHO,2019). World health organisation defined cancer as the uncontrolled growth and spread of cells. (WHO,2014). According to the Centre for Disease Control and Prevention, the human body is made up of building blocks called cells. These cells grow and divide to form new ones; these cells die when old or are damaged as the new ones take over; cancer occurs when genetic changes interfere with this process (CDC, 2018). National Cancer Institute went further to define cancer as a group of diseases involving abnormal cell growth with the potential to spread to other parts of the body (CDC, 2018; NCI, 2018).

Cancer usually starts from one part of the body, in some cases, spreads to other parts (Witto, 2018). This process of cancer spreading from one part of the body to another is known as metastasis (WHO, 2019; Witto, 2018). Cancer is a respecter of no one as such affects everyone -the young and old, rich and poor, man or woman, adult and children, boys and girls (WHO, 2019). Cancer is caused when normal cells are transformed into tumour cells in the multistage process that generally progresses from a pre-cancerous lesion to a malignant tumour (WHO,2018). As seen in all chronic diseases, there are risk factors that could expose or increase a person's chance of cancer; these factors include physical inactivity, unhealthy diet, family history, age, Hormones, alcohol intake, tobacco, infectious agents, among others (CDC, 2018; WHO, 2017; National Cancer Institute, 2015).

In 2018, there was a global estimation of 18.1 million new cancer cases, of which 9.6 million deaths will occur globally (WHO, 2019). Approximately 20% of males and 17% of females will have cancer at some point in their lives, and 13% of males and 9% of females from the above estimation will die of cancer globally (Brinton et al., 2018). According to WHO 2017, global new cancer cases will increase by 70% in 2 decades (WHO,2017).

Cancer can be diagnosed through mammogram screening, biopsy, and radiation (Jemal et al. (2011). Cancer can be reduced through early detection and management of the patients (WHO, 2017). Global cancer diagnosis as of 2008 was 12.7million (Jemal et al., 2011). Cancer can be 30 -50% prevented by avoiding risk factors and adhering to existing evidence on prevention procedures (WHO, 2017). Cancer is a treatable disease, and most cancers can be cured through surgery, chemotherapy and radiotherapy

(WHO, 2014). Unfortunately, cancer is the second cause of global death, accounting for approximately 9.6 million deaths in 2018 (WHO,2019). In 2010, 7.98 million people died due to cancer (Lozano et al., 2012). About one-third of the cancer deaths are due to behavioural and dietary risks such as high body mass index, low fruit and vegetable intake, lack of physical activity tobacco and alcohol use (WHO,2017). Tobacco use alone is responsible for approximately 22% of cancer death (WHO,2012). Nevertheless, in low- and middle-income countries such as Nigeria, some infections such as Hepatitis B and human papillomavirus account for about 25% of cancer cases. Hence, they are referred to as cancer-causing infections (WHO, 2019; NCI, 2015).

According to Osaro et al., 2011, 56%- 70% of all cancer deaths occur in low and middle countries (Osaro et al., 2011). Africa is made up of low- and middle-income countries, with Nigeria, ranked as the country with the highest cancer incidence and deaths (Azubuike et al., 2018).

In Nigeria, cancer is a dreaded word that strikes fear into people's hearts ((Ezeokoli 2015). An estimation of over 71,000 people dies each year from cancer, with new cases of about 102,000 each year (Ezeokoli 2015). Nigeria's cancer death ratio is 4 in 5 affected persons, with an incidence rate of 50.5 per 100,000 women (Onogu, 2016; Azubuike et al., 2018). This ratio is one of the worse in the whole world. The age-standardised incidence rate in Nigeria for invasive cancer from the IBCR was 66.4 per 100,000 men and 130.6 per 100,000 women; in ABCR 58.3 per 100,000 for men and 138.6 per 100,000 for women (Jeddy Agba et al., 2012). BCR reported a total of 3,393 out of which 66% (2,238) were females and 34% (1155) were males (Jeddy Agba et al., 2012). Different cancers exist depending on which part of the body is affected; most common cancer deaths are caused by Lung, Cervical, Colorectal, stomach and breast (WHO,2019). The cancer focus in this study is breast cancer.

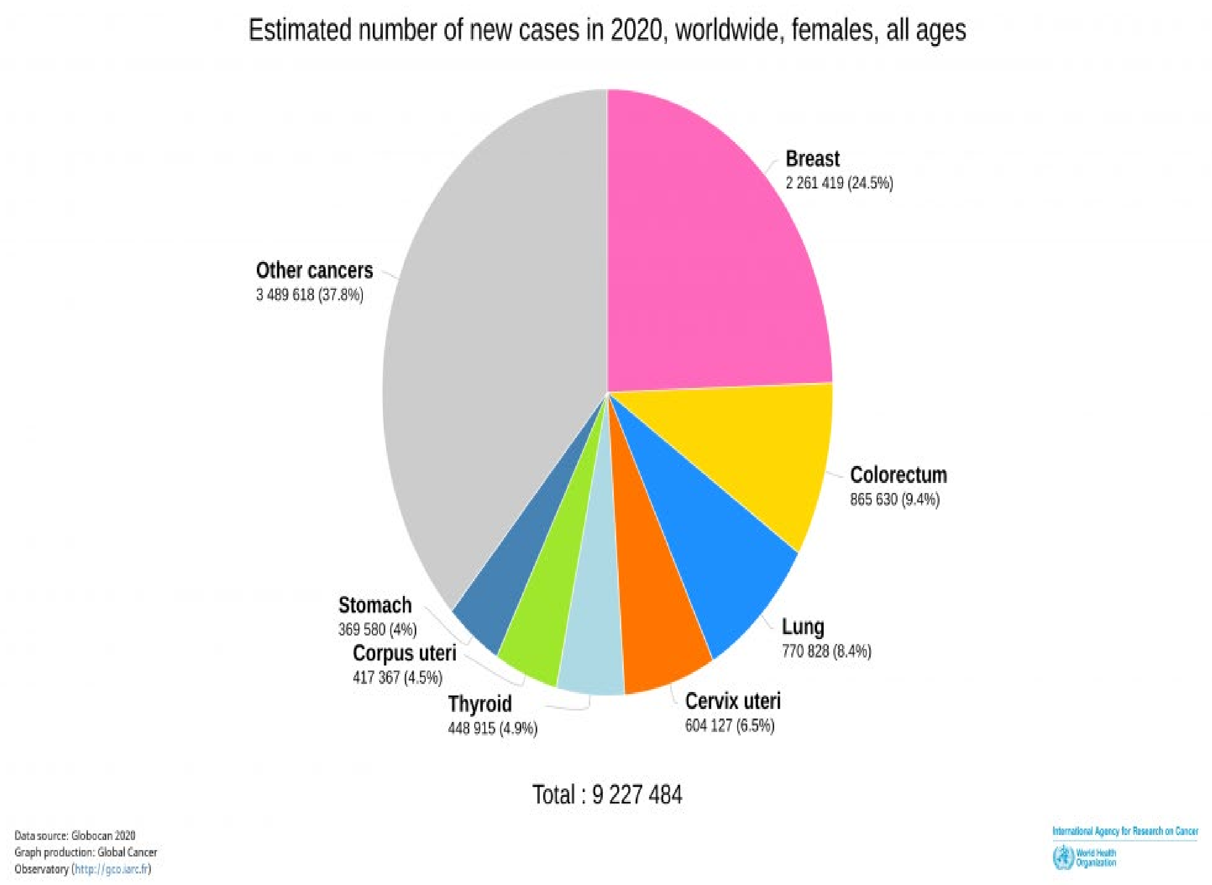
2.3 Breast cancer and its epidemiology

Centre for Disease Control and Prevention defined breast cancer as an out-of-control growth of cells in the breast which occurs when the cells in the breast grow out of control (CDC, 2018). American cancer society (2019) stated that cancer could occur in any part of the breast, and the type of breast cancer is determined by the cell in the breast that turned into cancer. Breast cancer is the most common cancer that affects women in the world. And the second leading cause of cancer deaths in the world (Brinton et al., 2018). The presence of breast cancer can be established after a clinical diagnosis (WHO, 2017). Diagnosis can be made through mammogram screening, Biopsy, and radiation (Jemal et al., 2011). Several factors increase one's risk of breast cancer, such as getting older, reproductive history, family history, exposure to radiation, being a woman, alcohol intake, sedentary lifestyle, hormones replacement therapy, as well as some infectious diseases like Hepatitis B and High Papillomavirus (CDC, 2018; WHO, 2017; Plummer et al., 2016). Symptoms of breast cancer include breast pain or heaviness; persistent changes, such as swelling, thickening, or redness of the skin; and nipple abnormalities such as spontaneous discharge (WHO, 2015).

Breast cancer can occur both in men and women but is most common in women due to risk factors such as being a woman and reproductive history. The men's risk of breast cancer is 1 in 883 (NCI,2018). In women, a total of 268,600 new cases of invasive breast cancer and 62,930 new cases of non-invasive (in-situ) breast cancer were estimated in 2019, while in men, 2,670 new cases of invasive breast cancer will be diagnosed in 2019 (NCI,2018).

Breast cancer is the most prevalent cancer globally, with 1 in 4 cancer diagnoses attributed to breast cancer (Globocan, 2020). According to World Health Organisation (2020), about 7.8 million women have been diagnosed with breast cancer globally within the last five years. New breast cancer cases diagnosed globally in 2020 were 2.3 million, with about 685,000 deaths (WHO, 2021). Globally, women's disability-adjusted life years (DALYs) lost to breast cancer is more than any other cancer type (WHO, 2021). According to the WHO (2019), in England, about 80% of B.C. cases occur among women 50 years and above, with its peak at ages between 60 and 64. The survival rate of breast cancer varies according to country and region (WHO, 2019). Developing countries and continents like Africa have low survival rates with increased prevalence, incidence, and mortality rates.

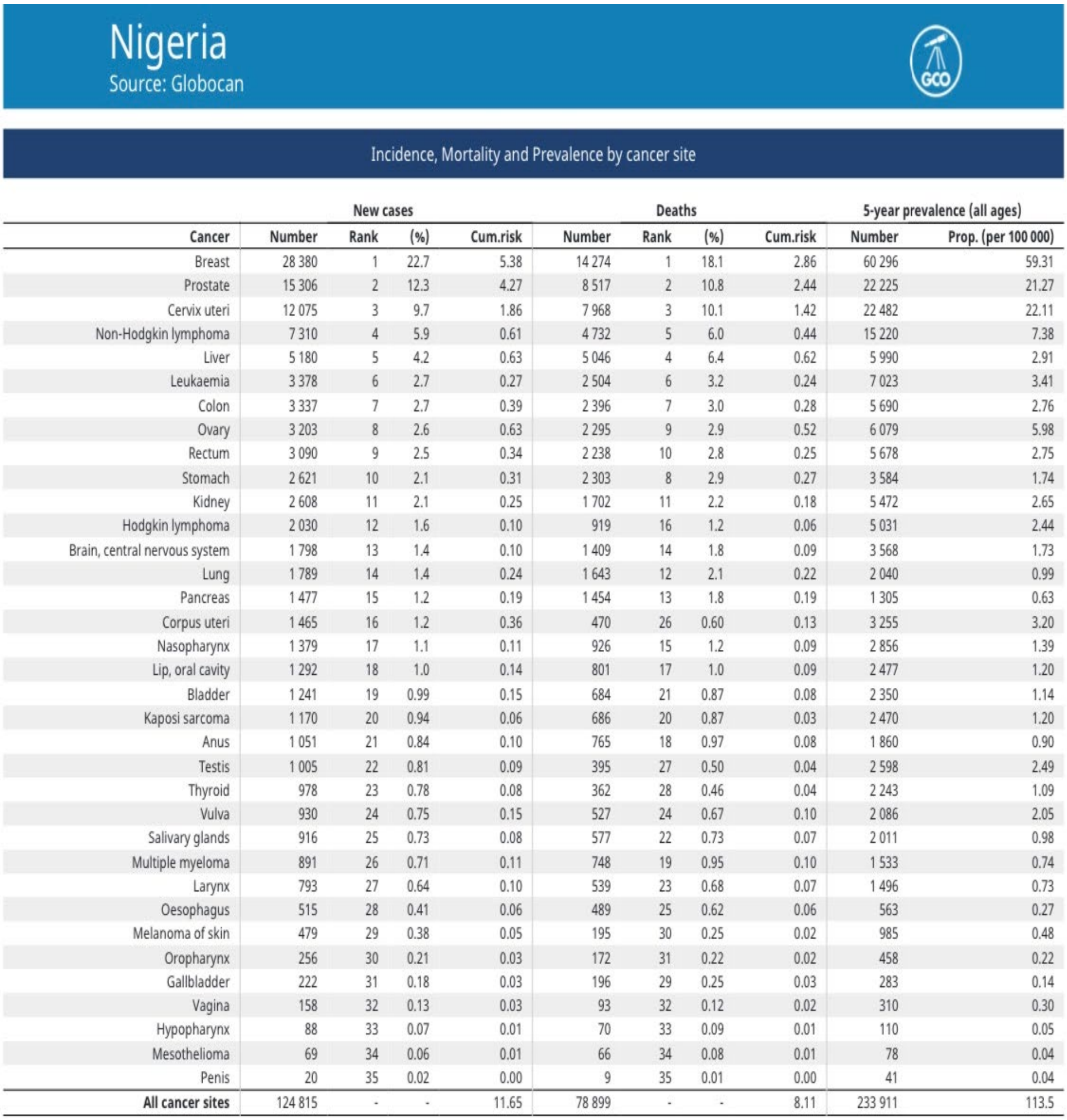
Figure 1: Global Incidence of Breast Cancer (Source: Globocan, 2020)



Breast cancer incidence in Africa is low compared to Europe and America. However, the age-standardised mortality rate in Africa is the highest (Azubuike et al., 2018). Furthermore, there has been a rapid increase in breast cancer incidence and mortality rate in Africa (Azubuike et al., 2018). This rapid increase is attributed to biological, environmental, socio-economic, cultural, racial disparity, and heath equalities (Adeloye et al., 2018). Whilst there are limited data on breast cancer incidence and mortality in Africa, the estimated age-standardised incidence of breast cancer, according to Globocan (2018) report, stood at 46.2 per 10,000 persons per year in South Africa region, 37.3 in the West Africa region, 29.9 in East African region and 27.9 in Middle African region (Bray et al., 2018).

The Sub-Sahara Africa region has the highest age-standardised mortality rate, with Nigeria, the most populous country in Africa, rated the highest (Wragg, 2016; Youlden et al., 2012). Although breast cancer incidence in Nigeria is low, urbanisation and changes in population lifestyle have been identified as factors contributing to the recent rise in breast cancer cases. Breast cancer represents 23% of all cancer cases in Nigeria, with an estimated 18% of all death cases from cancer, making it the lead cause of cancer death in Nigeria. Although there is limited national epidemiological data on breast cancer incidence in Nigeria, records from a study by Jedy-Agba et al. (2012) in Abuja and Ibadan showed the age-standardised mortality rate for breast cancer 64,6 and 52.0 per 10,000, respectively.

Table 1: **Incidence, Mortality and Prevalence, by cancer site, Nigeria, 2020.**



Nigeria
Source: Globocan

Incidence, Mortality and Prevalence by cancer site

	New cases				Deaths				5-year prevalence (all ages)	
Cancer	Number	Rank	(%)	Cum.risk	Number	Rank	(%)	Cum.risk	Number	Prop. (per 100 000)
Breast	28 380	1	22.7	5.38	14 274	1	18.1	2.86	60 296	59.31
Prostate	15 306	2	12.3	4.27	8 517	2	10.8	2.44	22 225	21.27
Cervix uteri	12 075	3	9.7	1.86	7 968	3	10.1	1.42	22 482	22.11
Non-Hodgkin lymphoma	7 310	4	5.9	0.61	4 732	5	6.0	0.44	15 220	7.38
Liver	5 180	5	4.2	0.63	5 046	4	6.4	0.62	5 990	2.91
Leukaemia	3 378	6	2.7	0.27	2 504	6	3.2	0.24	7 023	3.41
Colon	3 337	7	2.7	0.39	2 396	7	3.0	0.28	5 690	2.76
Ovary	3 203	8	2.6	0.63	2 295	9	2.9	0.52	6 079	5.98
Rectum	3 090	9	2.5	0.34	2 238	10	2.8	0.25	5 678	2.75
Stomach	2 621	10	2.1	0.31	2 303	8	2.9	0.27	3 584	1.74
Kidney	2 608	11	2.1	0.25	1 702	11	2.2	0.18	5 472	2.65
Hodgkin lymphoma	2 030	12	1.6	0.10	919	16	1.2	0.06	5 031	2.44
Brain, central nervous system	1 798	13	1.4	0.10	1 409	14	1.8	0.09	3 568	1.73
Lung	1 789	14	1.4	0.24	1 643	12	2.1	0.22	2 040	0.99
Pancreas	1 477	15	1.2	0.19	1 454	13	1.8	0.19	1 305	0.63
Corpus uteri	1 465	16	1.2	0.36	470	26	0.60	0.13	3 255	3.20
Nasopharynx	1 379	17	1.1	0.11	926	15	1.2	0.09	2 856	1.39
Lip, oral cavity	1 292	18	1.0	0.14	801	17	1.0	0.09	2 477	1.20
Bladder	1 241	19	0.99	0.15	684	21	0.87	0.08	2 350	1.14
Kaposi sarcoma	1 170	20	0.94	0.06	686	20	0.87	0.03	2 470	1.20
Anus	1 051	21	0.84	0.10	765	18	0.97	0.08	1 860	0.90
Testis	1 005	22	0.81	0.09	395	27	0.50	0.04	2 598	2.49
Thyroid	978	23	0.78	0.08	362	28	0.46	0.04	2 243	1.09
Vulva	930	24	0.75	0.15	527	24	0.67	0.10	2 086	2.05
Salivary glands	916	25	0.73	0.08	577	22	0.73	0.07	2 011	0.98
Multiple myeloma	891	26	0.71	0.11	748	19	0.95	0.10	1 533	0.74
Larynx	793	27	0.64	0.10	539	23	0.68	0.07	1 496	0.73
Oesophagus	515	28	0.41	0.06	489	25	0.62	0.06	563	0.27
Melanoma of skin	479	29	0.38	0.05	195	30	0.25	0.02	985	0.48
Oropharynx	256	30	0.21	0.03	172	31	0.22	0.02	458	0.22
Gallbladder	222	31	0.18	0.03	196	29	0.25	0.03	283	0.14
Vagina	158	32	0.13	0.03	93	32	0.12	0.02	310	0.30
Hypopharynx	88	33	0.07	0.01	70	33	0.09	0.01	110	0.05
Mesothelioma	69	34	0.06	0.01	66	34	0.08	0.01	78	0.04
Penis	20	35	0.02	0.00	9	35	0.01	0.00	41	0.04
All cancer sites	124 815	-	-	11.65	78 899	-	-	8.11	233 911	113.5

(Source: Global Cancer Observatory, 2021)

World Health Organization grouped different types of breast cancer: Ductal carcinoma (in-situ), Invasive ductal carcinoma, invasive lobular carcinoma and inflammatory breast cancer (WHO,2018). Of all the different types of breast cancer, Invasive ductal carcinoma is the most common (WHO, 2019).

2.4 Treatment experiences of breast cancer patients

Breast cancer is the leading cause of all cancer-related deaths, accounting for 15% of all deaths associated with cancer; therefore, it is the commonest cause of cancer deaths (WHO, 2020). In women, breast cancer is the most common cancer (CDC, 2018) and one of the foremost causes of cancer-related deaths in Nigeria (Olasehinde et al., 2019). However, there has been tremendous progress in recent times, in the diagnosis, treatment and prevention procedures of breast cancer, mainly as a result of headways made in biomedical technology, thus resulting in an improved survival rate and treatment outcomes (Gunusen, Inan and Ustun, 2013; Williams and Jeanetta, 2016).

Notwithstanding the advancement in breast cancer diagnosis and management, methods used to treat breast cancer can create other problems for the patients and survivors (Remmers, Holtgrawe, and Pinkert, 2010). There is evidence that significant distress on the patient, uncertainty and fear for the future (especially the possibility of reoccurrence) and that breast cancer many times calls into question a woman's self-confidence, identity, body image and sexual relationships (Krigel et al., 2014; Campbell-Enns and Woodgate, 2015). According to Vilhauer (2008), there are chances that the daily activities of these women will decline as a result of being diagnosed with breast cancer. Consequently, it is imperative to understudy their treatment experiences and appreciate their journey through their lenses (Clark et al., 2018).

During the manifestation of the disease, the course of treatment and post-treatment, women with breast cancer have problems in all facets of their lives. Breast cancer prognosis and treatment negatively affect a woman's physical and psychosocial experiences (Gunusen et al., 2013). In addition, the physical signs of breast cancer, the treatment after effects, acute consequences of chemotherapy, mastectomy, and other treatment options weigh down these women and their lifestyles (Vilhauer, 2008).

According to Olasehinde et al., 2019, mastectomy is the most used treatment option for invasive breast cancer in developing countries like Nigeria. This treatment's popularity is partly because women usually show up for diagnosis with large tumours, thereby limiting the option of preserving the breast. This delay in the presentation may be attributed to the aversion to mastectomy. Experiencing mastectomy for most women is perceived as interfering with their quality of life as the female breasts are perceived as a hallmark of womanhood and a vital organ for motherhood. These beliefs may cause an aversion to mastectomy, which may be responsible for a delay in presentation or outright refusal of treatment (Koçan and Gürsoy, 2016.).

A study conducted in France by Williams and Jeanetta (2016) unveiled that the physiological changes witnessed by breast cancer patients posed a principal adverse factor during diagnosis and treatment. The study respondent informed that hair loss, including eyelashes and eyebrows, was the most crucial element of their treatment experiences. In addition, it affected their self-esteem and the ability to cope in the early stages of diagnosis and treatment. Coping in this situation is associated with their ability to comfortably handle the stress and problems linked to the diagnosis and treatment of breast cancer. To successfully manage the attendant stress and challenges, some patients turned to chronicle their daily schedule and involvement in fun activities to remain positive and have high-level participation in religious and spiritual exercises (Gunusen et al., 2013; Williams and Jeanetta, 2016).

Treatment experiences for breast cancer patients have remarkably changed due to improved efforts in cancer care delivery. Clinicians are steadily and increasingly motivated to achieve patient-centred communication and involve the patient in decision making (Katz et al., 2017). According to Thomsen et al., 2007, this interpersonal dimension leads to patient satisfaction with cancer treatment. This link is because patient satisfaction with treatment outcomes may be regarded as an accomplishment on the one hand and because satisfaction in treatment outcomes has been linked to adherence to treatment directives, pain control, and emotional and psychological well-being of breast cancer patients. On the other hand, dissatisfaction by a patient can lead to low adherence to treatment directives, a longer period of recovery, an increased rate of complications and a poor psychosocial state.

Laporte et al., 2017 reported that numerous studies have looked into the psychosocial effect of breast cancer. Women diagnosed and treated for breast cancer believe that they have to start a new life after diagnosis and treatment. They reported difficulty settling back to family life and coming to terms with their new reality and social commitments. While dealing with these circumstances, patients turn to spirituality, adapt and make sense of their unique situation and receive social support (Gunusen et al., 2013). In a similar study conducted by Williams and Jeanetta (2016), most cancer patients stated that support was a principal factor in their psychosocial, physical and emotional health balance during diagnosis and treatment. Support from friends and colleagues was highlighted as an essential element of their support system. However, the family was rated as the most critical support system.

From the above-reviewed literature, several factors are said to be affecting treatment experiences of breast cancer, with less attention being drawn to investigating the potential contribution of sociocultural factors to the breast cancer epidemic (Ball & Crawford, 2010). In the new Health definition by World Health Organization, some neglected aspects of health were incorporated, considering their importance in an effective health care delivery (Peat, 1997). WHO's the recent definition of health defined health as a state of complete physical, mental and social wellbeing and not merely the absence of disease and infirmity (WHO, 1978). This new definition covers all aspects of well-being, covering quality of life, positive mental health and consideration of culturally sensitive approaches to healthcare (Peat, 1997). Cultural issues have increasingly become incorporated into health care due to the recognition of great intimacy between cultural beliefs and health beliefs (Vaughn et al., 2009). According to Vaughn et al., 2009, to effectively address any health issue, the knowledge of cultural differences and their impact on treatment decisions should be prioritised (Vaughn et al., 2009).

2.5 Sociocultural factors and breast cancer management

Sociocultural factors refer to social determinants of health (CDC,2018). These social determinants of health affect one's health treatment-seeking behaviour, which affects their health (CDC,2018). Centre for disease control and prevention named the following as some of the social determinants of health: Culture and Ethnicity, spiritual and religious values, sexual identification, family and social support, alternative treatment, and social and physical environment (CDC, 2018).

Culture is said to Influence health and healing practices (Vaughn et al., 2009). In a study conducted in Ghana, sociocultural factors were one of the four main influential factors contributing to breast cancer's late presentation (Wiafe, 2017). Erroneous beliefs and misconceptions about breast cancer were common themes among many studies carried out in Africa. According to some patients, the perceived causes of breast cancer include evil spirits, amorous lifestyles, supernatural manipulation or a retributive justice by God. These misconceptions are why women delay presenting their condition for diagnosis and treatment (Bonsu and Ncama 2019).

Another cultural barrier to breast cancer management and early presentation is taboos. Women are considered off-limits to touch or feel their breasts in some African and Asian communities (Nwagu et al., 2021; Ahmadian and Samah, 2012). On the other hand, it is equally unacceptable for a male medical practitioner to feel or examine a woman's breast. To avoid being assessed by a male medical practitioner, women refuse to present themselves at the hospital for diagnosis in good time (Nwagu et al., 2021; Ahmadian and Samah, 2012; Ahmadian et al., 2011).

In another study carried out in Ghana by Tetteh 2016, traditional notions about 'gender' and 'full woman' were identified to affect breast cancer patients' experiences (Tetteh, 2017). In addition, scholars recognise that sociocultural body image affects access to breast cancer prevention and treatment (Nyblade et al., 2017, Vanderpuye et al., 2017). For instance, Vanderpuye et al. (2017) stated that most African women consider breast cancer surgery shaming, dishonouring, having a spiritual undertone, and culturally abominable. This perception leads to the high rate of mastectomy refusal in some countries like Nigeria (Vanderpuye et al., 2017: Martei, Vanderpuye and Jones, 2018; Olasehinde et al., 2019).

Also, there is this concern of initial denial of breast cancer among these women due to fear of death. In a study finding, women believe that breast cancer always results in a deadly outcome: deformation from chemotherapy and mastectomy (Allo, Edewor, and Imhonopi, 2019; Iddrisu, Aziato, and Dedey, 2020). Because most women perceive breast cancer as irredeemable and the associated stigmatisation that comes with it, they tend to delay seeking help to avoid confirming themselves as a carrier of the disease (Bonsu and Ncama 2019). This delay affects their treatment and outcomes.

The role of religious affiliation as a social support system is a recurring theme in recent studies. Martei, Vanderpuye and Jones (2018) stated that the church played an influential role as a support system before presentation for diagnosis and after. From the study of Matei et al. (2018), the church's position was positive as it encouraged the women to seek medical help upon their revelation of their condition to trusted members in the church circle. Equally, Bonsu and Ncama (2019) and Allo et al. (2019) identified the church's role as a support system in their different studies. However, the outcome of their research differs Matei et al. (2018). They informed that religious network groups aided the women in delaying presentation and care-seeking from medical experts in one way or another. These women are reassured by trusted church leaders in the supernatural and miraculous powers of God; and that nothing is beyond the powers of God, including making the breast cancer vanish.

Various scholars also identified alternative treatment as a significant cause of delays in presentation for diagnosis and treatment by many women (Mohd Mujar et al., 2017). Matei et al. (2018) stated that a common risk factor that aids delayed presentation is the quest for alternative treatment from traditional healers. Black and Richmond (2019) informed that these alternative treatments are not limited to traditional healers but prayer camps and religious homes. Also, the economic and financial strength of women involved influences the preference for alternative treatment (Akuoko et al., 2017; Foerster et al., 2019).

For Bonsu and Ncama (2019), alternative treatment was partly influenced by mistrust in contemporary medicine due to some history of misdiagnosis and mismanagement of breast cancer cases by some practitioners.

Studies have shown that African women commonly deprioritise their health and pay more attention to family and social responsibilities (Allo et al., 2019). Women tend to be concerned with a commitment to children, spouses and close relatives. As a result of these obligations, some women tend to ignore their health and thereby delay care-seeking behaviour (Bonsu and Ncama 2019). This behaviour is not limited to African women alone. A study performed in Germany by Remmers et al. (2010) reported that respondents with younger children or relatives with special care needs were more concerned about their young children and family members than themselves.

In a study by Nwagu et al. (2021), sociocultural factors present unique challenges and opportunities for the management of breast cancer. Identifying these challenges will pave the way to understanding them, thus; providing solutions toward reducing or eliminating them. There is spare literature on the impact of sociocultural factors on breast cancer treatment outcomes, especially in developing countries like Nigeria. In Nigeria, the mechanism by which sociocultural factors affect breast cancer treatment outcomes is yet to be established. We will be exploring the treatment experiences of breast cancer patients while investigating the impact of sociocultural factors on their treatment outcomes.

2.6 Types of breast cancer

According to the American Cancer Society (2022), a type of breast cancer is established by the precise cells in the breast that become malignant**.** There are more than a few kinds of breast cancer, including sub-types. Nonetheless, breast cancers are classified into two broad types, non-invasive breast cancer and invasive breast cancer.

2.6.1 Non-invasive breast cancer

In the non-invasive type of breast cancer, cells are limited to the ducts and do not spread to nearby breast tissues (In-situ). The non-invasive breast cancer is further classified into Ductal carcinoma in situ (DCIS) and Lobular carcinoma in situ (LCIS).

2.6.1.1 Ductal carcinoma in-Situ (DCIS)

Ductal carcinoma in Situ is also referred to as intraductal carcinoma. According to Sharma et al. (2010), over 90% of all non-invasive breast cancer is Ductal carcinoma in situ (DCIS). In DCIS, cancer has not spread beyond the milk duct, nor have entered the breast tissue around. Having DCIS type of cancer increases the patient's risk of breast cancer reoccurrence and developing a new one by about 30% (NCI, 2016). In most cases, the reoccurrence occurs between 5-10years. Women who had DCIS and undergone surgery without radiation therapy have about 25%to 30% of reoccurrence in future. With radiation therapy after surgery (lumpectomy), there is a 15% reduction in the risk of occurrence. American cancer society (2019) reported that about 60,000 cases of DCIS are diagnosed annually in the U.S., which accounts for 1 in 5 cases of breast cancer. Most cases of DCIS are asymptomatic, and only a few experiences some discharge from the nipple. It is relieving to hear that mammography can be found by about 80% of DCIS (NCI, 2016).

2.6.1.2 Lobular carcinoma in situ (LCIS)

Lobular carcinoma in situ (LCIS) is also called lobular neoplasia. This breast change is not cancer, though the name can be confusing. Lobular carcinoma in situ (LCIS) is less prevalent than DCIS and is conceive as the precursor for intensified risk for breast cancer (Breast Cancer Network Australia, 2022). In LCIS, cells that look like cancer cells are growing in the lobules of the breast's milk-producing glands, but they do not extend through the wall of the lobules.

2.6.2 Invasive Breast Cancer

This is the second broad categorisation of breast cancer. Invasive Breast Cancer becomes invasive when it develops and proliferates beyond the ducts or lobules into the adjourning breast tissues. This type of cancer can be invasive without necessarily spreading to other organs of the body; the disease is confined within the breast and nearby lymph nodes or armpit (Sharma et al., 2010). Invasive breast cancer is further classified into invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC).

2.6.2.1 Invasive ductal carcinoma (IDC)

This type of cancer is also referred to as infiltrating ductal carcinoma. Invasive ductal carcinoma is the most prevalent breast cancer (Zangouri et al., 2018). According to the Breast Cancer Network Australia (2022), 80% of breast cancers diagnosed are attributable to this type of cancer. The word invasive means that cancer has spread around its surrounding breast tissues. Ductal means cancer started from the milk duct, while carcinoma refers to any form of cancer that can start from the skin or other tissues that cover internal organs such as breast tissue (Dillion & Schnitt, 2014). In invasive ductal carcinoma, cancer has broken the walls of the milk duct and invaded the breast's tissues and possibly spread to other body regions (Dillion & Schnitt, 2014; Sharma et al., 2010). This type of cancer can spread to the lymph nodes and other breast parts with time. The American Cancer Society has reported that more than

180,000 women are diagnosed with invasive breast cancer annually in the U.S. Although invasive ductal carcinoma can occur in women at any age, two-thirds of the women affected are 55years; IDC is typical as one gets older (American Cancer Society, 2019). The first sign of IDC is a new lump or mass in the breast

2.6.2.2 Invasive Lobular Carcinoma (ILC)

Invasive Lobular Carcinoma (ILC) is the second most common type of breast cancer after invasive ductal carcinoma. Tasdemir et al. (2018) stated that invasive lobular carcinoma accounts for 10- 15% of all invasive breast cancer. As the name implies, invasive means cancer has already invaded, and lobular means cancer started from the milk-producing lobules, which empty into the duct that carries the milk to the nipple. At the same time, carcinoma means cancer begins from the skin or tissue covering the internal organs. Invasive lobular carcinoma usually spreads to the lymph nodes and other body parts. Although ILC affects all ages, it is common among older women. The risk of ILC increases with hormone replacement therapy during and after menopause (American Cancer Society, 2018). ILC is most likely asymptomatic and usually challenging to detect using a screening mammogram. Invasive ductal carcinoma shows a lump, making mammogram screening very easy because invasive lobular carcinoma spreads to the surrounding connective tissue (stroma) in a line formation instead of a lump. (American cancer society 2016).

Other types of invasive breast cancer are less prevalent when compared to Invasive Ductal Carcinoma (IDC) and Invasive Lobular Carcinoma (ILC). They include Paget Disease Nipple, Inflammatory Breast Cancer, Phyllodes Tumours of the Breast, Medullary carcinoma, Mucinous carcinoma, Tubular carcinoma, etc.

2.6.3 Paget's disease

Paget's disease of the nipple is an uncommon type of breast cancer which starts in the milk ducts and develops to the nipple and skin around the areola. This cancer type is responsible for about 1% of all cancer types (Sharma et al., 2010). The symptoms of this cancer type include itchy, reddish, scaly and irritation in the nipple and areola area (Ooi et al., 2019). These rare changes in the nipple and areola area are usually the early precursors signifying the presence of cancer (Breast Cancer Network Australia, 2022).

2.6.4 Inflammatory Breast Cancer (IBC)

Inflammatory breast cancer is an uncommon malignant tumour that is a rare subtype of breast cancer and very aggressive (Dawood et al., 2011). Inflammatory breast cancer causes the breast to be red and warm, resulting from the cancer cells blocking the lymph vessels of the breast (Pan et al., 2019). This type of breast cancer is fast-grow and spreads very quickly, with the symptoms getting worse in hours or even a day. This rare breast cancer accounts for about 1% of all breast cancer cases (Sharma et al., 2010). According to the American cancer society (2022), inflammatory breast cancer accounts for about 1%-5% of all breast cancer types in the U.S.

Notwithstanding its low prevalent rate, Inflammatory breast cancer is accountable for 7-10% of mortalities associated with breast cancer in western countries (Lim et al., 2018; Valeta-Magara et al., 2019). The first symptom of inflammatory breast cancer is reddening and swelling, making the breast feel thicker and heavier. Being overweight has been established as one of the significant risk factors for inflammatory breast cancer (Rana et al., 2019).

2.6.5 Phyllodes Tumours

These are usually non-cancerous though some can be malignant, with less than a 1% incidence rate (Ogunbiyi et al., 2019). These tumours tend to develop quickly. Nonetheless, it hardly proliferates beyond the breast region. These tumours grow within the breast connective tissue. This connective tissue, known as stroma, is not within the breast ducts and lobules and is most often treated by surgical removal (Chen et al., 2018; Sharma et al., 2010). According to Ofri et al. (2022) Phyllodes Tumours develop in three histological grades: harmless, borderline, and malignant.

2.6.6 Medullary carcinomas

Medullary carcinomas are considered invasive breast cancer and are recognised as part of the range of tumour penetrating and encroaching the lymphocyte-rich breast cancers (Shea, Koh and Tan, 2020). Studies have shown that medullary cancers have a good diagnosis, notwithstanding the high histological grade (Reis-Filho and Lakhani, 2008).

2.6.7 Mucinous carcinoma (MC)

Mucinous breast carcinoma is a moving lake of tumour clusters inside extracellular mucin pools. It is an inert type of invasive breast cancer (Marrazzo et al., 2020). Mucinous carcinoma is grouped into two sub-groups; Pure mucinous carcinoma (PMC) and Mixed mucinous carcinoma (MMC) (Jang et al., 2020; Marrazzo et al., 2020). The subdivision is due to the percentage of a mucinous element in the tumour. More than 90% of mucinous component is contained in Pure Mucinous Carcinoma (PMC). PMC is an uncommon type of breast cancer usually associated with elderly patients and is estimated to account for about 2% of all invasive cancers. PMC is low-grade cancer, and the success of prognosis is satisfactory (Pareja et al., 2019). The component of mucin associated with the Mixed mucinous carcinoma (MMC) is less than 90%, with the appearance of other forms like the ductal or lobular breast cancer (Marrazzo et al., 2020).

2.6.8 Tubular carcinoma

Tubular carcinoma is an uncommon subtype of breast cancer that has been recognized to have an excellent prognosis (Poirier et al., 2018; Zhang et. al., 2018). It is associated with small tumour size and low prevalence of lymph node incidence, and it accounts for 2-4% of all breast cancers. The rate of detection and diagnosis of tubular carcinoma has greatly improved because of increased breast screening awareness (Sharma et al., 2010; Zhang et al., 2018; Chen et al., 2019).

2.7 Risk factors of breast cancer

A combination of factors increases a person's risk of breast cancer. However, there are factors that one cannot control, like being a woman, getting older and having an early menstrual period. Irrespective of the above stated, other risk factors predispose women to breast cancer that one can control. Below are the risk factors for breast cancer:

2.7.1 Being a woman

Being a woman is one of the most significant risks of developing breast cancer (WHO, 2019). Although men develop breast cancer, only 1% of 266,120 new cases of invasive breast cancer and 63.960 cases of non-invasive cancer occur in men. This gender inequality in breast cancer distribution is underpinned by the hormonal stimulation of highly responsive and vulnerable breast cells found in women. Men's breast cells are inactive with low oestrogen levels, unlike in women, where breast cells are highly active with a high oestrogen level.

2.7.2 Getting Older

Breast cancer incidence increases with age (CDC, 2018; Yi-sheng et al., 2017). Incidence of breast cancer is highly related to increasing age and is common among women 50 years and above (CDC,2018**).** According to the American Cancer Society, the ageing process is one of the most significant breasts cancer risk factors. Most genetic damage in the human body usually occurs as one gets older. This is because our bodies become so weak and less capable of repairing genetic damage. American Cancer Society stated that 1 out of 8 invasive breast cancer develops in a woman younger than 45, and 2 out of 3 invasive cancer is found in women 55 years and older. Getting old increases a woman's risk of breast cancer.

2.7.3 Genetic mutation

BRCA1 and BRCA2 are two famous anti-oncogenes for breast cancer risk inherited from a person's mother or father (Yi-sheng et al., 2017; Kuchenbaecker et al., 2017). These genes are human genes that produce proteins that help in repairing damaged DNA; thus, they play a vital role in ensuring the stability of each cell's genetic material. However, DNA damage may not be repaired accurately (NCI,2018). Therefore, women who inherited such genes from parents are at higher risk of developing breast cancer at some point in their lives (WHO,2019; NCI, 2018). Research has shown that 5-10% of breast cancer diagnosis in the U.S is linked to inherited gene mutation (NCI,2018). A recent study reported that about 72% of women who inherit a harmful BRCA1 and about 69% of women who inherit a harmful BRCA2 mutation will develop breast cancer by 80 (Kuchenbaecker et al., 2017). It has been estimated that 20 years after a woman's first breast cancer diagnosis, 40% of women with an inherited harmful BRCA1 mutation and about 26% of women with inherited harmful BRCA2 mutation will develop cancer in their second breast (Kuchenbaecker et al., 2017).

2.7.4 Reproductive history

Women whose menstruation started as early as 12 years are exposed to longer hormones; this is also applicable to women who began menopause after 55 years (CDC,2018). For every one year delay in menarche, breast cancer risk is decreased by 5% and increased by 3% for every one year delay in menopause (Dall and Britt,2017). These longer hormones increase their risk of breast cancer. These hormones at old age create a suitable environment for cancer cells to grow (CDC,2018).

2.7.5 Physical inactivity

Not being physically active and indulging in a sedentary lifestyle increases a person's chance of developing breast cancer (CDC, 2018; Ellingjord-Dale et al., 2017; Fournier et al., 2014). According to Wu et al., 2013, several epidemiological studies have established a link between physical activity and the risk of breast cancer. These studies have shown that physically active women have a lower risk of breast cancer than inactive women. In a meta-analysis of 31 prospective studies carried out in 2013, the average risk of breast cancer reduction associated with physical activity was 12% (Wu et al., 2013). The increase in the risk of breast cancer due to inactivity can be seen in both premenopausal and post-menopausal, with the latter most common (Eliassen et al., 2010; Wu et al., 2013). Therefore, there is the possibility that women who increase their physical activity after menopause may have a lower risk of breast cancer (Fournier et al., 2014; Eliassen et al., 2010; Ellingjord-Dale et al., 2017).

2.7.6 Alcohol intake

The quantity of alcohol consumed by a person exposes one to the risk of developing breast cancer, especially in women (Bagnardi et al., 2015; LoConte et al., 2018). As being a woman exposes one to breast cancer, alcohol intake will increase the risk (LoConte et al., 2018; Ellingjord-Dale et al., 2017). Alcohol intake influences how a woman’s body metabolizes estrogen, which could result from rising in estrogen levels. Women who drink alcohol have higher estrogen levels than women who do not (Key et al., 2011). This increased estrogen level increases a woman’s risk of breast cancer (Key et al., 2011). According to Bagnardi et al., 2015, several epidemiological studies have linked increased risk of breast cancer with increased alcohol intake. Data from 118 individual studies have indicated that light alcohol drinkers have a slightly increased (1.04-fold higher) risk of breast cancer than non-drinkers. The risk of breast cancer is common among heavy drinkers (1.6 fold higher) and moderate drinkers (1.23 fold higher) (Bagnardi et al., 2015). Cao et al. reported that on analysis of a prospective data of 88,000 women in two US cohort studies, findings and conclusions showed that women who never smoked, light to moderate drinking was a 1.13fold increased risk of breast cancer (Cao et al., 2015.

2.7.7 Having Dense breast

A dense breast comprises more connective tissue than fatty tissue (CDC, 2018; Yaghjyan, 2011). Women with dense breasts are 4-5 times at higher risk of breast cancer than women without dense breasts (Boyd et al., 2007). With dense breasts, diagnosing breast cancer is not easy as the dense breast is tough to be detected by mammogram. Breast cancer can easily be seen under the mammogram when fatty tissues surround them. Since the dense breast is more connective than fatty tissues, diagnosing breast cancer is complex. Therefore, women with dense breasts are usually asked to repeat their screening from time to time.

2.7.8 Use of combination hormone therapy

Consumption of hormones to replace estrogen and progesterone for more than five years exposes one to a higher risk of breast cancer (CDC, 2018). A study conducted in the UK on a million women reported a relative risk (RR) of 1.66 between current hormone replacement therapy users and those who never used it (Beral,2003). In addition, a cohort study of 22,929 women in Asia demonstrated a hormone replacement of 1.48 and 1.95 after Hormone replacement therapy for 4 and 8 years, respectively (Liu, 2016). It has also been established that the reoccurrence rate of breast cancer in women using hormone replacement therapy is high (Fuhlen et al., 2013).

2.7.9 Consumption of oral contraceptive

Continuous intake of oral contraceptives puts a woman at risk of breast cancer (CDC, 2018, Soroush et al., 2016; Bethea et al., 2015). Women who use oral contraceptives before the age of 20 are at more risk than women who use contraceptives at an older age. (McPherson et al., 2000).

2.7.10 Previous diagnosis

For a person diagnosed with breast cancer earlier, her risk of developing it again is increased (CDC, 2018). Reoccurrence is common with breast cancer; as such, having been diagnosed and treated for breast cancer does not prevent you from having it again instead, it increases the chance of occurrence (CDC, 2018).

2.7.11 Family history

Most breast cancer cases are related to family history (Brewer et al., 2017). A person’s risk of developing breast cancer increases if their first-degree female relative had/has been diagnosed or treated for breast cancer (Braithwaite et al., 2018; CDC, 2018; Siegel et al., 2017). First-degree female relations could be your mother, sister or daughter (CDC, 2018). A cohort study conducted in the UK involving over 113,000 women reported that women with one first degree relative with breast cancer have a 1.75-fold higher risk of developing the disease than women without any affected relative (Brewer et al., 2017). The risk level increases with the number of affected first-degree relatives (Brewer et al., 2017). About 13-16 per cent of women diagnosed with breast cancer have a first-degree female relative (Siegel et al., 2017). A woman who has a first-degree female relative with breast cancer is twice at risk than a woman without this family history [Braithwaite et al., 2018]. The more the number of first-degree female relatives with breast cancer, the higher the risk, about 2-4 times higher (Kharazmi et al., 2014).

2.7.12 Previous treatment using radiation

Women who have undergone radiation therapy stand an increased risk of breast cancer (CDC, 2018). When exposure to radiation is done before age 30, the person's risk of breast cancer is higher (CDC, 2018). High-energy radiation, such as x-rays can damage DNA and cause breast cancer.

2.7.13 Obesity

Evidence has shown an association between obesity and breast cancer. According to the study by Picon-Ruiz (2017), obesity predisposes women to a higher risk of breast cancer. This association is stronger among postmenopausal women (Engin, 2017; Picon-Ruiz (2017). The association of a higher risk of obesity among postmenopausal women was further supported by a study by White et al., (2015).

In Engin's (2017) report, a stronger association was evident between increased body mass index (BMI) and a higher incidence of breast cancer. The established association is as a result of an increase in the estrogens level from excessive aromatization activity of the following: adipose tissue, insulin resistance, hyperactivation of insulin-like growth factors (IGFs) pathways, overexpression of pro-inflammatory cytokines, extreme oxidative stress, adipocyte-derived adipokines and hypercholesterolemia are contributory factors to breast cancer development among the obese women (Engin, 2017).

2.7.14 Having your first child at an older age

Women who give birth to their first child after age 30 have an increased risk of breast cancer (Silkina & Bakhtiyarov 2018). According to Cardonick 2014, women with delayed first pregnancy and childbirth to older maternal ages are prone to an increased risk of breast cancer. This evidence by Cardonick (2014) supported the findings of other studies by Phipps (2010) and Reeves (2009). Furthermore, this evidenced association of age at first pregnancy and childbirth and breast cancer is more potent in histological subtypes of breast cancer, including ductal, lobular, and mixed ductal-lobular carcinoma, with lobular carcinoma the most common (Phipps, 2010; Silkina & Bakhtiyarov 2018).

2.8 Breast cancer diagnosis

There must be a referral from your doctor for breast cancer to be diagnosed. Breast cancer specialist usually carries out a breast cancer diagnosis. The diagnosis can be made in four ways: Breast ultrasound, diagnostic mammogram, Magnetic Resonance Imaging (MRI), and Biopsy. (CDC,2018; NHS, 2016)

2.8.1 Breast Ultrasound

Breast cancer can be diagnosed using an ultrasound machine. This machine uses high-frequency waves to create a detailed picture (Sonograms) of areas inside the breast, detecting abnormalities (CDC, 2018). This diagnosis is mainly effective when the specialist needs to know if the breast lump is in a solid or liquid state. Also, breast ultrasound is primarily recommended for young women under 35 years. This choice of diagnosis for under 35 women is because having a dense breast is common among this group, and a mammogram is not very efficient and effective in diagnosing breast cancer in a woman with dense breasts.

2.8.2 Diagnostic Mammogram

According to World Health Organisation, mammography screening is the only screening method proven to be very effective and widely used (WHO,2019; Yi-Sheng at el., 2017). However, with the proven effect of mammography screening, its expensive cost becomes a challenge that everyone cannot afford (WHO,2019). A Diagnostic Mammogram is an advanced x-ray of the breast that is usually done when there is an abnormal growth or changes like a lump in the breast tissue. Mammograms are carried out to provide a baseline reference for evaluating abnormal growth or changes in the breast. A mammogram helps a health provider ascertain if the growth in one’s breast will need further investigation. In addition, a mammogram is used to identify small lumps that mere physical examination cannot detect; it detects breast cancer at its early stages (CDC, 2018).

Mammography procedure

A technician compresses the breast with a digital x-ray machine and takes pictures from different angles, creating an image of the breast. These images of the breast made during the x-ray are called the mammogram. Under the x-rays, the fatty tissues appear dark and translucent, while the breast cancer tissues are usually white and opaque.

2.8.3 Magnetic Resonance Imaging (MRI)

MRI is a machine that scans the whole body using a powerful magnetic field. This magnetic heat is connected to a computer to create a detailed image of the breast and lymph nodes. MRI is used primarily to ascertain the extent of the disease in the breast (NHS England, 2018).

2.8.4 Biopsy

This diagnostic procedure involves a microscopic examination of fluid extracted from the breast. Biopsies can be performed differently depending on what the specialist knows about your condition. It can be carried out through fine-needle aspiration, open or core biopsies.

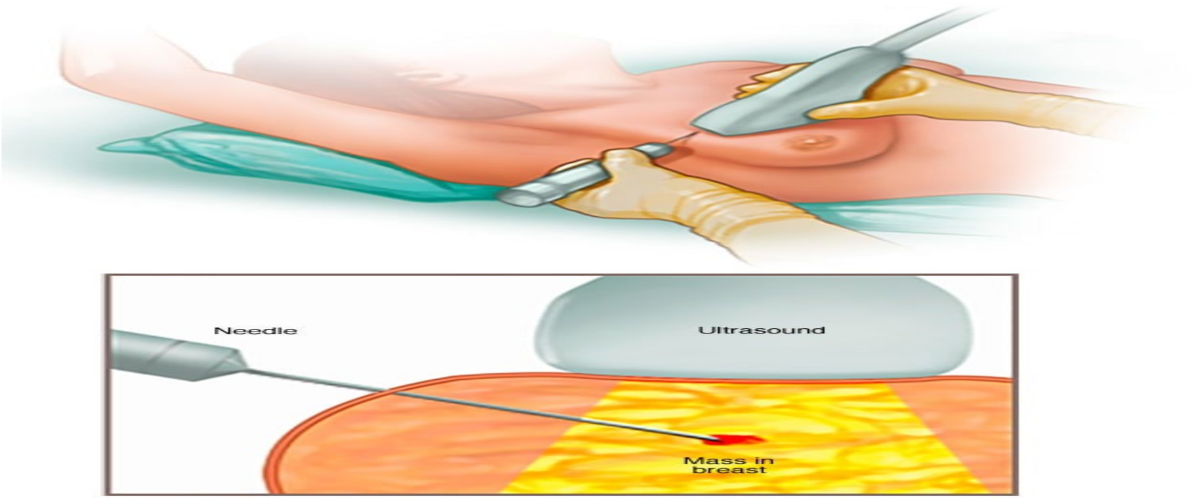
2.8.4.1 Fine needle aspiration

Fine needle aspiration involves using a thin needle to extract some samples of your breast cells. The needle is inserted into the breast, and a small amount of breast cell or fluid-filled lump is withdrawn for a Microscopic laboratory examination

2.8.4.2 Core Biopsy

Core biopsy is similar to fine needle aspiration, but in this case, the needle is bigger than that of the fine-needle aspiration. The core biopsy is usually gone under local anaesthesia (meaning that you will be awake during the procedure, but your breast areas will be numb. This procedure is guided by ultrasound. Also, based on the location of the mass, imaging techniques such as a mammogram or Magnetic Resonance Imaging (MRI) are used to guide the position of the needle for the tissue sample collection.

Figure 2: Biopsy diagram



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2.9 Breast cancer staging

After diagnosis and the presence of breast cancer is established, the next thing the doctors do is determine the breast cancer stage. The stage of breast cancer describes the size of cancer and the extent cancer has spread and gives an insight into the outlook (NHS, 2018; CDC, 2018).

2.9.1 Breast cancer staging procedures/tests

According to Mayo Clinic (2022), different tests and techniques are used in staging breast cancer after diagnosis. Doctors can ascertain the stage of breast cancer before surgery; nevertheless, it is easier to prove after surgery. The procedures/tests are as follows:

- Breast Magnetic Resonance Imaging
- Blood tests
- Mammogram
- Breast MRI
- Bone scan
- Positron emission tomography (PET) scan
- Computerized tomography (CT) scan

2.9.2 Stages of breast cancer

Stages of breast cancer are dependent on several factors, including tumour size, cancer characteristics, the location of cancer, and the degree and extent the tumour cells have infiltrated the breast tissues (Akram et. al., 2017). Breast cancer cells might be localized in the breast tissue during diagnosis or in the axillary lymph nodes located under the arm or other regions of the body. The stage of breast cancer is assigned based on the location where the tumour is situated (Trayes and Cokenakes, 2021).

Based on the above, breast cancer is conventionally expressed and designated on a scale of 0 to IV when cancer is diagnosed. The categorization in stages aids medical personnel in establishing the most suitable treatment and diagnosis (Sharma et. al., 2010). While the lowest stage (0) describes the non-invasive, the highest stage (IV) defines the invasive type of tumour. Therefore, the terms stage IV and metastatic are used interchangeably (Breastcancer.org). Most mortality from breast cancer is attributed to breast cancer metastasis. Consequently, it is crucial to detect cancer early for prognosis, management, and prediction of breast cancer development and progression (Akram et. al., 2017). The stages, as described below, are primarily based on the severity and location of cancer.

2.9.2.1 Stage 0

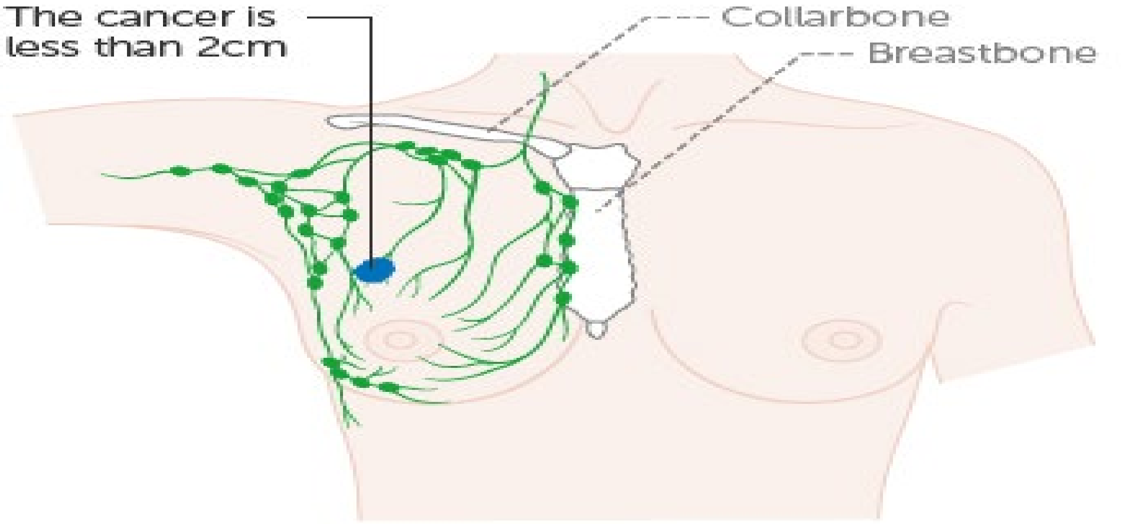
The Ductal Carcinoma in Situ (DCIS) is an excellent example of this tumour stage. Stage 0 is usually ascribed to non-invasive breast cancers. In this stage, both cancerous and non-cancerous cells are still situated within the breast region where the tumour originated. There is no indication of cancer cells spreading or invading the adjoining tissues in the breast region.

2.9.2.2 Stage I

This stage has two subtypes known as IA and IB. This stage indicates the presence of possible invasive cancer. It connotes that cancer cells are spreading and invading adjoining breast tissues.

Type A: describes invasive breast cancer in which tumour size is up to 2 centimetres, the cancer is still localized within the breast, and lymph nodes are yet to be invaded.

Figure 3: Diagrammatic representation of stage IA Breast Cancer



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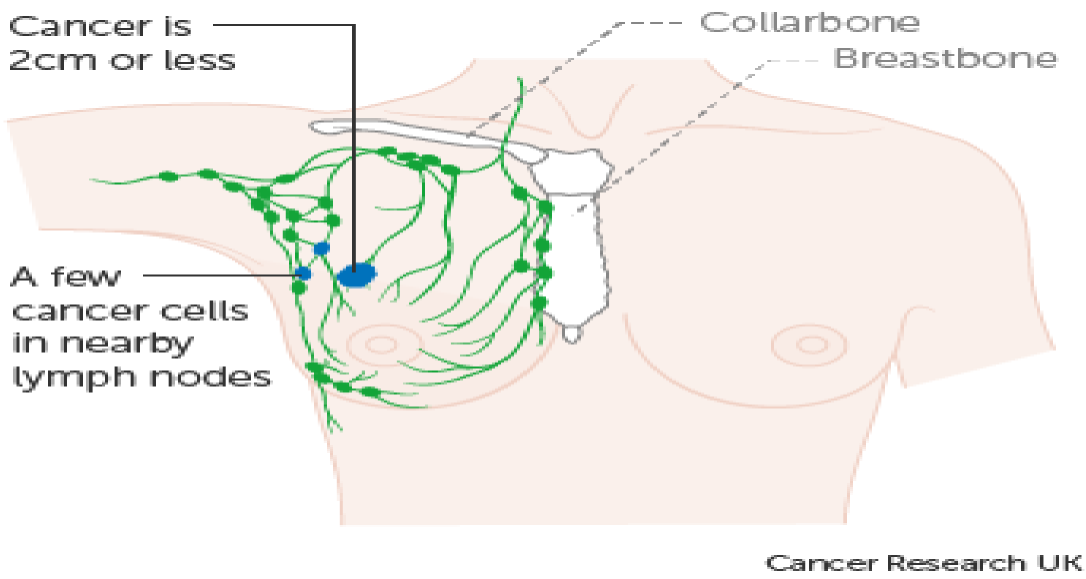
Stage IB

For type B, there is no evidence of tumour in the breast; instead, there are small clusters of cancer cells more significant than 0.2 millimetres but within the size of 2 millimetres discoverable in the lymph nodes (Cancer Research UK, 2020). In addition, there is the possibility of microscopic invasion at this stage, whereby the cancer cells measuring less than 1 millimetre, have commenced invasion of the external tissue walls of the lobule and duct (BreastCancer.org, 2022).

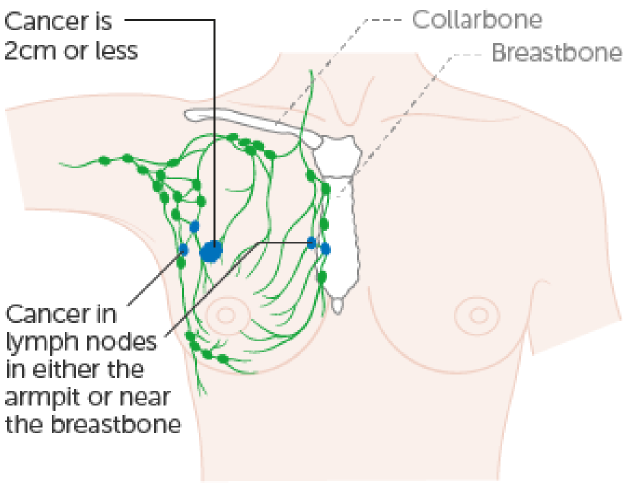
Figure 4: Diagrammatic representation of stage IB Breast Cancer



2.9.2.3 Stage II

This stage has two sub-types; IIA and IIB. Stage IIA indicates the absence of a tumour in the breast. Stage IIB shows the tumour in the lymph nodes under the arm or those close to the breastbone. In this case, the tumour can be under 2 centimetres but not larger than 5 centimetres (Moran et al., 2014).

Figure 5: Diagrammatic representation of stage IIA Breast Cancer



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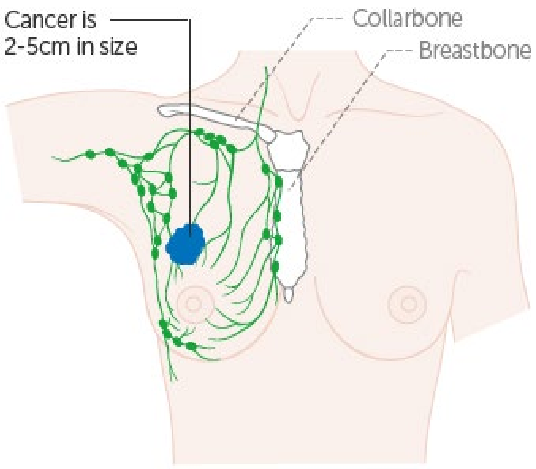

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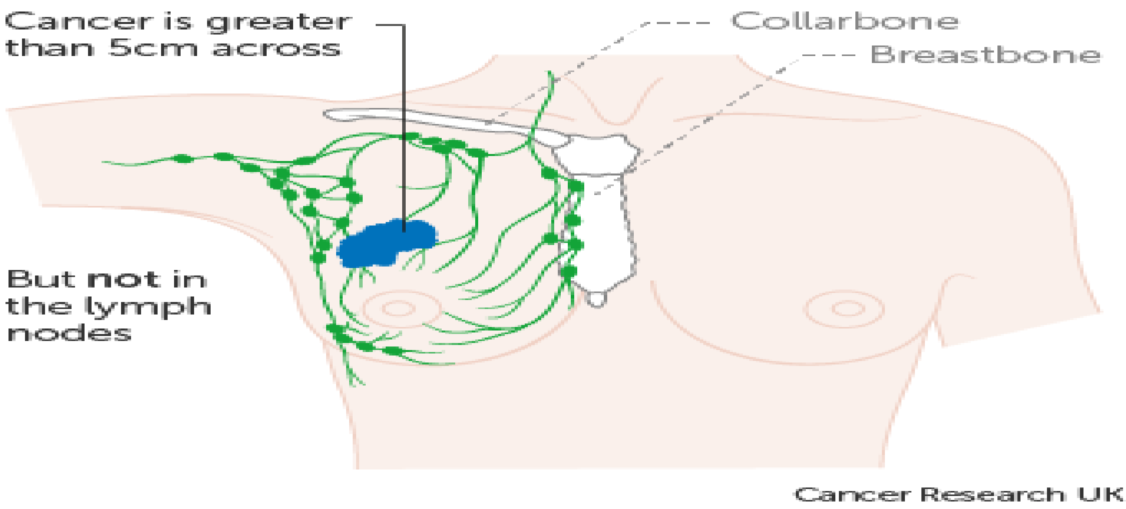
Figure 6: Diagrammatic representation of stage IIB Breast Cancer



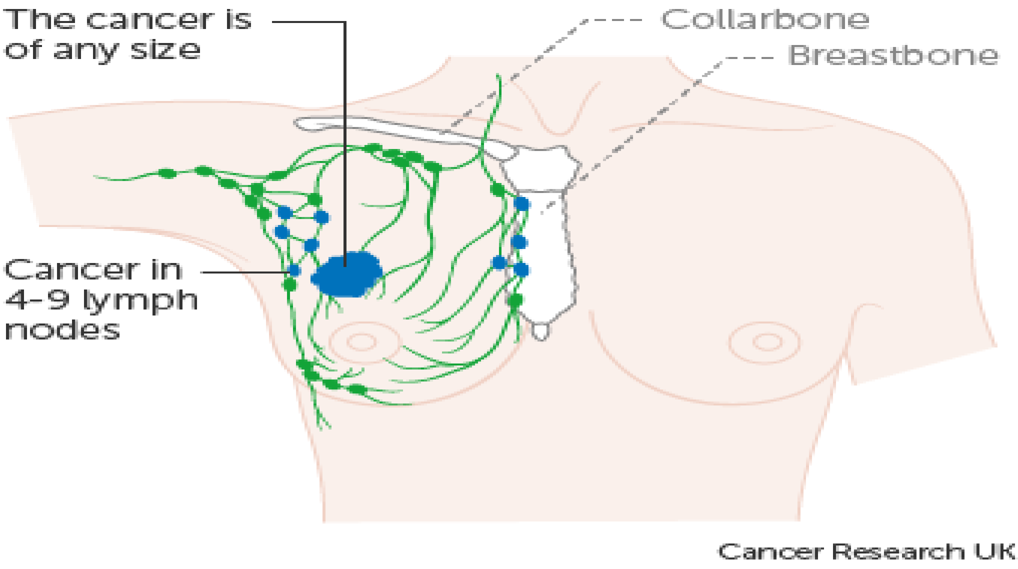
2.9.2.4 Stage III

Stage III has three subtypes; IIIA, IIIB & IIIC.

Stage IIIA

The first subtype (IIIA) describes invasive breast cancer whereby there is a tumour of any size in the breast, and the cancer is detected in four to nine lymph nodes under the armpit or in the lymph nodes close to the breastbone. Also, when a small cluster of breast cancer cells is detected in the nymph nodes and with a tumour greater than 5 centimeters, it is considered stage IIIA. The subtype stage IIIA further describes when cancer has progressed from one to three lymph nodes under the armpit or the lymph nodes close to the breastbone.

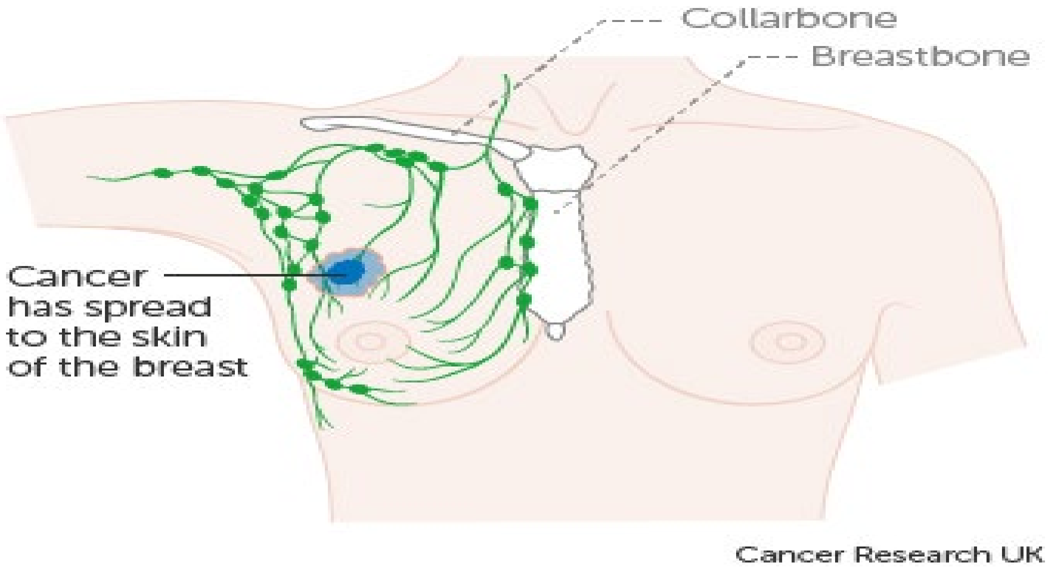
Figure 7: Diagrammatic representation of stage IIIA Breast Cancer



Stage IIIB

In the second subtype of stage III(B) breast cancer, the tumour size varies and does not count. However, the tumour must have spread to the skin or chest wall, causing inflammation and ulcer on the breast (BreastCancer.org, 2022).

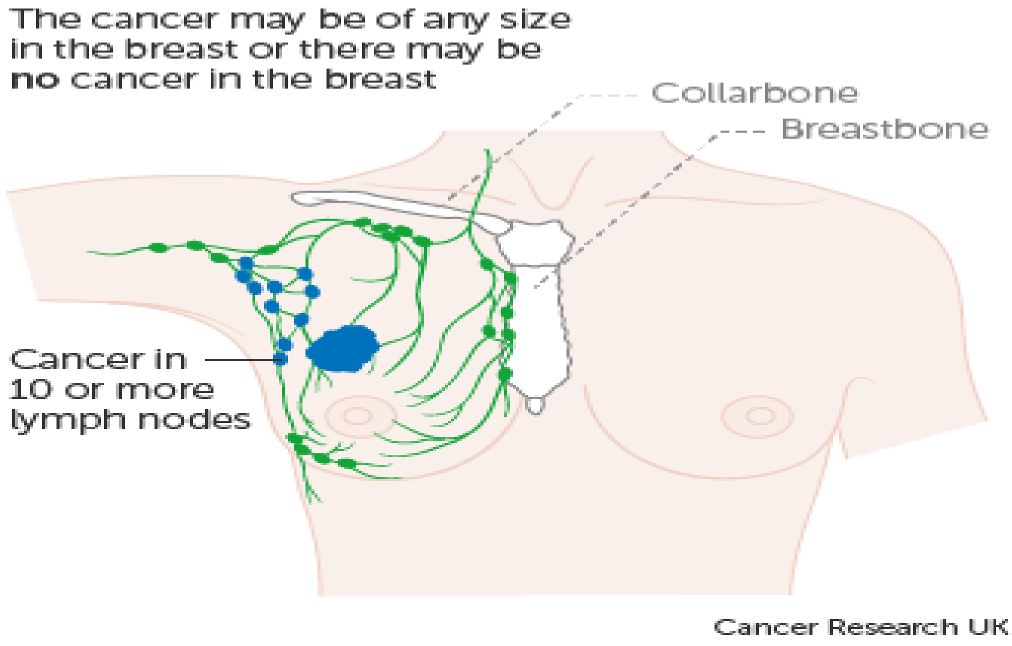
Figure 8: Diagrammatic representation of stage IIIB Breast Cancer



Stage IIIC

In the third subtype (IIIC), the tumour size can be of any size and has progressed to 10 or more lymph nodes under the armpit (Cancer Research UK, 2020). The tumour can be below the collar bone and has inflamed in up to one lymph node close to the breastbone on the matching side as the tumour (Sharma et. al., 2010).

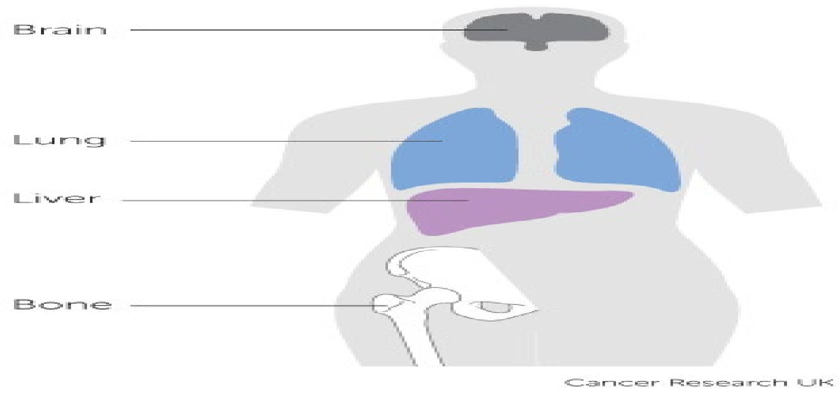
Figure 9: Diagrammatic representation of stage IIIC Breast Cancer



2.9.2.5 Stage IV

This stage is often described as advanced, metastatic or secondary breast cancer (Cancer Research, 2020). However, stage IV cancer is usually used interchangeably with metastatic stage because it describes the stage when cancer has progressed to other vital parts and organs such as the brain, lung, liver and bone.

Figure 10: Diagrammatic representation of stage IV Breast Cancer



2.10 Signs and symptoms of breast cancer

- Swelling of all or part of the breast
- Skin irritation or dimpling
- Breast pain
- Nipple pain or the nipple turning inward
- Redness, scaliness, or thickening of the nipple or breast skin
- Nipple discharge other than breast milk
- Lump in the underarm area
- Aching or burning
- Warmth:
- Orange-peel appearance:
- Swelling of lymph nodes
- Flattening or inversion of the nipple
- Aching or burning

2.11 Breast cancer treatment

According to Cancer Research UK, a doctor's choice of treatment depends on factors like the type of cells that started cancer, the location of the tumour, and other health conditions the patient has. The staging of breast cancer gives an idea of the prognosis. Other factors might be considered in deciding treatment procedure, such as the grade of the cancer, if the cancer cells have receptors for drugs, and if the patient has attained menopause. The type of breast cancer and how it spreads can also determine the kind of treatment to be given. Below are breast cancer treatment options according to the center for disease control and prevention (CDC, 2018):

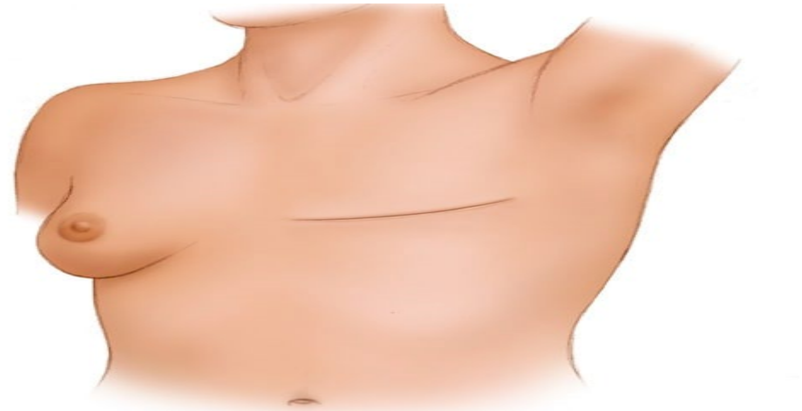
2.11.1 Surgery

This treatment option involves an operation whereby the cancer tissue in the breast will be removed by the doctor (WHO,2019; Moo et al., 2018). This process of cancer tissue removal from the breast could be through Mastectomy, lumpectomy or sentinel node biopsy. However, there are common risks associated with surgery, including the risk of bleeding, arm swelling, infection, and pain (Mayo clinic, 2022).

2.11.1.1Mastectomy

This surgery treatment option involves the removal of the breast tissue(Mayo clinic, 2022; Moo et al., 2018). The mastectomy mainly consists of removing the entire affected breast, which will include the removal of the ducts, fatty tissue, lobules, nipple, and some skin (Mayo clinic, 2022).

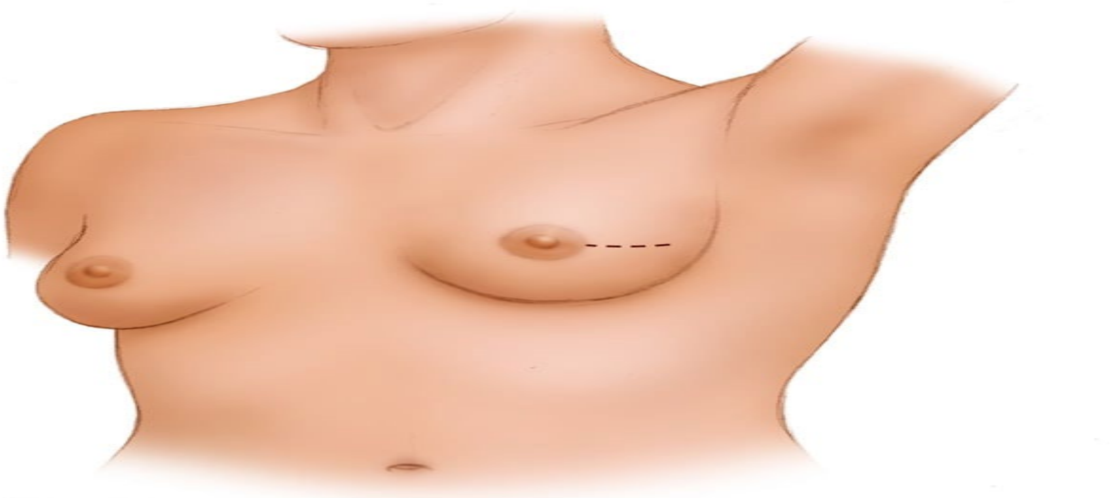
Figure 11: Mastectomy diagrammatic representation



2.11.1.2 Lumpectomy

This is another form of surgery that involves the removal of the breast tumour via a medical operation (MAYO Clinic, 2022; Moo et al., 2018). Lumpectomy is otherwise referred to as wide local excision or breast-conserving surgery. During lumpectomy surgery, the breast cancer(tumour) is removed alongside its healthy surrounding tissues. Lumpectomy is usually recommended for patients with small-sized tumours (MAYO Clinic, 2022).

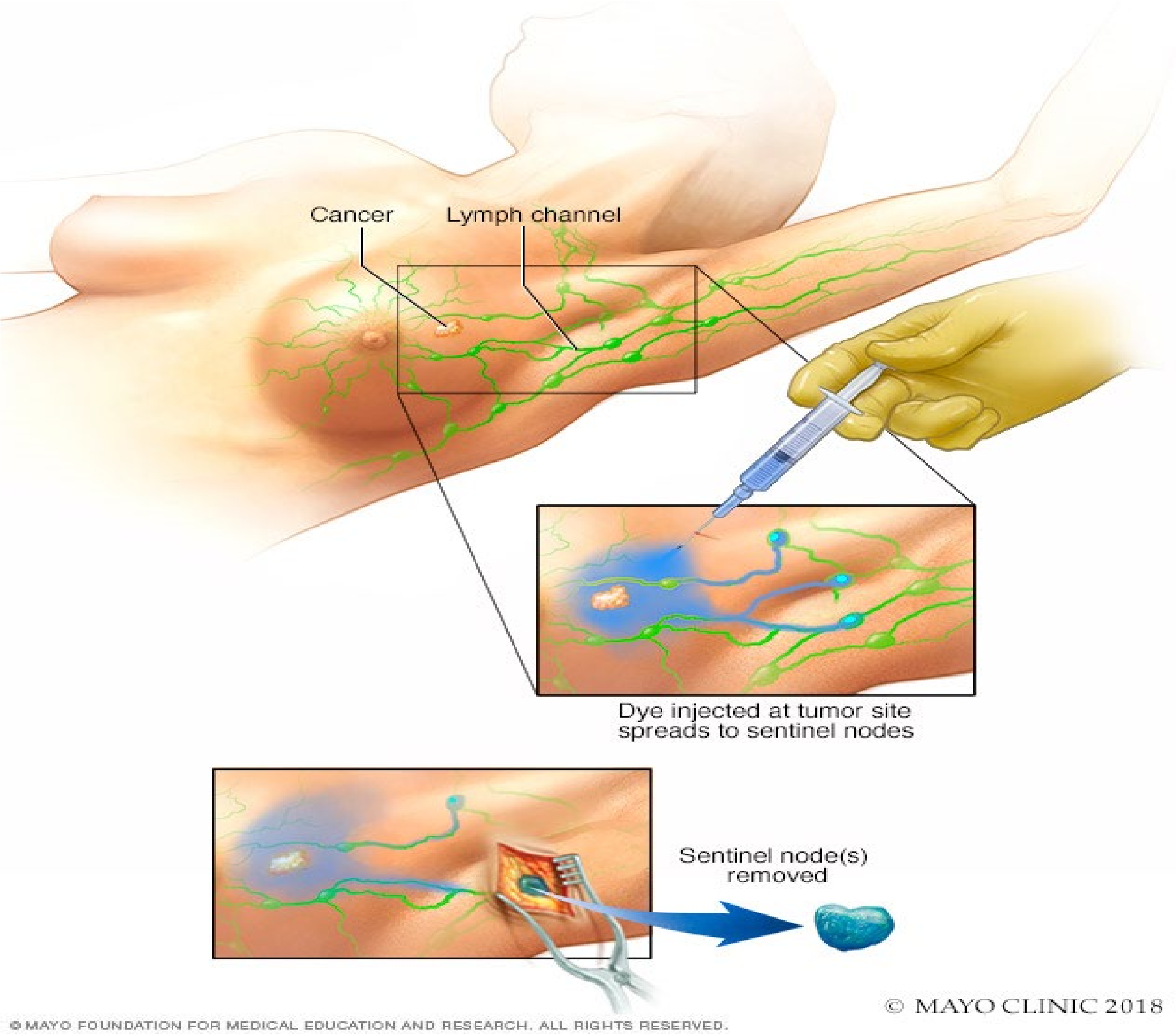
Figure 12: Lumpectomy diagram



2.11.1.3 Sentinel node biopsy and axillary lymph node dissection

Sentinel involves removing a small number of lymph nodes to confirm if the breast cancer has spread to the lymph nodes. The result of the sentinel node biopsy will inform the decision on whether to proceed with the axillary lymph node dissection or not (Mayo clinic, 2022). The axillary lymph node dissection involves the removal of lymph nodes in the armpit. This procedure can only be done if the sentinel node biopsy results show the presence of cancer in the lymph nodes.

Figure 13:Diagram on entinel node biopsy and axillary lymph node dissection.



2.11.2 Chemotherapy

This involves the shrinking or killing the cancer cells with the use of drugs Moo et al., 2018). These drugs can be in the form of pills or injections through the vein, or both. Chemotherapy is the most common breast cancer treatment option and can be done alone or alongside other treatment options (WHO, 2019). Chemotherapy is done before or after surgery, depending on how fast cancer spreads to other body parts. Also, chemotherapy can be done before surgery to shrink large size tumours for a lumpectomy.

Figure 14: Diagrammatic representation of chemotherapy

2.11.3 Hormonal therapy

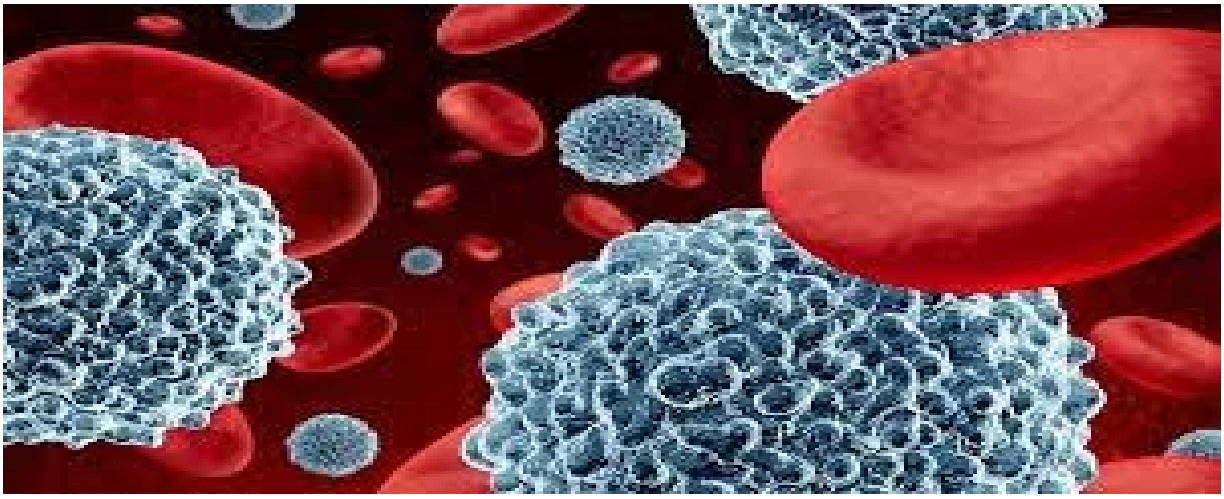
This treatment involves the blockage of the cancer cells from getting the necessary hormones they need to grow. By so doing, the cells will seize to grow and multiple. The blockage of the cancer cells could be done through medication administration (selective estrogen receptor modulators). This treatment procedure is very effective when treating breast cancer sensitive to hormones (estrogen receptor-positive-ER+ and progesterone receptor-positive- PR+). Hormone therapy is also used when trying to prevent breast cancer reoccurrence. Like chemotherapy, hormonal therapy can be used before or after surgery. Some of the side effects of hormonal therapy include night sweats, vaginal dryness, risk of blood clots, thinning of bones and hot flashes (Mayo Clinic, 2022).

Figure 15: Diagrammatic representation of Hormone therapy

2.11.4 Biological therapy

Biological therapy is also referred to as immunotherapy. This treatment option aims to boost the body's immune system to fight against cancer cells. Cancer cells naturally produce proteins that blind the immune system cells, making it impossible for the body to fight cancer. According to Mayo Clinic (2022), to re-activate these immune system cells, protein production and blinding of the immune system cells need to be altered. Immunotherapy is used to interfere in this process for the body's immunity to start fighting the cancer cells. According to Moo et al., (2018), immunotherapy is usually recommended for patients with HER2 positive breast cancer. These patients get HER2 targeted therapy combined with a chemotherapy backbone to boost their immune system to fight against breast cancer.

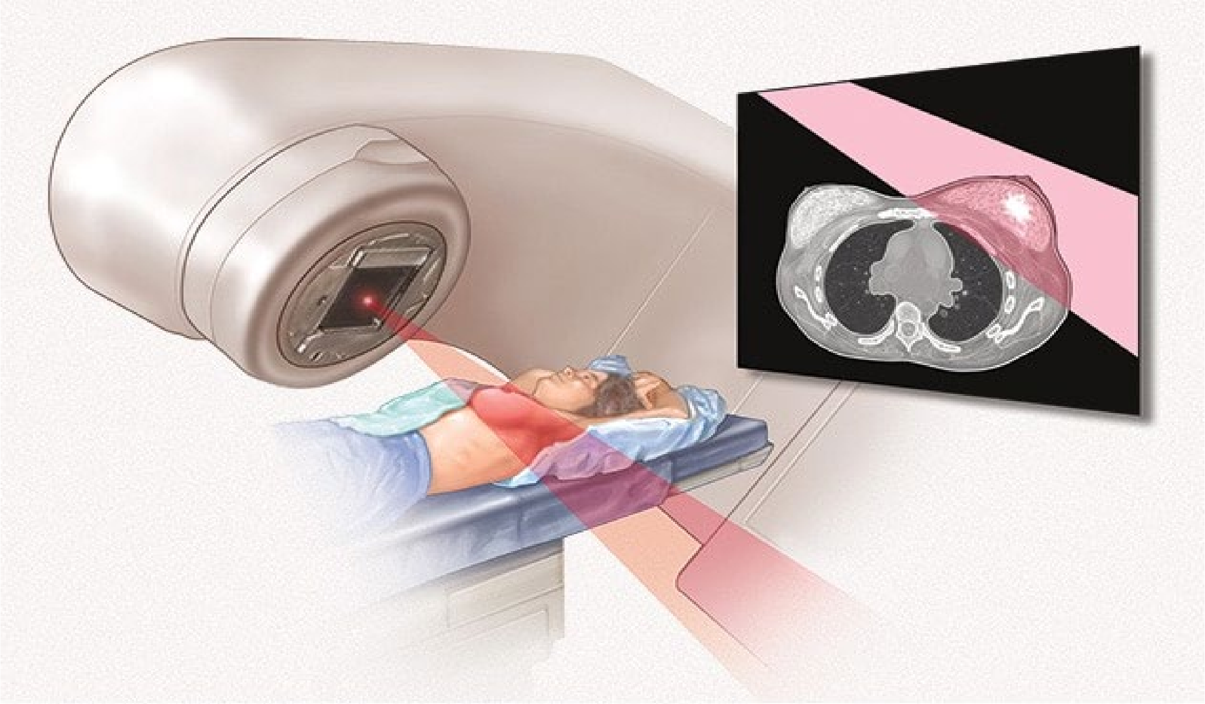
Figure 16: Diagrammatic representation of immunotherapy



2.11.5 Radiation therapy

Radiation therapy can as well be referred to as radiotherapy. According to WHO (2019), this treatment option involves the use of high energy rays to kill the cancer cells. The radiation therapy procedure includes targeting the energy beams from the radition machine to the body (external beam radiation) or by replacing radioactive material in the body(brachytherapy). Radiation therapy is recommended after surgery (lumpectomy or mastectomy) in most cases. The possible side effects of radiation therapy are red rashes, swollen breasts and fatigue.

Figure 17: Diagram representation of radiation therapy



2.12 Preventive Measures

- Keeping a healthy weight
- Avoid exposure to chemicals than one
- Reduce exposure to radiation
- Discuss with your doctor before taking hormone replacement therapy or oral contraceptives
- Breastfeeding your children

3.0 CHAPTER THREE: CONCEPTUAL AND THEORETICAL FRAMEWORK

3.1 Introduction

This chapter presents the conceptual and theoretical framework adopted in this study.

3.2 Research framework

A research framework is a clear-cut illustration of the design of a research plan. It offered the researcher a basic template for the overall research endeavour in this study. The vital areas of the research can be ascertained through this design, and it also helps prioritize the researcher's effort. In this study, the research framework was typically used as a map to guide the researcher and ensure that the researcher did not deviate from the scope of this study (Amiri, Akanbi and Fazeldehkordi, 2014).

3.3 Conceptual framework

Conceptual frameworks are common in qualitative research within the behavioural and social sciences. It directs the researcher's steps and proffers the basis for proving its rigour and credibility (Adom, Hussien and Agym, 2018). A conceptual framework provides a direction to research and supports the researcher and the targeted audience in understanding the study's contribution to knowledge. It also demonstrates the robustness of the methodology and study design and illustrates how the rudiments of the study align with each other in a systematic and logical flow (Ravitch and Riggan, 2012). Therefore, it is the researcher's account of how to explore the research problem and present a cohesive approach to viewing the phenomenon or research topic.

A conceptual framework can be written or presented via a visual representation of a probable relationship between variables. Primarily, conceptual frameworks are developed from theories about the research topic and reviewed literature of existing studies. This study involved a systematic review that assessed the existing literature on the subject under investigation in a larger setting (West Africa). Also, theories on the research topic were also considered. The researcher attempts to connect literature to practical experiences and actions in other to contribute to practice or provoke further thoughts. According to Ngulube, Mathipa and Gumbo (2015), a conceptual framework is the bedrock of sound research. Conceptual framework provided this study's researcher, an outline to select and prioritise variables of interest. It also helped the researcher in this study to present explicitness and coherence aim, methodology and direction (Ngulube et al.,2015).

3.4 Theoretical Framework

For research designed around a theoretical framework, the theory becomes the focal lens by which a research problem is examined and understood. This is because there may exist multiple theories about a chosen topic. The theoretical framework will comprise evaluation, comparison and selection of the most fit-for-purpose theory/theories for the subject of choice. It is, therefore, essential that the theoretical framework is grounded in published and established views and ideas (Ravitch and Riggan, 2017), which aids a researcher in forming the foundation for data analysis, interpretation and making sense of data collected in the study (Kivunja, 2018). This is to say that the theoretical framework encompasses theories articulated by an expert in the researchers' area of anticipated research. Theoretical framework can be compared to a map. A map guides a traveller to a specific location. The theoretical framework also helps a researcher contribute to scholarship by navigating the inquiry within the bounds and trajectory of established theories (Fulton and Krainovich-Miller, 2010).

The benefits associated with a theoretical framework in research are numerous. Also, the theoretical framework enables the generalization of research findings and makes the results more meaningful (Akintoye, 2015). Furthermore, the theoretical framework generally offers a common viewpoint from which researchers and scholars support their thoughts and position about a phenomenon. Finally, it acts as the glue that binds the fabrics of research together; the research design becomes disorganized in the absence of the bond (Ngulube, 2018).

3.4.1 Importance of theory in research

A theory is a phenomenon that elucidates the reason/s for how or why the phenomenon occurs. It may appreciate the phenomenon to be studied and used as a perspective in new knowledge that may unfold from the study (Reeves et al., 2008). Notwithstanding the nature of research (qualitative or quantitative), a theory is the mainstay of a study. Applying theory to different natures of research might differ, but all nature of research accepts theory as an integral and vital aspect of research (Rengasamy, 2016). For Reeves et al. (2008), theory offers researchers different perspectives of viewing complex and intricate issues by paying attention to different parts of data and serving as a groundwork for carrying out data analysis.

A theory provides a multivarious appreciation and understanding of a phenomenon and helps shape the research designs and outcomes (Heng, 2020). It guides and steers a researcher's thought process about a problem and methodologies options to be adopted (Merriam, 2002). Theory assists in providing a direction for the research; it aids the researcher in sieving out data relevant to the study. It also offers a framework by which ideas serve as a lens for understanding how researchers see a problem (Harnish, Frank and Maul 2011).

3.5 PEN – 3 Model

The researcher adopted the PEN-3 Model for this study. Airhihenbuwa developed the PEN-3 model in 1989. The model places culture at the centre of the research of health behaviours, beliefs, health outcomes, and the heart of determinants of health behaviour in the development, application, promotion, and evaluation of disease prevention interventions (Airhihenbuwa 2007a). This study focused on the impact of sociocultural factors on breast cancer treatment and outcomes hence, the relevance of this model in the study. The PEN-3 model is also helpful for developing intervention strategies, which provides useful templates for making sure that policy interventions are explicitly designed for a population by identifying and incorporating the population's cultural elements into the planning process (Cowdery, Parker, and Thompson, 2010).

The PEN-3 model was originally conceived as a guideline for disease prevention and health promotion in Africa. However, due to the increased emphasis and spotlight on the relevance of culture and community-based interventions, the PEN-3 model has been exported and applied in other climes (Fitzgibbon and Beech, 2009). Considering that the PEN-3 model application is in the African context, adopting the model in this study is appropriate, as this study was conducted in Nigeria, West Africa.

The model advocates that the efficacy of disease prevention and intervention campaigns will be greater if a population's cultural heritage, beliefs and lived experiences are components of the intervention initiatives (Airhihenbuwa, 2007a, 2007b). The qualitative stance of this study explored the lived experiences of breast cancer patients and identified sociocultural factors such as religious and cultural beliefs that impact their treatment and outcomes. PEN-3 model provides a culture-minded framework to health that analyses context in totality, including those that constrain or aids the individual. In addition, this framework appreciates the role other elements perform in limiting or helping healthy behaviour change (Iwelunmor, Newsome, and Airhihenbuwa, 2014).

The PEN-3 model departs from the mainstream health promotion approaches and handles health promotion from three main domains. These domains address the individual risk behaviours and influencing factors (family and the environment) and the part that each element plays in making health decisions (Cowdery et al., 2010). PEN-3 model deals with health behaviour, the negative and positive cultural relevance of such behaviour and the education of the individual, the family and those within the environment (Airhihenbuwa, 1995). The PEN-3 model comprises three domains: cultural identity, relationships and expectations, and cultural empowerment; each part consists of three constructs that informed the acronym PEN. The cultural Identity domain consists of a person, extended family, and neighbourhood. Relationships and Expectations comprise perceptions, enablers, and nurturers, while the Cultural Empowerment domain involves positive, existential, and negative.

The domain of Cultural Identity considers a patient's contribution, members of their extended family or community (neighbourhoods), to their health behaviours. The cultural domain in this study examines the role of each breast cancer patient, their extended family and neighbourhood on their health behaviour. This domain confirms patients who reported to the hospital as soon as they noticed the signs and symptoms of breast cancer, patients that needed permission from their spouse before visiting the hospital, and the support from their neighbourhood/community.

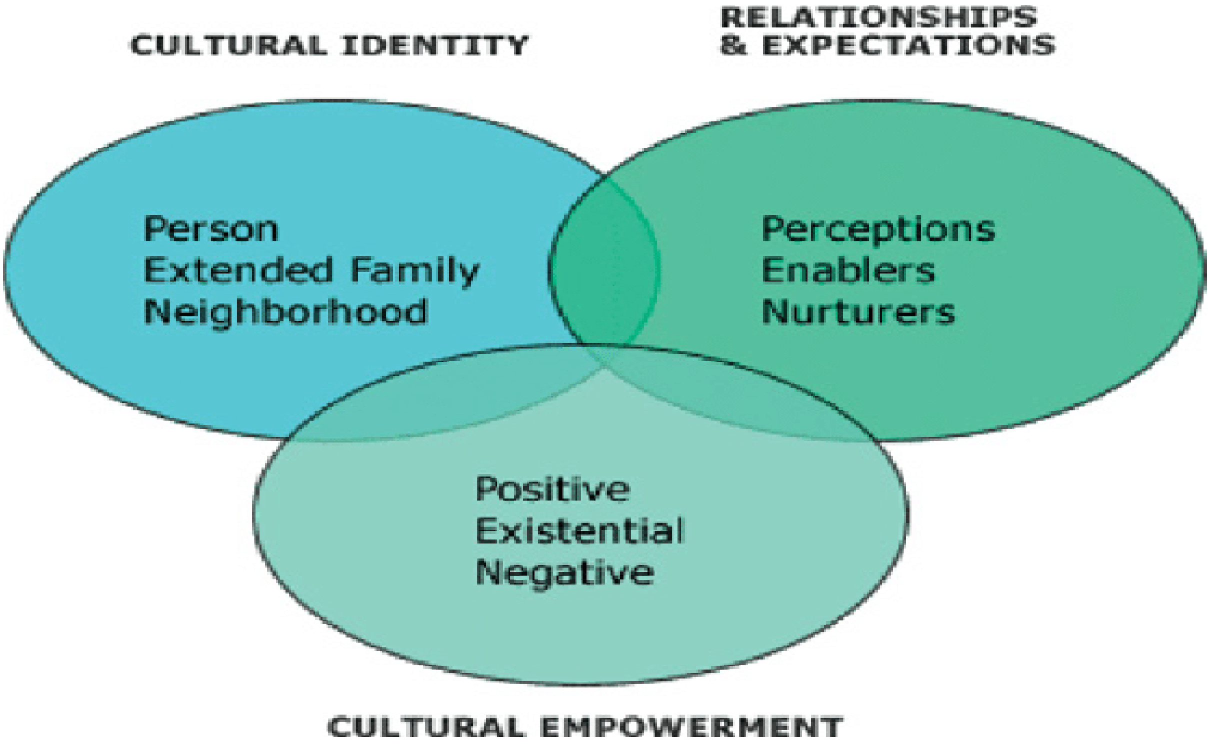
The Relationships and Expectations domain focuses on an individual's views, and positions about the health problems and the influence family and relations possess in making decisions that involve efficient management of a patient's health challenges. It also considers how the healthcare services aid or inhibits effective health-seeking practices. The Relationships and Expectations domain comprises perceptions, enablers and nurturers.

On the perception sub-domain, the participants' perception of breast cancer and their knowledge of the risk factors of breast cancer were explored and accessed in this study's qualitative and quantitative stances. In addressing the sub-domain enablers, the researcher considers how healthcare services aid or inhibit the effective health-seeking behaviour of the participants in the study. The enablers in this study include availability and accessibility of the breast cancer treatment facilities, affordability of the treatment and availability of financial resources. The last sub-domain in the relationship and expectation domain are nurturers. In nurturers, the influence of family and relation on the participants' health management decision. Based on this study's context, in Nigeria, where men are heads of their families, men's contribution to their spouses' treatment decisions was considered. Also, the support patients receive from their families was explored in this study under this domain.

The Cultural Empowerment domain explores health challenges by first identifying and highlighting those beliefs, values, and practices that are helpful with no underlying detrimental outcome before venturing into identifying the harmful health practices that can pose as inhibitors to effective management of health problems. The Cultural Empowerment domain comprises positive and existential or negative. Positive cultural beliefs and practices that are beneficial to breast cancer management are encouraged, those that are harmless are recognized, while the harmful beliefs and practices are exposed and discouraged (Iwelunmor et al., 2015; Airhihenbuwa,1995).

According to Iwelunmor et al. (2015), the PEN-3 model has been deployed to handle issues associated with cancer, diabetes, HIV, smoking, and other problems that need to be addressed and examined from both behavioural and cultural contexts. Notwithstanding the wide acceptance of the PEN-3 model as a framework for disease prevention and health promotion, the model has some limitations. The major limitation is transferability. Transferability is the degree to which the research outcome can be transferred and replicated in another context. There are nuances in the cultural characteristic of health behaviours that may even appear similar but may not be reproduced in another setting. Therefore, it is recommended that the researcher adopting the model should always commence with a qualitative method of data collection to capture the peculiarity associated with each population. This study is a mixed-method study where a qualitative study was first conducted before the qualitative research. In adopting this model for this mixed-method study, the transferability of the study findings is assured. Also, by understanding the uniqueness of the population under investigation, the PEN-3 model deployed in this study would support policy and practice in developing culturally specific and fit-for-purpose local intervention initiatives geared toward understanding the sociocultural factors that impact the treatment and management of breast cancer in Nigeria.

Figure 18: PEN-3 Model diagram



4.0 CHAPTER FOUR: METHODOLOGY

4.1 Introduction

This chapter discusses the mixed-method study design adopted in this study and presented a rationale for adopting this design.

4.2 Philosophical assumptions

The philosophical assumption adopted in this research is pragmatism research philosophy. Pragmatism is a research paradigm developed in the 19th and 20th centuries, which focuses on the practical consequences of social reality (Kelly & Cordeiro, 2020). Pragmatism is a philosophical and epistemological framework for evaluating beliefs and ideas (Dewey, 1938). Pragmatism links inquiry, experience, acting and knowing in research (Kelly & Cordeiro, 2020). According to Kaushik & Walsh (2019), a paradigm is a set of beliefs that guides a researcher's actions and defines their worldview. Pragmatism research philosophy can integrate more than one research design within a study. This research is a mixed-method study that integrates both the qualitative and quantitative research designs in one study (Coolins & Hussey, 2014).

The qualitative and quantitative designs pragmatism adopts both the positivism and interpretivism approaches (Lincoln et al., 2011; Saunders, Lewis & Thornhill, 2012). Based on these approaches, pragmatism research philosophy could be deductive, inductive, or both. While the qualitative stance in this study adopts interpretivism, the survey adopts the positivism approach. According to the pragmatism research philosophy, research questions are the major determinants of the research philosophy. Therefore, this study's research questions were answered from a qualitative and quantitative stance.

The interpretivism and positivism approach adopted in this study are explained in chapters six and seven of this work on qualitative and quantitative studies.

4.3 Study Setting

This research is self-funded for a PhD academic award and was carried out in Nigeria. Collecting data from all parts of Nigeria for this study would not be possible considering the cost and time; hence, the decision to choose two cities in Nigeria for this study.

In deciding the part of Nigeria for the primary data collection (qualitative and quantitative stance), attention was drawn to the distribution of the breast cancer facilities in Nigeria, which are not evenly distributed across the states and cities in Nigeria. Also, the cost of treatment differs, making some facilities more affordable than others. With the above-mentioned situations in Nigeria, and to ensure appropriate participants are recruited for this study, the researcher purposively selected breast cancer treatment facilities in Lagos and Ibadan for the data collection. Furthermore, data were collected from public and private breast cancer facilities in the chosen cities for an even representation of people from different socioeconomic backgrounds. (See the study population setting for more details on why Nigeria was chosen for this study).

Some of the cities' characteristics that underpin the researcher's choice include security, availability of breast cancer treatment facilities, type of city, and characteristics of the residents. Ibadan and Lagos are in low-risk security zones of the country; as such, safe access to the study area and collection of data did not pose any safety danger to the research team. Also, most of the efficient breast cancer treatment facilities (Teaching hospitals) are situated in these cities, thus, increasing the potential number of patients to participate in the study. Furthermore, Ibadan and Lagos are heterogeneous cities comprising people from different cultures, religions and beliefs. These attributes are vital for this study as the researcher examines how their sociocultural factors affect treatment outcomes. In addition, studying this population is crucial as urbanisation and the adoption of a Western lifestyle are said to be some of the factors responsible for the current increase in breast cancer incidence and prevalence in Nigeria (CDC, 2018).

Lagos is the most populous city in Nigeria and Africa and the fastest growing city globally (Dion et al., 2014). Lagos is a state located in the southern part of the country. On May 27th, 1967, Lagos state was created with Ikeja as its state city. Lagos state was Nigeria's capital until 1991 when it was moved to Abuja. According to the Nigeria congress (2015), of all the states in Nigeria, Lagos state has the smallest landmass with 3,577km^2. Lagoons and creeks made up 22% of the Lagos state total area. As of census 2006, Lagos recorded a population of 9113,605, and in 2012, it was 17,552,940. Its density is 2,500/km^2 (6,600/sq mi). It is located between latitude 6^o 35^{1}N 3^{o}45^{1}E/6.583^{o}N 3.750^{o}E. Lagos state is bounded north and east by Ogun state, west by the Republic of Benin and south by the Atlantic Ocean. Lagos is the highest urban area and the most economically important city in Nigeria. According to John (2013), Lagos is considered the fifth largest African economy. There are presences of higher institutions and tertiary health facilities in the state, thereby bringing people from different diversity of life into the state. Lagos is a socio-cultural melting pot attracting people from all parts of the country and foreigners to itself. Although the southerners mostly dominate Lagos, it remains a heterogeneous city. The presence of two teaching hospitals (Lagos University Teaching Hospital- LUTH and Lagos State University Teaching Hospital- LASUTH) with the availability of private breast cancer treatment facilities also informed the researcher's decision to include Lagos in this study.

Ibadan is the state capital and most populous city in Oyo state, located in the southwestern part of Nigeria. Ibadan is the third-largest city by population in Nigeria, with over three million people as of

2021 and a density is 985.13/km^2 (2,551.5/sq mi). Geographically, Ibadan is also the largest city in Nigeria, with a landmass of about 128 kilometres inland northeast of Lagos and 530 kilometres southwest of Abuja. In the days of British rule, Ibadan was the centre of administration of the old western region, with the city's ancient protective walls still standing to date. Ibadan is a heterogeneous city, although dominated mainly by the Yoruba tribe. Ibadan has the oldest university and the oldest functional teaching hospital. The University College Hospital (UCH) is located in Ibadan and is known for efficient health care delivery and affordability; hence the decision to include this facility in this study. There are also private breast cancer facilities in Ibadan, although fewer than that in Lagos.

4.4 Study Population

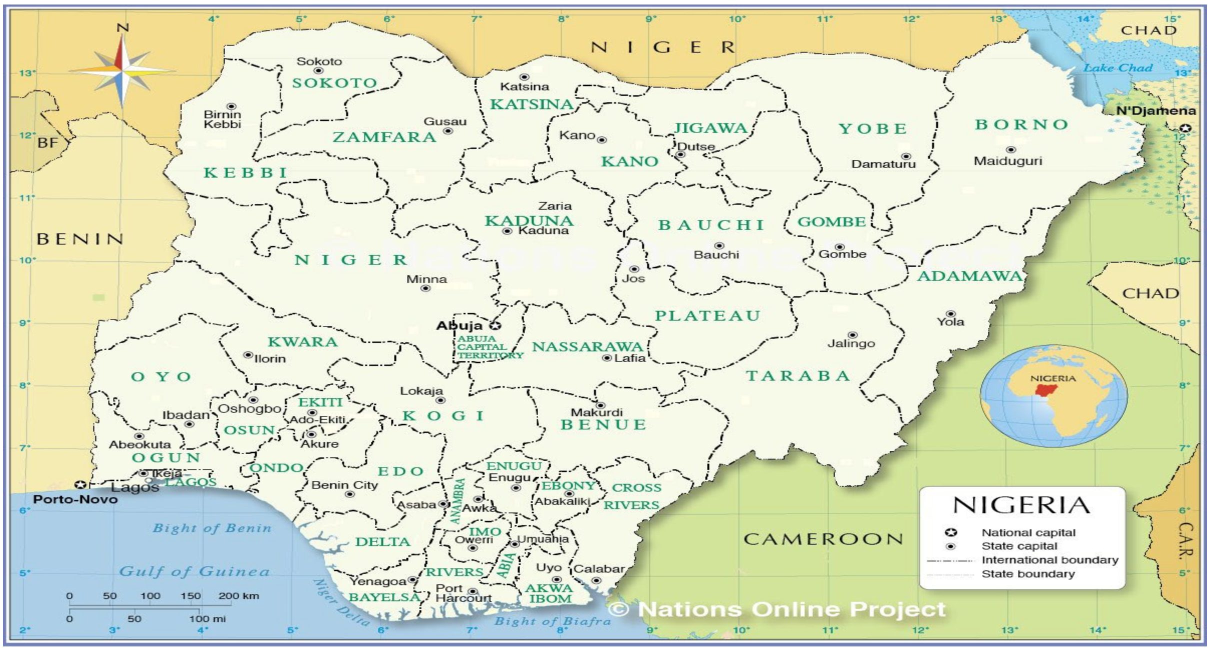
The target population for this study was breast cancer patients who met the study inclusion criteria; they must be between ages 18 and 75, undergoing treatment in any selected facilities in Nigeria. Existing evidence shows that breast cancer occurs in adults (18 years and above), especially in middle adulthood (45-65 years). Therefore, including this population in this study ensured that all adults with breast cancer, receiving treatment in the selected facilities were given equal chances to participate in the study.

Also, breast cancer patients undergoing pre- or post-treatment were included in this study. This criterion was underpinned by the researchers' interest in exploring the patients' treatment experiences. Therefore, including participants who have not commenced treatment or stopped treatment at the time of this research will not be beneficial in achieving the research objectives.

Again, the increasing incidence and prevalence of breast cancer and the high mortality rate reported in Nigeria informed the researcher to conduct the study in Nigeria. In West Africa and Africa at large, Nigeria is rated as the country with the highest breast cancer mortality rate (Federal Ministry of Health Nigeria, 2011b). Also, Nigeria is a religious nation, where people hold their religious beliefs so dear to them and their religious leaders in very high esteem.

Furthermore, Nigerians comprise of several ethnic groups with different cultures and languages. This study assessed the impact of sociocultural factors on breast cancer treatment outcomes; hence, cultural beliefs and languages as health determinants are very important. Finally, Nigeria's customary court puts men as the head of their families and in charge of their family's decision-making. This reason also contributed to the researcher's choice due to the systematic review in this study identifying gender role as a socio-cultural factor that impacts breast cancer treatment outcomes. Therefore, with a focus on the study objectives, the choice of the Nigerian population for this study is crucial.

Figure 19: Map of Nigeria with study areas presented.



4.5 Research Design

The mixed-method research design was adopted in conducting this study. The mixed-method research design is a methodological orientation that involves a combination of different research approaches to gain a broad breadth and in-depth understanding of the phenomena under study (Schoonenboom & Johnson, 2017; Hunter and Brewer, 2015; Archibald et al., 2015). This study included a systematic review, qualitative research, and survey (quantitative analysis). There are three most familiar types of mixed method designs: the convergent parallel design, the explanatory sequential design, and the exploratory sequential design (Busetto, Wick & Gumbinger, 2020). This study adopted the exploratory sequential mixed method to investigate the association between sociocultural factors and breast cancer treatment outcomes among Nigerian breast cancer patients undergoing treatment in Ibadan (Oyo State) and Lagos (Lagos State). In using exploratory sequential mixed methods, the first step was to conduct and analyse the systematic review. The review findings informed the development of the interview guide for the qualitative study. The second involved conducting qualitative research and analysing the data. The qualitative study findings reported the development of the questionnaire for the survey. The survey was the third and final study conducted in this mixed study research approach. The developed questionnaire was used for the data collection. The collected quantitative data was collected further cleaned, prepared and analysed using SPSS version 27. The research findings could be used for transferability in a similar context. Finally, the results from the three studies were discussed, and the findings were integrated in presenting the mix-method study conclusion (Schoonenboom & Johnson, 2017; Creswell and Plano Clark 2011;)

The rationale for the Mixed Method Design

A mixed-method approach ensured that the research questions for this study were answered, and research objectives met. According to Busetto, Wick & Gumbinger (2020), to be well equipped to address a range of research problems and fill in blind spots in research and practice, it is advisable to conduct a qualitative and a quantitative study. According to researchers (Hunter and Brewer, 2015; Archibald et al., 2015; Creswell & Plano Clark, 2011), there are many reasons for adopting a mixed-method research design. Reasons for adopting the mixed-method approach in this study include:

- The corroboration of findings and expansion to extend the breadth and range of the study (Archibald et al., 2015; Creswell & Plano Clark, 2011).
- To complement for illustration and clarification of results (Hunter and Brewer, 2015; Archibald et al., 2015).
- To address the weaknesses of one method using the strength of another approach. (Hunter and Brewer, 2015; Archibald et al., 2015).
- Using the findings from one research approach to explain the results of another. (Hunter and Brewer, 2015; Archibald, et al., 2015; Creswell, & Plano Clark, 2011).

In addition to the reasons presented above, identifying the essential variables to measure (sociocultural factors that impact breast cancer treatment and outcomes) in developing an instrument (questionnaire) for the quantitative data collection also informed the researcher's choice to use a mixed-method design. Due to limited research on this study area, the systematic review captured what is already known in the research area in a broader setting (West Africa). The primary research setting is Nigeria, one of West Africa's countries. Furthermore, the qualitative study explored the treatment experiences of the breast cancer patients using an in-depth one to one interview, and its findings informed the development of the questionnaire for the survey. Finally, the identified variables were measured using the quantitative study and the emergent hypothesis on the association between the independent and dependent variables was tested. The results of the quantitative survey presented possible associations that are statistically significant as well as generalizability. Therefore, although using a quantitative design could provide evidence of the sociocultural factors that impact breast cancer treatment and outcomes, the qualitative design was also crucial in exploring their treatment experiences.

Figure 20: Common Mixed-Method Research Designs8

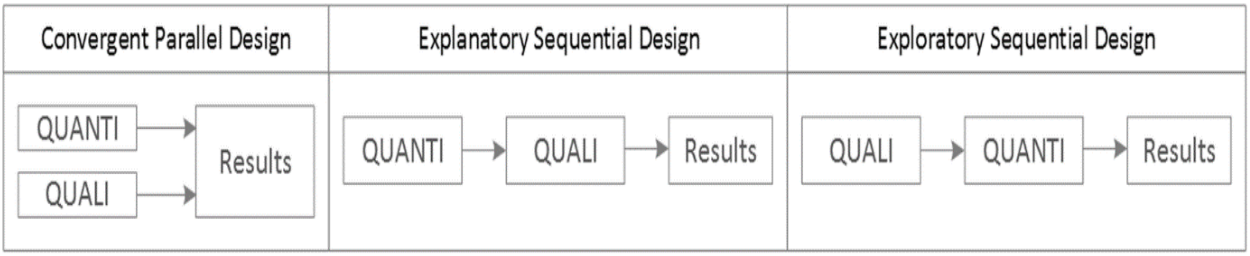
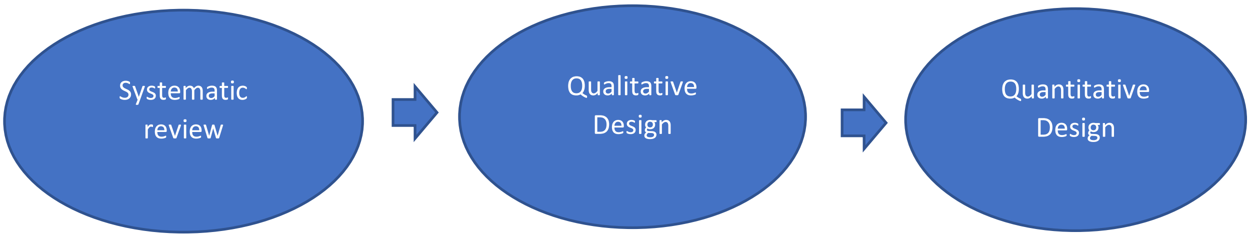


Figure 21: Adopted study design for this study



4.5.1 Systematic review

According to Bowling (2014a), a systematic review is a research design that involves a comprehensive literature review, using a systematic approach in line with a pre-specified protocol to reduce bias in the study. This systematic review was registered on the International Prospective Register of Systematic Reviews (PROSPERO) database with registration number CRD42020175602, with no deviations from the established protocol. This review was conducted using secondary data from existing works of literature on the review topic in West Africa. The review was carried out using PubMed Central, CINAHL and Discover. Eligibility criteria were adhered to in selecting articles for the study using the PEO framework. The studies that met the inclusion criteria were included in the review. The selection procedure was presented in a PRISMA flow chart. The secondary data included studied in this review were critically appraised and summarised to arrive at a viable conclusion. The attempt to appraise, summarise, and reconcile evidence to inform a decision is in line with the works of Dempster (2011) and Winter (2013). Conducting this systematic review informed the qualitative study.

4.5.2 Qualitative study design

A qualitative study was conducted using an in-depth one on one interview with breast cancer patients receiving treatment from the selected breast cancer facilities in Lagos and Ibadan. The qualitative research adopted a phenomenological approach. This approach was considered most suitable as it is mainly used for health care research that aims to understand and explore patients' experiences (Barnard et al., 1999). The phenomenological approach focuses on a thorough description and interpretation of inherent inexperience (Philip-paula et al., 2011). Thus, the researcher set aside previous prejudgments and earlier preconceived thoughts and approached the issue with an open mind, intuition, and imagination. The phenomenological study answers questions relating to experiences from a subjective stance. Hence, suitable for this research that sought to answer why and what factors affect breast cancer treatment outcomes.

The phenomenological approach for this study involved the 'epoche process'. The Epoche process helps identify both conscious and unconscious beliefs and biases that may affect the treatment outcome of the disease (Philip-paula et al., 2011). This epoche process allowed the researcher to explore breast cancer patients' experiences and, in turn, identify sociocultural factors like religion, culture, and others that may affect the treatment outcome. The findings from the interviews determined the treatment experiences of the breast cancer patients in Lagos and Ibadan, Nigeria, identified sociocultural factors that impact their treatment and how the identified sociocultural factors could impact the treatment outcome of breast cancer. See Chapter six for further information on the qualitative study methodology (recruitment strategy and the data collection.

4.5.3 Quantitative study design

An analytical cross-sectional study was conducted involving female breast cancer patients aged between 18 and 65. The analytical cross-sectional study design is quantitative, giving a snapshot of the outcome, relatively inexpensive and less time-consuming (Bland, 2015). According to Levin, 2006, public health planning usually involves using a cross-sectional study approach to measure the outcome of interest in each population. This study design was used to investigate the impact of sociocultural factors on breast cancer treatment and outcomes in Ibadan and Lagos, Nigeria. The questionnaire served as the data collection instrument for this survey. The researcher developed and validated the questionnaire under the director of studies and 2nd supervisor; to ensure that it answered the research questions in this study. The validated questionnaire investigated how sociocultural factors mediate breast cancer treatment outcomes. In addition, the analytical cross-sectional study design enabled inferences to be drawn from the findings of the sample population (Creswell, 2013). Eligibility criteria (inclusion and exclusion criteria) were used to select participants, and only participants that met the inclusion criteria were included in the study. Setting a guideline for participants' recruitment ensures that the results from the study will be due to what is under investigation (Patino & Ferreira, 2018). Eligibility criteria describe the critical features of a target population to be included in a study (Patino & Ferreira, 2018). They are characteristics that must be met to participate in a study (Williams, 2007). See Chapter seven for details on the survey methodology, which include: epistemology, positionality, study design, eligibility criteria, sample size determination, sampling procedures, materials and data collection and analysis).

4.6 Instruments for data collection

The systematic review involved using secondary data published in a peer-reviewed journal. The journal articles included in th systematic review was selected from included databases for the review. See chapter five of this thesis for details on the study selection for the systematic review.

The qualitative data collection instrument includes an interview guide, digital audio-recorder, batteries for audio-recorder, notepad, and biro. The reacher designed the interview guide. Refer to the qualitative chapter of this thesis for detailed information on the instrument for the interview data collection.

The questionnaire was used for the quantitative data collection. The researcher developed the question under the guidance of the research supervisors. Details on the questionnaire design and sections are available in the chapter seven section of this thesis.

For the primary studies, the Participant Information Sheet(PIS) and participant consent form were included as instruments for data collection

4.7 Data collection

Different data was collected based on the nature of the study in the mixed-method design. The systematic review involved collecting secondary data from existing literature evidence. The review involved using the three selected databases (PubMed Central, CINAHL, and Discover) in the study to search for the articles with strict adherence to the selection criteria. The selection process was explained using the PRISMA flow chart, and eligibility criteria were followed during the studies' selection for this review. All the studies that met the inclusion criteria were included for data extraction and synthesis. The titles and abstracts of articles were accessed, and those that did not meet the inclusion criteria were removed.

Furthermore, the full text of the selected studies was assessed and considered, and articles that did not meet the need for the study were deleted. Finally, data extraction was performed on articled that met all the selection criteria. See chapter five for details on the systematic review of data extraction.

The qualitative data collection took place during the breast cancer patients' clinic days at the hospital and used an interview guide to conduct interviews. The findings of the systematic review informed the development of the interview guide. The interviews were recorded, and notes were taken with the consent of the participants. The interviews were transcribed verbatim and updated with the notes taken during the interview. The transcribed interviews (primary data) were further analysed. See chapter six of this thesis for details on the qualitative data collection. Other instruments for that data collection include a pen, Sony tape recorder, notebook, and consent form.

The quantitative data collection took place at selected breast cancer facilities for this study. Data was collected from the recruited breast cancer patients that consented to participate in the study. The data was collected on the selected patients' clinic days. The questionnaire, which was the data collection instrument, was either self-administered or interviewer-administered, depending on the participants' preference. The participants also completed the consent form before completing the questionnaires. See chapter seven for more details on the quantitative data collection.

4.8 Data analysis and interpretation

This study adopted the mixed-method approach; hence, data analysis and interpretation were done separately based on the type of data generated from each method (systematic review, qualitative research, and quantitative study).

Existing data (secondary data) from the included studies were synthesised using thematic synthesis for the systematic review. This approach was preferred over narrative synthesis as it gave the researcher the avenue to explain the review findings in themes and in line with the theoretical model adopted in the study.

Also, the thematic analysis process used to analyse and interpret the qualitative data from the interviews. Although this approach was similar to the systematic review, it was the researcher's most understood and convenient data analysis.

Furthermore, the data analysis for the survey was done quantitatively, which involved performing some statistical analysis. Both descriptive and inferential statistical analysis was carried out using the Statistical Package for the Social Science (SPSS) software. The descriptive statistics presented frequencies and percentages of the variables in the study. The inferential statistics used the univariable and multivariable regression to test for association between the dependent and independent variables in the study.

4.9 Study discussion

The findings from the studies included in this mixed-method research were merged and summarised in the discussion section. These findings were compared with existing works of literature to confirm if they align with current evidence or differ. For results that did not align, possible reasons for the difference were addressed (study setting, study population, and year of research).

4.10 Chapter Summary

This study adopted an exploratory study design that involved a systematic review, qualitative and quantitative studies. The systematic review was first conducted to understand what is known in the research area, and the findings from the systematic review informed the decision to conduct a qualitative study. The qualitative study explored the treatment experiences of breast cancer patients and identified the sociocultural factors that impact the breast cancer treatment outcomes. These identified factors formed the key variables and were used to develop the survey questionnaire. The identified variables were statistically tested for associations in the quantitative study.

5.0 CHAPTER FIVE: SYSTEMATIC REVIEW

5.1 Introduction

A systematic review of the impact of sociocultural factors on West African breast cancer diagnosis and management.

5.2 Overview

A systematic review is a research design involving a comprehensive literature review, using a systematic approach in line with a pre-specified protocol to reduce bias in the study (Bowling, 2014a). In a systematic review, the existing works of literature are critically appraised and summarized to reconcile the evidence and provide reliable findings from which decisions are made (Dempster, 2011; Winter, 2013). Bowling (2014a) states that systematic reviews differ from traditional or narrative reviews. For example, although narrative reviews are usually descriptive and informative, there are elements of selection bias, unlike in a systematic review (Bowling (2014a). Also, the narrative or traditional reviews do not adopt a systematic approach and are sometimes confused, especially when synthesising diverging results. Systematic reviews inform medical decision-making, establish clinical and health policy, plan future research agendas, and conduct comparative effectiveness research (Livinski et al., 2015). This systematic review was on the impact of sociocultural factors on West African breast cancer diagnosis and management. There are different methods of analysing data in systematic reviews based on the collected data and study methods in the included studies. Examples of data analysis methods in systematic reviews include meta-synthesis, meta-ethnography, narrative synthesis, thematic synthesis, meta-analysis, and vote count. In this review, only qualitative studies met the inclusion criteria and were included in the study; hence, the thematic synthesis method was adopted for data analysis.

5.3 Protocol and Registration

This systematic review protocol was registered on the International Prospective Register of Systematic Reviews (PROSPERO) database with registration number CRD42020175602. There were no deviations from the established protocol.

5.4 Selection Criteria

To understand clinical research reasoning, knowing the inclusion and exclusion criteria is vital (William et al., 2009). Identified inclusion and exclusion criteria are boundaries for systematic reviews that decide a study's eligibility to be included in the review (Patino & Ferreira, 2018). According to Pawlik & Sosa, 2013, defining and specifying a population of interest and set inclusion and exclusion criteria should be the first step when conducting a systematic review. The eligibility criteria were set before the study's commencement in this review. The inclusion and exclusion criteria may include variables like ethnicity, gender, age, race, type and stage of the disease, and sociocultural, psychological, and emotional (Chow & Liu, 2008). In addition, inclusion and exclusion criteria imply interpretation and generalizability of findings (Polik & Beck, 2013). Other standard inclusion and exclusion criteria are dates, exposure of interest, geographic location of study, language, participants, peer review, reported outcomes, setting, study design and type of publication (ref).

In selecting valid and reliable studies for this systematic review, the eligibility criteria were based on the PEO (Population, Exposure and Outcomes) framework, study design, setting and date ((Aslam and Emmanuel, 2010). According to Aveyard, 2010, formulating and answering research questions is a challenge most researcher encounters while conducting research. Therefore, the PEO framework was used in this review to develop keywords to identify relevant studies that answered the questions for this systematic review (Bettany-Saltikov, 2012). PEO used in this study was represented thus:

P- Population

E- Exposure

O- Outcomes

The PEO framework was outlined in Table 2 below with its selection justification.

5.4.1 Inclusion Criteria

There are specific characteristics that a prospective study must have before it could be included in a study; these particular characteristics are referred to as inclusion criteria, otherwise known as eligibility criteria (Polit & Beck, 2010). In carrying out this systematic review, studies included must:

- Address the impact of sociocultural factors on breast cancer diagnosis and management
- Be peer-reviewed
- Be conducted in West Africa
- Be on Breast cancer patients between ages 16years and above
- Not be more than five years old from its year of publication
- Have its research methods well presented
- Be either qualitative, quantitative or mixed-method study

5.4.2 Exclusion Criteria

According to Polit & Beck 2010, exclusion criteria are those characteristics that disqualify a prospective study from being included in a study. In this systematic review, studies were excluded if,

- The study did not discuss the impact of sociocultural factors on breast cancer diagnosis and management.
- The study was written in languages other than English.
- The study was not peer-reviewed.
- The study was published beyond 2015.
- The study did not focus on breast cancer patients between 16 years and above.
- The studies were conducted outside west Africa.
- The study was a case study or ethnography.

5.4.3 Justification for inclusion criteria

In assuring the validity and reliability of this systematic review, eligibility criteria are for setting boundaries. The inclusion criteria were strictly adhered to ensure that valid and reliable studies were included. Studies published within the last five years only were included in the survey to ensure the use of current information and data within the economic era. The inclusion of studies conducted in West Africa was underpinned by the increase in incidence and high mortality rate of breast cancer in Africa. Nigeria is rated as the country with the highest breast cancer incidence and mortality rate in Africa. Nigeria is in the Western part of Africa, hence deciding to study west Africa.

Furthermore, West Africa is culturally diversified and will be of great value to this study as a high level of cultural diversity could potentially impact access to treatment. Studies that worked with breast cancer patients between 16 years and above were reviewed to ensure that the age range that is susceptible to breast cancer was captured in this study. Including qualitative, quantitative or mixed methods studies in this systematic review confirmed that this study is as inclusive as possible.

5.4.4 Justifications for exclusion criteria

Adequate understanding, interpretation and analysis of studies included in a systematic review are fundamental. To better understand the studies to be reviewed, studies conducted in languages other than the English language were excluded from the study. For quality control, non-peer-reviewed studies, and to avoid deviation from the study focus, all studies that did not focus on breast cancer patients between ages 16 and above were also excluded. West Africa is the population of interest in this study; hence, all studies conducted outside West Africa were excluded.

5.5 Search strategy

An advanced literature search was done using PubMed Central, CINAHL and Discover databases to identify relevant studies published between January 2015 and January 2020. Boolean operands 'AND' and 'OR' were applied during the literature search, using the keywords and synonyms shown in Figure 1. The notion of using Boolean operands - 'AND', 'OR', 'NOT' is to get as many articles as possible on the study interest, especially when the topic has lots of search terms (Anderson et al., 2010). Using the Boolean operands, the researcher ensures that all search terms are present in the results. The literature search was conducted between November 2019 and January 2020. The search terms were merged during the literature search involving the population (breast cancer patients between ages 16 and above), exposure (sociocultural factors), outcome (breast cancer) as well as the setting (West Africa). See figure 1 for the search terms.

Table 2: PEO model

PEO	Inclusion Criteria	Justification	Exclusion Criteria
Population	Breast cancer patients between the ages of 16 and above	Age group susceptible to breast cancer	Children below the age of 16
Exposure	Sociocultural factors	Impact on breast cancer management	Articles with no reference to sociocultural factors affecting breast cancer diagnosis and management
Outcome	Diagnosis and Management	The review is concerned with the impact of sociocultural factors on the diagnosis and management of breast cancer	Articles with no mention of diagnosis and management of breast cancer
Setting	West Africa	Increase in the prevalence of breast cancer and countries with similar cultural values.	Countries outside of West Africa
Research methods	Qualitative, quantitative and mixed methods	To be as inclusive as possible	Meta-analysis, systematic reviews, and newsletters.

Publication language	English	Translation not available	Non-English publications
Publication type	Peer-reviewed and Grey Literature	Quality & valid research work	Editorials and opinion pieces
Year of Publication	2015 to 2019	Recent studies	2014 and older

Figure 22: Search Terms and Strategy

Search Terms and Strategy

Breast cancer* OR breast neoplasm* OR breast carcinoma*;

AND Sociocultural factors* OR Spirituality* OR Religion* OR fear* OR Tradition* OR Gender* OR Culture*OR Body image* OR Faith* OR Family support* OR Social support

AND diagnosis* OR screening* OR treatment* OR Management AND West African* OR Ghana* OR Nigeria* OR Gambia* OR Benin* OR Guinea* OR Ivory coast* OR Togo* OR Niger* OR Sierra leone* OR Mali* OR Cape Verde* OR Senegal* OR Burkina Faso* OR Mauritania* OR Guinea-Bissau

5.5.1 Justification of the Databases used

5.5.1.1 PubMed Central (PMC)

PubMed Central (PMC) is a free full-text digital repository that archives publicly accessible full-text scholarly articles published within the life science and biomedical articles (Ossom-Williamson, & Minter, 2019). It came into existence in 2000 and is currently the second-largest archive for the PubMed database. As of 2020, PMC archives contain over seven million articles. PMC was developed and managed by NLM's National Center for Biotechnology Information (NCBI) and served as a digital counterpart to the National Library of Medicine's (NLM) extensive print journal collection (Funk et al., 2017). Also, PMC has most of its articles written in English language and other languages (Minter, 2018). The choice of this database for this systematic review was informed by the reasons stated below:

- Free full-text access: Pubmed Central offered researchers journal articles without any subscription. Pubmed Central enabled the reviewer to access full-text articles for this review without incurring any financial burden from paid subscription journals.
- English Language: As most of the articles in PubMed Central are written in English, this enabled the researchers to understand the reports and interpret their findings without involving the services of a translator. Using PubMed Central saved the researcher the financial cost of engaging a translator.

5.5.1.2 Cumulative Index to Nursing and Allied Health Literature (CINAHL)

CINAHL is also a free full-text database giving access to open Access Journals in nursing and allied health sciences (Wright, 2015). CINAHL offered the researcher access to over 814 Open Access journals, with high-quality subject indexing and precise full-text linking. Besides granting the researcher access to journal articles, CINAHL also provided evidence-based care sheets, quick lessons, legal cases, clinical trials, etc. CINAHL comprises journal articles written mainly in the English language; nevertheless, other-language journal articles in nursing and health sciences are also available (Wright, 2015). In this review, searching and retrieving information was made easy using CINAHL. It provided subject headings and used Medical Subject Headings (MeSH) and search limit options to enhance effective search(Wilczynski, Marks, Haynes, 2007). In addition, over 300 new subject headings such as Covid- I9, Vaping, and social distancing have been recently added to CINAHL to assist researchers in the literature search. According to Flemming & Briggs (2007) and Wilczynski, Marks& Haynes (2007), CINAHL is an excellent source to search when reviewing qualitative evidence. In this review, CINAHL was chosen for the following reason:

- Nursing and Health sciences journal articles: this research focuses on public health; hence, CINAHL is an excellent database. It focuses on nursing and health sciences journal articles.
- Free access: in this review, the researcher is a student and cannot afford a paid access journal. Using CINAHL was very useful as many articles were searched and accessed without the researcher having to pay.
- Search Limits, subject headings and MeSH terms: The search limits, subject headings and use of MeSH terms available in CINAHL enabled the researcher to apply the study's inclusion criteria while searching for articles to be included in the review.

- Qualitative evidence: This review adopted a mixed-method approach, hence giving equal opportunity for both qualitative and quantitative studies to be included in the study. As CINAHL is a good source for qualitative study search, it is essential to use it for this literature search.
- Reliability: CINAHL database is reliable as it provides vetted and scholarly articles, which assures the researcher of good quality articles for review.

5.5.1.3 Discover

Discover is a library search engine that gives access to a broad range of materials for a quick search. In using Discover, you can search for your topic of interest by searching many databases simultaneously. Search limits are available in the Discover search engine, and save your search preferences in your personal EBSCOhost folder. Keeping in EBSCOhost is possible as Discover is based on the EBSCOhost interface. The access to the Discover search engine is usually through a University login; this offer students access to the University subscribed journal articles, dissertations and theses. The decision for the selection of the Discover for this review was underpinned by the following:

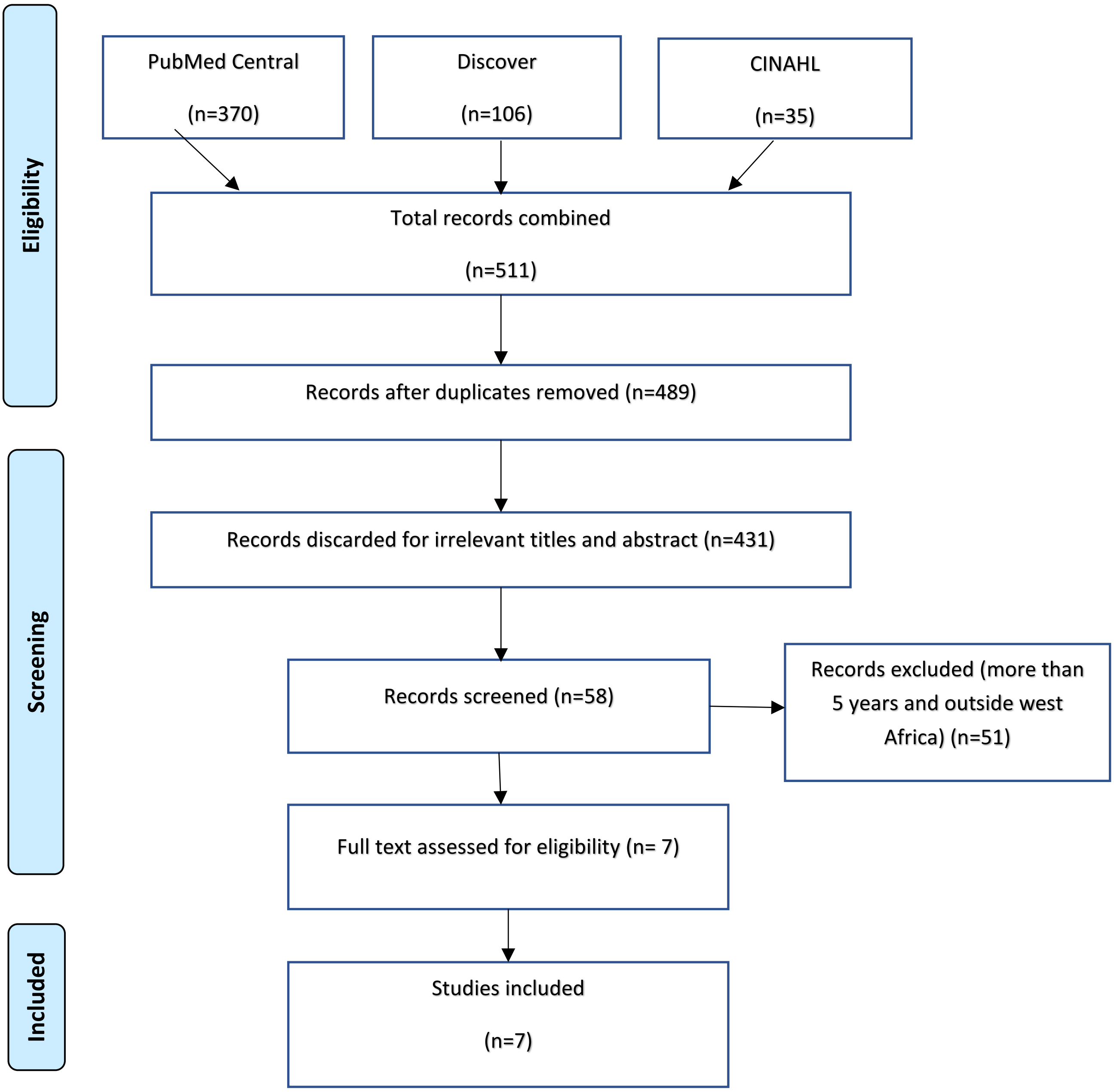
- Free access to paid journals: As the reviewer is a student, accessing journals that require a paid subscription would have been impossible if not for the institutional subscription on the Discover search engine. The access to paid journals increased the number of articles that the reviewer could access.
- Full-text access: The need to access full-text articles also informed the researcher's decision to use the Discover search engine.
- Access to different databases: Discover offered the researcher the opportunity to access various databases for this review.
- Search limits: The Discover search engine allows the researcher to limit their search to the study's inclusion criteria. In addition, the Discover search engine helped the reviewer narrow the search results to suit the topic under review. For instance, date of publication, subject or type of resource, and research methods, among others, could be used to narrow a search.
- Access to dissertations and theses: Discover search engine offered the researcher access to dissertations and theses used in searching for grey literature. Including a grey literature search in this review ensured the inclusion of unpublished reports in this research.

5.6 Study selection

As seen in figure 1 above, search terms were used in selecting articles for this study. The search terms were inputted into the search bar of the selected databases (PubMed central, CINAHL and Discover) for this study. With the focus on the subject under review, titles and abstracts of articles were retrieved. Retrieved reports were exported to the EndNote library to remove duplicated articles. The first screening of articles' titles and abstracts was carried out after removing duplicates. The screening was done by applying the inclusion and exclusion criteria as the screening guide. This screening enabled the researcher to identify relevant papers; articles that meet the inclusion criteria were selected for further screening, while others were excluded from the study. Next, the full text of all the selected articles was searched and downloaded. The obtained full-text articles were carefully studied to ensure that only relevant articles were included. The full-text articles were further screened using the inclusion and exclusion criteria. All Full-text articles that did not meet the inclusion criteria were excluded from the study.

In contrast, the articles that met the inclusion criteria were selected and included in this systematic review. The second researcher re-assed the selected papers based on the eligibility criteria for the study. Discrepancies in the inclusion criteria were discussed and resolved. PRISMA flowchart was followed throughout the literature search, as seen in Figure 23 below.

Figure 23: PRISMA 2009 Flow Diagram



5.7 Data extraction

Godfrey and Harrison (2010) defined data extraction as how vital information is collected and summarised from different studies. According to Ridley 2012, the main aim of data extraction is to critically read and understand articles identified for the research and ensure that all information has been extracted. This review adopted a narrative synthesis approach in synthesising and summarising findings on the impact of sociocultural factors on breast cancer diagnosis and management among breast cancer patients in West Africa. A data extraction framework by Caldwell et al.,2010 was used in extracting data from the titles, abstracts and full text of all selected studies. Included studies were critically analysed, and data was gathered depending on the research question for this systematic review. The researcher independently carried out the data extraction under the supervisor of the director of studies to ensure that included studies were relevant to the study. Information extracted had author, journal, year of publication, titles, study design, objectives, participants, sample size, setting/country, methods, as well as relevant findings (on sociocultural factors to screening, diagnosis and management of breast cancer), see Table 1 for the data extraction details).

5.8 Quality assessment/Critical Appraisal

This involves the application of rules of evidence to a study to assess data validity, report completeness, methods and procedures, conclusions, and compliance with ethical standards. According to Greenhalgh,2014, the central aspect of critical appraisal is study design, process, participants, reports and settings. Singh, 2013 stated that essential appraisal skills help make sense of research methodologies, ensure reliability, and draw the correct conclusions. In assessing the methodological quality of the identified studies, the researcher used the Critical Appraisal Skill Programme (CASP) tool. In using CASP, the strength and weaknesses of a study were identified (Singh, 2013). The Critical Appraisal Skill Programme (CASP) checklist for quality assessment differs according to the study types - qualitative, quantitative, randomised control trials, systematic reviews, cohort studies, case-control studies, diagnostic studies, and qualitative studies.

The Critical Appraisal Skill Programme (CASP) checklist for qualitative studies evaluated the quality of selected research since all the studies that met the inclusion criteria in this systematic review were qualitative studies. The CASP checklist comprises ten questions/items; each paper was scored on the checklist, and the scores (maximum score of 4 for each item) were used to determine the quality of each study. We used ranges of total scores to produce a quality assessment chart based on a traffic light system of 'good (scores from 31-40)', 'adequate (scores from 21-30)', 'poor (scores below 21)' (see Table 2 for scores for each article). The quality criteria for eligible studies were based on; the clarity of the research aim, appropriateness of the methodology (research design, recruitment strategy and data collection process), ethical considerations, data analysis process, a clear statement of findings and how valuable the research was. Based on the quality assessment exercise, all the seven identified studies subjected to quality assessment scored between 36 and 40 and were deemed of good quality for inclusion and therefore retained for review.

See table 4 below for more information on the Critical Appraisal Skills Programme for qualitative studies adopted in this study.

Table 4: Critical Appraisal Skill Programme for qualitative study (CASP, 2017)

Authors	Aziato & Clegg-Lamptey,(2015)	Asobayire & Barley, (2015)	Asoogo & Duma, (2015)	Elewonibi & Belue, (2019)	Karikari, (2018)	Martei et al., (2018)	Waife (2017)
Was there a clear statement of the aims of the research?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is a qualitative methodology appropriate?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was the research design appropriate to address the aims of the research?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was the recruitment strategy appropriate to the aims of the research?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was the data collected in a way that addressed the research issue?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Has the relationship between the researcher and participants been adequately considered?	Not included	Not included	Not included	Yes	Not included	Yes	Yes
Have ethical issues been taken into consideration?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Was the data analysis sufficiently rigorous?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is there a clear statement of findings?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Is the research valuable?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Scores	36	36	36	40	36	40	40

5.9 Data Synthesis

This review adopted a thematic synthesis (Thomas & Harden, 2008) in integrating and summarising findings on the impact of sociocultural factors on breast cancer screening, diagnosis and Management in West Africa. The thematic synthesis is one of the qualitative evidence synthesis approaches used in aggregating, integrating and interpreting results of qualitative studies in a systematic review (Sandelowski & Barroso, 2006). First, the thematic synthesis involved using the identified sociocultural factors to establish formal subthemes and themes (Thomas & Harden, 2008). Next, the identified sociocultural factors were used to form sub-themes using related constructs and, finally, develop the analytical theme (Thomas & Harden, 2008; Sandelowski & Barroso, 2006). Themes were derived from sub-themes with common characteristics; formed themes include religious belief, cultural belief, support, gender role, body image, fear and language(Thomas & Harden, 2008). In addition, a textual description of results from the included studies based on themes was done. This approach was best suited for this data synthesis as all studies included in this systematic review used a qualitative design (see table 5 below).

Table 5: The thematic analytical process used for the data synthesis.

Themes	Sub-themes	Identified Sociocultural factors
Religious belief	Spirituality, Religion Faith	Spirituality (Asoogo & Duma, 2015; Karikari, 2018; Wiafe, 2017)
		Role of church (Martei et al., 2018)
		Faith in God (Aziato & Clegg-Lamptey, 2015)
		Religion (Elewonibi & BeLue, 2019; Martei et al., 2018)
Support	Family support Social support	Family support (Asobayire &Barley, 2015; Elewonibi & BeLue, 2019)
		Social stigma (Martei et al., 2018; Wiafe, 2017).
		Social support (Asobayire &Barley, 2015; Aziato & Clegg-Lamptey, 2015)
Fear	Fear of treatment, Fear of divorce, Fear of death	Fear of mastectomy (Asoogo & Duma, 2015; Martei et al., 2018).
		Fear of Chemotherapy (Asoogo & Duma, 2015)
		Fear of death (Asobayire &Barley, 2015; Martei et al., 2018).
		Fear of diagnosis (Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Martei et al., 2018).
		Fear of being abandoned by the spouse (Aziato & Clegg-Lamptey, 2015).
Cultural belief	Tradition, Culture and Myth	Traditional belief (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Elewonibi & BeLue, 2019; Martei et al., 2018
		Belief in herbal treatment (Asobayire &Barley, 2015; Aziato & Clegg-Lamptey, 2015; Karikari, 2018; Wiafe, 2017).
		Cultural factors (Wiafe, 2017).
		Myths and misconceptions about breast cancer (Martei et al., 2018)
		Breast cancer is a punishment from God (Asobayire & Barley, 2015; Wiafe, 2017).
		Traditional health practitioners (Asobayire & Barley, 2015; Karikari, 2018)

		Cultural taboo for a woman to feel her breast (Asobayire & Barley, 2015)
Gender role	Femininity	Relationship with husband/partner (Martei et al., 2018)
		Women are unable to make sole decisions without their spouse/partners (Aziato & Clegg-Lamptey, 2015; Wiafe, 2017).
Body image	Self-esteem	Body shame (Aziato & Clegg-Lamptey, 2015)
	Shame	Intimacy with husbands/partners (Aziato & Clegg-Lamptey, 2015)

5.10 Results

5.10.1 Description of study selection.

The initial literature search yielded 511 articles (PubMed Central 370, Discover 106 and CINAHL 35) from the three different databases used for this search. Relevant studies were not found from other sources such as grey literature. Therefore, duplicated articles (22) were removed, and the remaining 489 articles were screened by applying the inclusion and exclusion criteria. Based on the year of publication, titles of identified studies, extensive reading of the abstracts, and investigation carried out in West Africa, 482 studies were excluded. The full texts of the remaining seven studies were assessed for eligibility and quality. All remaining seven studies were eligible and of good quality; hence, included in the final review (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Elewonibi & BeLue, 2019; Karikari, 2018; Martei et al., 2018; Wiafe, 2017).

5.10.2 Characteristics of included studies

Table 6 summarises the characteristics of the seven studies included in this review. The included studies were all qualitative and published between 2015 and 2019. The majority of the included studies were conducted in Ghana (six), with one study from Nigeria. The total sample size in all the seven included studies was 178 participants. Most of the participants were breast cancer patients except for studies with cohort groups of breast cancer patients and non-patients (e.g. healthcare workers), as seen in Martei et al., 2018 and Karikari (2018). The age range of participants in the included studies was between 18— and 74 years. Although not all studies identified their participants' stages of breast cancer, Asoogo & Duma (2015) reported that their participants (30) were in stages II and III of breast cancer related to their diagnoses. All patients in the study were undergoing treatment at the studies. The included studies were homogenous regarding their research aims (exploring the impact of sociocultural factors on breast cancer screening, diagnosis and management).

Table 6: Summary of included studies

Authors	Titles	Aims & Objectives	Method & Population	Intervention Or focus	Extracted results	Identified sociocultural factors
Aziato & Clegg-Lamptey (2015)	Breast cancer diagnosis and factors influencing treatment decisions in Ghana	To explore the reactions of women with breast cancer and identify factors influencing treatment decisions	An exploratory, descriptive qualitative approach, using face to face interviews with breast cancer patients 12 breast cancer patients were included in the study	Exploring factors that influence treatment decisions of breast cancer women.	Patients' decisions were influenced by family, Friends, Doctors, Faith and Support	Faith, family support, alternative treatment, body image, fear of death, fear of mastectomy effect on intimacy with spouse and social support
Asobayire & Barley (2015)	Women's cultural perception and attitudes towards breast cancer. Northern Ghana	To ascertain how societal perception and attitudes influence women's awareness of breast cancer and its treatment.	A qualitative study using a focus group interview was conducted in Kassena-Nankana District, Ghana. Six participants were recruited for the study.	How societal perceptions and attitudes could influence women's breast cancer awareness and treatment.	Women's perceptions of and attitudes toward breast and its treatment are influenced by a myriad of economic and sociocultural factors such as traditional beliefs and gender roles; certain myths about breast cancer are entrenched in the traditional belief system.	Tradition, Gender role (inequality), language, myths, alternative treatment, social stigma, Family support and social support
Elewonibi & Belue (2019)	Influence of sociocultural factors on breast cancer screening behaviour in Lagos Nigeria	To describe culturally relevant factors that shape attitudes towards breast cancer and breast cancer screening	Qualitative method via semi-structured interview	Describe cultural factors that shape breast cancer patients' attitudes towards seeking medical care (screening).	The study identified religion as the most prominent sociocultural factor that shapes attitudes towards breast cancer and its screening. Other identified factors include family and traditional belief	Religion, Family support traditional belief

Martei et al., (2018)	Fear of mastectomy associated with delayed breast cancer presentation among Ghanian women.	To characterise sociocultural factors associated with delayed presentation understanding of childhood overweight	A qualitative study via in-depth interviews. 31 participants were included in the study	To identify the sociocultural factors that result in delayed presentation of breast cancer patients for health care.	Delay in treatment after breast cancer diagnosis was as a result of fear of mastectomy, the role of the church as a social support system, myths and misconceptions about breast cancer, the financial burden of treatment, and not seeing a painless lump as a breast malignancy	Fear, religion, social stigma, myths, social support and tradition
Waife (2017)	Impact of sociocultural factors on appraisal and help-seeking behaviour among Ghanaian women with breast cancer symptoms	To ascertain how specific sociocultural issues influence Ghanaian women's appraisal of breast cancer symptoms, the meaning they ascribed to those symptoms, the significance of this experience on their timing and choice of healthcare utilisation, and whether these factors are different in Ghana from those identified in Western countries	A qualitative design involving purposive sampling was used to recruit 35 patients awaiting their first medical consultation at two healthcare facilities in Ghana, 27 members of the patients' social networks, and eight healthcare professionals. The interviews were face-to-face audio-recorded, semi-structured, and participants completed a demographic questionnaire	Identify sociocultural factors that influence the Ghanaian's women appraisal of breast cancer symptoms, meaning ascribed to those symptoms and their significance.	The study found four main influential factors that contributed to late presentation within the sample: patients' sociocultural backgrounds, specific manifestations of breast cancer signs, patients' emotional responses towards those signs and symptoms, and the existing healthcare system.	Cultural beliefs and practices, religiosity. Traditional medicine and influence of husbands (Gender role)
Asoogo & Duma (2015)	Factors contributing to late breast	To describe the factors which contribute to the late	A qualitative study via semi-structured in-depth	Factors contributing to breast cancer	Lack of knowledge about breast cancer; fear of cancer	The traditional belief, alternative treatment, and spirituality

	cancer presentation for health care amongst women in Kumasi, Ghana	presentation of Ghanaian women with breast cancer for health care at a tertiary hospital in Kumasi, Ghana	interviews in Kumasi, Ghana, with 30 participants	patients' late presentation	treatment and its outcomes; poverty; traditional and spiritual beliefs and treatments, and caring for others were identified as factors contributing to late breast cancer presentation in the study area	
Karikari, N. A. (2018)	Exploring the sociocultural interpretations of breast cancer and the coping strategies of patients at the cape coast teaching hospital, Ghana	To examine some sociocultural interpretations of breast cancer and the coping strategies adopted by patients in Cape Coast Teaching Hospital	A qualitative study via in-depth interviews involving 25 participants in Cape coast Ghana	Sociocultural interpretations of breast cancer	The study revealed that the interpretations linked with the disease determined the time patients reported to the hospital and permeated their entire health-seeking, tradition behaviours.	Spirituality, non-orthodox treatment and

5.10.3 Sociocultural factors associated with breast cancer screening, diagnosis and management

The sociocultural factors identified in this review include tradition, religion, culture, Family support, social support, spirituality, language, traditional medicine, fear, gender role/influence of husbands and body shame. Using a narrative approach, we synthesised the reported factors into themes based on their similarities: religious belief, support, fear, cultural belief, body image and gender role. The themes were formed by repeatedly identifying the sociocultural factors with similar meanings and ideas.

5.10.3.1Cultural beliefs

Tradition, culture, myths and misconceptions made up this theme' Cultural belief'. All the seven included studies for this systematic review reported this (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Elewonibi & BeLue, 2019; Karikari, 2018; Martei et al., 2018; Wiafe, 2017). Furthermore, six (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Karikari, 2018; Martei et al., 2018; Wiafe, 2017).

Out of the seven studies that reported traditional beliefs were conducted in Ghana, one study (Elewonibi & BeLue, 2019) was carried out in Nigeria. The impact of social culture on breast cancer early detection/screening is evident in the women's refusal to self-examine their breasts due to cultural taboos surrounding touching parts of their bodies (Asobayire &Barley, 2015; Aziato & Clegg-Lamptey, 2015). Again, some female patients refuse to go for screening to avoid a male physician examining their breasts; this can be seen in a participant comment in Asobayire & Barley's study (Asobayire &Barley, 2015).

I cannot allow another man to touch my breast ... I would be accused of being adulterous if found in such a compromising position ... I do not want to be divorced, which will bring disgrace upon my family. (Asobayire & Barley, 2015).

This cultural belief of only their husbands being allowed to touch their breast affects culturally or societally imposed breast cancer examination/screening access rates. Furthermore, the perception that breast cancer is linked to an evil spirit and a curse on families was reported as to why patients do not actively refer themselves to the hospital for treatment interventions (Karikari, 2018; Wiafe, 2017). In a comment from a participant.

B*reast disease is a disease that evil spirits too can associate with, so if you get it, you just have to be quiet about it and be searching for some treatment spiritually* (Wiafe 2017).

When spiritual help from the deity through the traditional healers fails to provide a remedy, it is concluded that the woman might have been cursed, and people start to avoid the sufferers; this also results in women hiding their symptoms instead of going for treatment (Asobayire &Barley, 2015; Karikari, 2018; Wiafe 2017). These aspects of culture impact breast cancer patients' screening, diagnosis, and treatment-seeking behaviours in Ghana and Nigeria.

5.10.3.2 Religious beliefs

As one of the established themes, religious beliefs were the second most reported sociocultural factor that impacts breast cancer screening, diagnosis and treatment in this study. This theme comprises the following sociocultural factors: religion, spirituality and faith. Six out of the seven included studies in this systematic review reported the theme of religious belief (Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Elewonibi & BeLue, 2019; Karikari, 2018; Martei et al., 2018; Wiafe, 2017). Two studies reported religion (Elewonibi & BeLue, 2019; Martei et al., 2018) and were carried out in Nigeria and Ghana, respectively. Three studies (Asoogo & Duma, 2015; Karikari, 2018; Wiafe, 2017) reported spirituality and were carried out in Ghana, while one study reported faith (Aziato & Clegg-Lamptey, 2015) and was also carried out in Ghana. The terms religion, spirituality and faith, are often used interchangeably. These three sociocultural factors are related to one another, as they all address the relationship between man and God and the mode of worship. Although these three factors have a similar meaning, spirituality and faith are considered individual practices, while religion looks at beliefs and practices shared by a group or community (Schlehofer, 2008). Religion was an identified barrier to breast cancer screening, as women who went for their screening were tagged as unfaithful(Elewonibi & BeLue, 2019). The teachings and words of the religious leaders are held with so much value, influencing their members' decisions and health-seeking behaviours (Elewonibi & BeLue, 2019). One of the reported reasons for delayed presentation at the hospital is patients' trust, hope and faith in God (Wiafe, 2017). Patients reported seeking help by engaging in personal and group prayer sessions while waiting for a miracle; late presentation was attributed to when the miracle was not forthcoming (Wiafe, 2017). According to Aziato and Clegg-Lamptey[19], patients would prefer to remain in their homes and believe that God will heal them instead of presenting themselves at the health care facilities (Aziato & Clegg-Lamptey, 2015). These findings provided evidence on the impact of religious belief on breast cancer screening and treatment-seeking behaviours in West Africa.

5.10.3.3 Support

Five (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Elewonibi & BeLue, 2019; Martei et al., 2018) out of the seven included studies reported supported as a theme. This theme comprises family support, social support and social stigma. Four reviewed studies (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Elewonibi & BeLue, 2019) identified family support as an essential factor that predicts the treatment outcome of breast cancer. Three studies(Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015) identified social support, and one study (Martei et al., 2018) identified societal stigma. Among the studies that identified family support, three (Asobayire &Barley, 2015; Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015) were carried out in Ghana (Elewonibi & BeLue, 2019) in Nigeria. All the studies that identified social support were conducted in Ghana, while the only study that reported societal stigma was undertaken in Ghana. Social support is said to be one of the determinants of well-being, with its support reliant upon emotional (Nurturance), informational (advice), companionship (sense of belonging), tangible (financial assistance) and intangible (personal recommendation) (Salakari, 2017). The importance of family support is evident in women referring themselves directly to hospitals due to a lack of familial support (Asoogo & Duma, 2015). As identified in the studies above, the absence of social support explains the social stigmatisation faced by breast cancer patients (Aziato & Clegg-Lamptey, 2015). In addition, social stigma hinders the community members' understanding of breast cancer (Martei et al., 2018); hence, it is often viewed as a punishment (Asobayire &Barley, 2015; Martei et al., 2018). These identified socio-cultural factors (family support, social support, and societal stigma) impact breast cancer screening and management.

5.10.3.4 Fear

Fear of mastectomy (losing their breast), fear of chemotherapy (skin discolouration/ hair loss), fear of losing spouse/partners (divorce), fear of being discriminated, fear of diagnosis and fear of death (knowing people who died as a result of breast cancer), were all discussed under the theme 'Fear'. Three studies (Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Martei et al., 2018) reported this theme. Asoogo & Duma (2015) and Martei et al., (2018) reported fear of mastectomy; only Asoogo & Duma, (2015) recorded fear of chemotherapy and Aziato & Clegg-Lamptey, (2015) reported fear of losing their spouse/partner because of breast cancer. One study (Martei et al., 2018) reported fear of being discriminated against, while three studies (Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015; Martei et al., 2018) reported fear of diagnosis. In comparison, two studies (Asoogo & Duma, 2015; Aziato & Clegg-Lamptey, 2015) reported fear of death. According to a participant in the survey by Martei et al., (2018):

A woman's glory is her breast; of what use will a woman be without a breast?'. This sociocultural factor 'fear' results in patients not going for their diagnosis (fear of losing a spouse/being discriminated against) and refusing treatment (fear of mastectomy, chemotherapy and death).

5.10.3.5 Gender role

Three studies (Aziato & Clegg-Lamptey, 2015; Martei et al., 2018; Wiafe, 2017) included in this review reported gender roles as sociocultural factors that impact breast cancer management. According to the population health report, women are classified as part of the marginalised group, which leads to health inequality (Graham, 2004). Gender role deprives women of being sole or independent decision-makers when deciding on their health and otherwise (Aziato & Clegg-Lamptey, 2015). In most settings in West Africa, customary marriage puts men as the head of the family; hence, women need their authorisation to access everything, including healthcare (Aziato & Clegg-Lamptey, 2015, Martei et al., 2018). This sociocultural factor impacts breast cancer screening and diagnosis, and treatment (Wiafe, 2017). Studies show that most spouses/partners of breast cancer patients will not consent to their spouse's breast cancer treatment due to the financial implications Wiafe, 2017; Karimi, 2018). They would rather discourage them from using orthodox medicine while giving their permission for an alternative treatment which is assumed to be cheaper Aziato & Clegg-Lamptey, 2015). In such a scenario, women will obey their husbands/partners' decisions to avoid being labelled disobedient (Wiafe, 2017).

Furthermore, the customary marriage system bestows the man the responsibility for his wife and their children (Martei et al., 2018). As morality and chastity in marriage are held in high esteem by families, married women are required to inform and seek authorisation from their husbands whenever they need to visit a health facility (Aziato & Clegg-Lamptey, 2015). Women also feel obliged to respect their husbands' views, as divorce is seen as a sign of failure and disgrace to the woman involved and her extended family (Aziato & Clegg-Lamptey, 2015). As such, the gender roles of women affect not only breast cancer diagnosis but also their capacity for treatment-seeking behaviour.

5.10.3.6 Body image

Body image is a sociocultural factor that affects breast cancer treatment and treatment-seeking behaviour in this review. Only one study (Aziato & Clegg-Lamptey, 2015) specifically identified body image as a sociocultural factor in this review. Patients tend to avoid appropriate and recommended treatment for breast cancer for their body image (Aziato & Clegg-Lamptey, 2015). The idea of a 'full woman' has been misinterpreted, resulting in women refusing mastectomy as a potential treatment option Aziato & Clegg-Lamptey, 2015. As the breast is recognised as a symbol of female identity, treatment options such as mastectomy could be refused; since it will involve the loss of one or both breasts, which could create the sense of losing one's femininity (Izadi-Ajirlo, 2013).

Furthermore, side effects of breast cancer treatment such as loss of a breast, development of scars, skin discolouration, change in appearance, and weight gain/loss can result in dissatisfaction with body image. The dissatisfaction often led to breast cancer patients avoiding formal treatment intervention after a positive diagnosis (Aziato & Clegg-Lamptey, 2015; Izadi-Ajirlo, 2013). According to a participant's response in one of the included studies (Aziato & Clegg-Lamptey, 2015).

I was so worried about what would happen to me if the doctors found this to be cancer. I do not even have a child yet. What if they want to remove all my breasts? Will I ever be a woman again? So I just kept this thing to myself and prayed to fall pregnant first so that I could breastfeed my baby.

In other words, undergoing a mastectomy would make her feel incomplete as a woman. This identified sociocultural factor affects breast cancer treatment.

5.10.3.7 Language

As reported by (Asobayire & Barley, 2015) in this review, language is a sociocultural factor that affects breast cancer screening, diagnosis, and management. Language is fundamental; language barriers could result in uncertainty, stress, and challenges that affect the implementation of culturally competent, patient-centred care and effective decision-making (Asobayire & Barley, 2015). The absence of a translation for the term breast cancer in most local languages in this setting and poor knowledge of breast cancer can be seen as confounding and confounding to a lack of linguistic capital (Asobayire & Barley, 2015). This sociocultural factor reduces the impact of breast cancer awareness, which affects the screening (Asobayire & Barley, 2015).

Regarding the quality assessment outcome using the Critical Appraisal Checklist for a qualitative study, all included studies were of optimal quality. This conclusion was based on the scoring result where all studies scored a cumulative score of above 70%or more across the checklist.

5.11 Discussion

5.11.1 Summary of findings

This review is the first to formally synthesise evidence from primary studies on the impact of sociocultural factors on breast cancer screening, diagnosis and management in West Africa. The following sociocultural factors- culture, tradition, religion, family support, social support, spirituality, Language, traditional medicine, gender role and body image were identified in this review. The findings of this review confirm that breast cancer management in West Africa could be influenced by sociocultural factors. This means that for possible improvement in breast cancer management (increase in the survival rate) in West Africa, the role of sociocultural factors needs to be considered. Also, the findings of this review demonstrated limited current research on the topic under review in West Africa. Therefore, the review findings are essential as they close the literature gap, open new channels for further study, demonstrate the importance of sociocultural factors in breast cancer management, and create an awareness focus for an improved outcome of breast cancer management in West Africa.

5.11.2 Alternative explanations of the findings.

This systematic review reported sociocultural factors that impact breast cancer screening, diagnosis and management in West Africa. Nevertheless, other factors like lack of funds (treatment affordability), for example, could also result in patients seeking traditional community support and assistance instead of presenting themselves at the hospital for formal diagnosis and treatment; as the traditional remedy is assumed to be cheaper (Karimi et al., 2018). According to Karimi et al., (2018), breast cancer patients (especially women of lower incomes, uninsured or underinsured) may find themselves stuck between paying for care and paying for basic expenses, like rent, energy and food. Lack of knowledge is evident as one of the underlying factors of the misconception of breast cancer which is presented as a sociocultural belief (Tetteh and Faulkner, 2016). For instance, not knowing what breast cancer is could be why it is considered a punishment from the gods (Tetteh and Faulkner, 2016; Facione and Katapodi, 2000). Furthermore, lack of awareness is the most common cause of not attending breast cancer treatment (Olasehinde et al., 2019). Again, the problem of husbands/partners not giving their consent to their spouses' breast cancer treatment has been linked with the problem of lack of knowledge or overall awareness of the condition (Karimi et al., 2018).

Finally, accessibility to breast cancer centres could be a hidden factor underpinning why women fail to refer to hospitals for formal diagnosis and treatment interventions(Akinyemiju, 2012). For some people living in rural communities, travelling to cities (urban settlements) where most breast cancer centres are situated might be challenging (Karimi et al., 2018). Other options like engaging in prayers for healing or self-medication could be their preferred options (Olasehinde et al., 2019). All of these areas raised for discussion can be posited as alternative explanatory factors in the findings of this review.

5.11.3 Strengths and limitations of the study

This study is the first systematic review to provide evidence on the impact of sociocultural factors on breast cancer screening, diagnosis and management in West Africa. A similar systematic review on this topic also incorporates studies from other sub-Sahara African countries (Tetteh and Faulkner, 2016). However, considering some contextual differences concerning social, cultural, economic and health systems among sub-Sahara African countries like South Africa and Nigeria, the transferability of findings of the systematic review by Tetteh and Faulkner (2016) may not be appropriate in West Africa.

Some of the limitations of this review resulted from the inclusion criteria. Including only studies written in the English language introduced selection bias, thereby excluding studies with possible relevant evidence. Nevertheless, the English language is taught throughout the educational system of the anglophone countries. Over 41% of the countries in West Africa have the English language as their official language (Banjo, 2000); the search strategy will be able to capture studies covering a majority of the West African population.

Furthermore, this review focused on socio-cultural factors; previous studies have shown that the more significant impact of sociocultural factors like culture and faith is more among those at the lower socioeconomic level (Tetteh and Faulkner, 2016). In addition, the misconception of breast cancer has been linked to being common among individuals with no formal education (Tetteh and Faulkner, 2016). Also, seeking alternative treatment (traditionally) has been linked to a lack of money (low income), hence the decision to opt for a less expensive treatment (Olasehinde et al., 2019).

Finally, although this review focused on West Africa, countries in West Africa were not well represented in the study. Only studies conducted in Ghana and Nigeria met the inclusion criteria; hence other countries in West Africa were not represented in this review. Nevertheless, Nigeria and Ghana are representative of West Africa as they share common characteristics; they are spiritual but also linked to the historical and cultural heritage of the people (Mbiti, 1991). Furthermore, just like in most West African countries, the healthcare system in Ghana and Nigeria do not meet the World Health Organization's (WHO) framework for sound healthcare systems (Oleribe et al., 2019).

5.11.4 Comparison with existing literature

Among those sociocultural factors identified, culture and tradition were mainly reported to impact breast cancer management in West Africa. All the included studies carried out in Ghana reported the effect of culture (Asobayire and Barley, 2015; Asoogo and Duma, 2015; Aziato and Clegg-Lamptey, 2015; Karikari, 2018; Martei et al., 2018; Wiafe, 2017). This finding supports the results of some researchers, which described Ghana as a country with a fascinating repository of cultural heritage, where tradition and culture are held in high esteem; hence, play a major role in the health of the Ghanaians population (Spittel et al., 2019)

A report of a study conducted in Nigeria concluded that religion greatly influences Nigerians' health and health-seeking behaviours (Rumun, 2014). In another study, most deaths among patients in Nigeria were associated with the negative impact of religion; patients delayed presentations to healthcare facilities or even stopped taking their medications because of an assurance of miraculous healing promised to them by their religious leaders (Ijabla, 2015). These findings are supported in this review as the only Nigerian study that reported religion/spirituality as a major socio-cultural factor that impacts breast cancer management in West Africa.

Family and social support are essential factors affecting breast cancer patients' capacity to deal with their conditions and an associated factor for major depressive disorder among breast cancer patients (Tefferi et al., 2015). Family relationships play a central role in shaping an individual's well-being/health across the life course (Merz and Consedine, 2009). In line with our findings, other studies have demonstrated this strong association. The study by Salakari 2017 established an association between inadequate family and social support and increased cancer-related mortality. Support sources could be emotional (nurturance), informational (advice), companionship (sense of belonging), tangible (financial assistance) and intangible (personal advice) (Salakari et al., 2017).

Studies have demonstrated the impact of fear and gender role on breast cancer management. Evidence has shown the effect of fear on breast cancer treatment (Singer et al., 2015; Consedine et al., 2004). In a study by Singer (Singer et al., 2015), patients reported fear before and after treatment, fear of surgery, fear of chemotherapy and fear of radiotherapy. The report of these studies is in line with the findings of this review. Also, the influence of gender roles on breast cancer management is evident in the research (Karimi et al., 2018; Olasehinde et al., 2019). In a study (Karimi et al., 2018), women cannot make decisions without their husbands' consent. For married women, knowing that divorce will be the consequence of their disobedience and considering how divorced women are stigmatised, women allow their husbands to guide their decision-making in light of their religion (Karimi et al., 2018). Identifying the influence of husbands/partners on breast cancer treatment has been linked with a financial cost, as men who cannot afford the treatment tend not to give their consent for treatment (Karimi et al., 2018; Olasehinde et al., 2019). The findings of these studies are evident and in line with the results of this review. This sociocultural factor directly affects patients' capacity for health-seeking behaviour and treatment intervention.

Although the least reported sociocultural factors in our review, our results on body image and language, complement those of other studies (DeSantis et al., 2015; Tetteh and Faulkner, 2016; Izadi-Ajirlo et al., 2013; Alexandraki and Mooradian, 2010; Kawar, 2013; Schapira et al., 2019). In a systematic review by Tetteh and Faulkner (2016), body image was reported to play a significant role in breast cancer management. Kawar's (2013) report on the role of language in breast cancer management stated that for an increased breast cancer screening participation, appropriate language and culturally sensitive educational materials should be created and made available to all. Also, ineffective or suboptimal communication between patients and healthcare providers is due to the Language barrier (Ali and Johnson, 2017).

5.11.5 Practice, policy and research implications

Our review provides evidence on the impact of sociocultural factors on breast cancer screening, diagnosis and management in West Africa; hence, the identified socio-cultural factors ought to be targeted for a positive management outcome. This review contributes to the emerging evidence on sociocultural factors that affect breast cancer management in West Africa and provides evidence on their role.

This review is the first to raise awareness of the barriers of independent access to breast cancer diagnosis and treatment intervention for women in relation to their sociocultural backgrounds in West Africa, enabling policymakers to reflect upon and revisit the existing proposed strategies for breast cancer management in West Africa. According to the proposed strategy for breast cancer management in Africa (Vanderpuye et al., 2017), the identified limitations to positive outcomes (high survival rate) of breast cancer management include poor nursing care and surgery, inadequate access to radiotherapy, poor availability of basic and modern systemic therapies; with no consideration on the impact of sociocultural factors to breast cancer screening, diagnosis and management.

In line with the findings of this review, there is a need for more and improved awareness with an emphasis on the role of sociocultural factors in breast cancer screening and management, especially on cultural and religious beliefs. This improved breast cancer awareness will help reduce the impact of sociocultural factors on independent access to breast cancer screening, diagnosis and management, hence increasing the survival rate of breast cancer in West Africa.

Further studies need to be carried out in other West African countries to broaden the evidence on the impact of sociocultural factors on breast cancer screening, diagnosis and management. The fact that only studies conducted in Ghana and Nigeria met the study inclusion criteria indicates the limited current data on the impact of sociocultural factors on breast cancer management in other parts of the region under review.

There is a need for more exploratory studies to identify other possible sociocultural factors that could influence breast cancer treatment outcomes in this region. In addition, quantitative studies should be conducted to investigate the causal pathways between the identified socio-cultural factors and breast cancer screening, diagnosis, and management.

5.12 Conclusion

Social determinants of health like sociocultural factors impact breast cancer management and outcomes. Identifying these sociocultural factors and understanding their influence on breast cancer management in West Africa will possibly help to improve positive treatment outcomes, hence, reducing the current mortality rate of breast cancer in the study setting. This review identified the sociocultural factors that affect breast cancer management in West Africa. The review also identified gaps for future research on this subject area as little work has been conducted outside Ghana. Also, issues raised in this review are likely to affect people as part of the wider West African diaspora. Addressing the issues of religious belief, fear, and other socio-cultural factors identified in this review will ensure a positive outcome for breast cancer management. This review involved a comprehensive exploration of data from the seven included articles and explored the evidence related to the impact of sociocultural factors on diagnosis and management of breast cancer in West Africa.

6.0 CHAPTER SIX: QUALITATIVE STUDY

6.1 Introduction

This chapter discusses the research design and methodological approaches adopted in the qualitative research, including an overview of the study design, Instrument for data collection, pilot study, trustworthiness, data collection, and data analysis. Also, the results from the qualitative research are presented in this chapter.

6.2 Overview

The phenomenological method was adopted in this study. This approach is considered a powerful qualitative research strategy that focuses on helping health professionals understand people's lived experiences and accurately describe these experiences concerning what is being studied (Neubauer, Witkop, & Varpio, 2019). The researcher used this approach to investigate breast cancer patients' treatment experiences and identified socio-cultural factors that impacted their treatment and outcomes in this study. In addition, the qualitative study's exploratory nature helped the researcher investigate how breast cancer patients in the study described their experiences. It explored how sociocultural factors (such as religion, culture, family support, societal support, gender role, fear, body image and language) impacted the treatment and treatment outcomes of the participants.

Among the different methods of data collection in a qualitative study which include observation (participatory or non-participatory), interviews, focus group discussions, and documents, the interview method was adopted. The researcher's choice of data collection method was underpinned by the quest to answer the research questions and ensured that the study's aim was achieved. Data collection via one-on-one semi-structured interviews is an essential aspect of qualitative research, with the researcher collecting and interpreting the data. Therefore, a one-on-one semi-structured interview was used to collect data for this study, giving the participants the platform to share their lived experiences. Although using other forms of discussions such as focus groups could be helpful if the research interest was to capture the dynamics of a group of people with a collective shared experience, this was not the case.

Also, adopting the use of observation (participatory or non-participatory) and documents data collection procedure will limit the study by introducing bias (**Smit** & **Onwuegbuzie** (2018). In adopting a semi-structured one-on-one interview in this study, participants were assured of confidentiality and anonymised responses.

6.3 Sampling procedure

The sampling technique adopted was based on the need to recruit participants who could provide adequate information to answer the research question, rather than the need for a representative sample to ensure potential transferability (Patton, 2002). Also, the accessibility to the study areas was purposive to avoid visiting high-risk areas. According to Guest, MacQueen, & Namey, 2011, the guiding principle in qualitative studies' sample selection is to select participants who can provide rich information to help achieve the study's aim. From the above mentioned, purposive sampling was most suitable for selecting participants for the interview. Purposive sampling is a strategic selection process and recruitment of individuals, providing valuable and rich information on the research area under study (Patton, 2002). Purposive sampling was preferred as it helped identify and select information-rich cases related to the phenomena of interest. Breast cancer patients that met the inclusion criteria and willingly gave their consent participated in the study. Therefore, the theoretical sampling was adopted, which involved concurrent data collection and analysis with each interview analysed before conducting the following Interview (Glaser and Strauss, 2009).

One of the benefits of theoretical sampling is that in adopting this design in interviewing, the initial interviews informed the conduct of the subsequent ones, thereby allowing for validation of findings and iterative enrichment of the data set (Glaser and Strauss, 2009). In qualitative studies, the interest is in having an in-depth understanding of the phenomena under study. There is no predetermined sample size nor a need for large sample size, thus engendering and providing an intensive and detailed data set (Guest *et al*., 2011). Therefore, the theoretical sampling strategy was adopted, and this involved concurrent data collection and analysis with each interview analysed before the conduct of the following Interview (Glaser and Strauss, 2009). With this strategy, codes were formed and incorporated into subsequent interviews, giving room for data validation. In addition, this strategy enabled the researcher to confirm and probe further explanations on experiences identified in previous interviews. The number of interviews conducted was based on saturation attainment during the interview process using theoretical sampling. Saturation was attained when new interviews did not yield further information on the topic under study. (Glaser and Strauss, 2009; Guest *et al*., 2011). Thirty participants were recruited from the selected hospitals for this study: 16 from Lagos and 14 from Ibadan. Data collection from each hospital ended as data saturation was attained.

6.4 Recruitment strategy

In recruiting participants for this study, gatekeepers were used at the hospitals to avoid the ethical implication of coercion. The gatekeepers were the hospital appointed members of the ethical committees and the heads of the oncology departments in the selected hospitals in this study. According to McFadyen and Rankin (2016), research gatekeepers have an invaluable positive influence on the research process. The gatekeepers in this study facilitated and ensured the smooth running of the data collection activity.

The Lagos University Teaching hospital (LUTH) ethical committee was contacted in Lagos, and ethical approval was obtained for the data collection. A member of the ethics committee was assigned to the researcher for assistance. The assigned staff introduced the researcher to the head of the oncology department. The head of the oncology department communicated directly with the researcher and provided necessary information like the breast cancer clinic days. The researcher and the head of oncology agreed on mutually convenient dates and times for the data collection. Having been introduced to the oncology team, the researcher was familiar with the oncologists and nurses on duty during the breast cancer clinic days. On the scheduled breast cancer clinic days, the most senior oncologist on duty was responsible for introducing the researcher to the patients for data collection.

Also, in Ibadan, the researcher worked alongside the gatekeeper to ensure the successful completion of the data collection process. At the University College Hospital (UCH) Ibadan, formal ethical approval was provided by the university ethical committee and the Institute for Advanced Medical Research and Training (IAMRAT), College of Medicine. Having obtained ethical clearance from these two bodies of the University, the appointed ethical committee member took the researcher to the hospital's oncology department, where the researcher was introduced to the teams of doctors and nurses in the oncology department. The head oncologist assigned his most senior staff to oversee the successful completion of the data collection. The breast cancer clinic days and times were discussed, and dates and times for the data collection were agreed upon. Finally, the head oncologist introduced the researcher to the breast cancer patients on their clinic days. See the recruitment section for details on how the participants were recruited.

6.5 Instruments for data collection

The instruments used for the qualitative data collection include the interview guide, digital audio-recorder, batteries for audio-recorder, biro, notepad, Participant information sheet and participant consent form. The interview guide comprised of questions used for the semi-structured face-to-face interview. The batteries for the digital audio recorded were used to power the recorder. The recorder was used to record the interview with the consent of the participants. The notepad and biro were used for notetaking during the interview. The participant information sheet provided information on the research, while a consent form was issued to participants who indicated their interest in participating.

6.4.1 Development of the Interview Guide

The interview guide was developed and used in this study to explore the lived experiences of breast cancer patients in Nigeria while identifying sociocultural factors that affect their treatment and outcomes. Under the guidance of the research supervisors, the researcher developed the interview guide used during the interview in this study. According to Holloway & Wheeler (2010), the researcher's goal in using an interview guide is to examine the study area, gather related data from respondents, and guide what respondents are to focus. The developed interview guide lists the topic that the researcher planned to cover in the interview, focusing on the research questions and objectives. The interview guide provided questions that guided the interviewer during the interview but did not dictate participants' feedback (SmithBattle, Punsuwun & Phengnum, 2021; Kallio et al., 2016).

The interviewer ensured that the principle of consistency was adhered to while developing the interview guide. In Brinkmann & Kvale's (2014) report, interview guides should promote consistency as it is an important tool that connects prior literature review with the research problem and research question. The interviewer used the same interview guide throughout the study's interviews to ensure consistency in the interview. Furthermore, the interview guide consisted of questions linked to the research questions and stimulated free conversation without ambiguities and hindrances (Pedersen et al., 2016). By stimulating conversation during the interview in this study, the interviewer understood the phenomenon from the respondent's perspective. The interview guide consisted of six questions. See appendix B for details on the questions included in the interview guide.

6.5 Pilot test

The pilot study was carried out to simulate the formal data collection process on a small scale to identify practical problems regarding the final data collection instruments, methodology and sessions (Hurst et al., 2015). A pilot study should be carried out in a setting similar to the research and a group of individuals with similar characteristics to the potential study population. This way, the data collection process could be replicated. In this study, the pilot test was conducted in Owerri, the capital of Imo State, Nigeria.

Owerri shares similar characteristics with the study setting- Ibadan and Lagos. Some of the characteristics they share include being the capital of a state and a heterogeneous city with people from different cultural backgrounds, which are essential to this study. Also, Owerri has private and public breast cancer facilities that assure participants' accessibility for data collection.

As this study explored breast cancer patient's treatment experiences with a focus on identifying sociocultural factors that impact their treatment outcomes, all participants in the pilot and main study share the same characteristic - 18 years and above and undergoing treatment in the selected hospitals, as at the time of the survey. Data for the pilot study were collected from breast cancer patients receiving treatment at the breast cancer clinic at Federal Medical Centre Owerri. A total of three breast cancer patients were interviewed during the pilot study.

The outcome of the pre-test was instrumental to the restructuring of the interview guide regarding the number and sequence of questions and reducing the proposed interview duration. For instance, nine questions were asked during the pre-testing, which was reduced to six questions for the final interview. Also, the interview duration, which was 20-45minutes during the pilot study, was reduced to 30 minutes during the primary interview. This interview duration was reduced as two out of the three interviews conducted during the pre-test did not exceed 27 minutes each.

6.7 Principles to the interview preparation

The interviewer ensured that the interviews were conducted in a conducive location in preparing for the interview. Most interviews took place in a private office at the hospital, as preferred by the interviewees. The researcher also adhered to the principles of interview preparation by McNamara (1999, pp. 2) and ensured that the interviews were successfully conducted.

The principles of the interview preparation by McNamara (1999, pp. 2) served as a checklist to ensure that a productive interview was achieved. The principles include choosing a setting with little distraction, explaining the purpose and format of the discussion, addressing terms of confidentiality, stating the interview duration, contacting the researcher, and asking the participants if they have questions before and after the interview.

Before the interviews, ethical concerns on anonymity and confidentiality, which are vital in data collection, were addressed, and participants in the study were assured anonymity and privacy (Britten, 1999). The participant information sheet was presented to the participants to better understand the research and their expectations. In addition, participants consented to participate in the study by signing the written consent form and giving verbal consent at the start of the recorded interview for confirmation. According to Kvale (1996), the assurance of anonymity and confidentiality's ethical principles increases the likelihood of honesty in an interview.

The purpose and format of the interview were discussed in the participant information sheet and distributed to the study participants. According to Ennis & Wykes (2016), the participant information sheet must contain adequate detail for potential participants to make an informed decision about taking part or not. Therefore, the participant information sheet for this study explained the following: the purpose of the study; what they need to do to take part; whether they have to take part; possible advantages and disadvantages of taking part in the survey; what to do if something goes wrong during the interview; confidentiality and anonymity of their participation; how the results of the study would be disseminated; who is funding the study; who has reviewed the study; and persons to contact for further information.

To ensure that productive interviews were conducted, the researcher identified the need for a conducive interview environment. According to McGrath, Palmgreen & Liljedahl (2018), the environment in which an interview is conducted affects the interview's quality. Hence, it should be free from distractions and be at times and locations suitable for participants. Participants were breast cancer patients undergoing treatments and selection of the participants was carried out in the hospital. The participants were given options of having the interview within the hospital premises or at their area of choice that was convenient to enable them to feel free to relive and narrate their lived experiences.

Before the interview, the researcher discussed the interview location concerns with the hospital management, who also understood the need for a healthy and conducive environment and offered one of their consultation rooms for the interview. As a result, 26 out of the 30 interviews took place in a private office at the hospital premises. Three took place in the participants' business environment. Finally, one took place at the participant's residence (the researcher was in the company of the research assistant at the participant's home).

Good rapport with participants was established before the interview commenced. From the reports of Bell (2014), good communication line with participants before the interview can positively affect the discussion. According to Schoultz et al., 2001 and Bell 2014, the most appropriate way to build rapport in an interview is to approach interviewees with an open and curious attitude, letting them know precisely why you are interested in their specific point of view. In line with the above conclusion from Schoultz et al., 2001 and Bell 2014, the researcher explained to the participants, letting them know why their specific point of view is needed and also an open and curious attitude during the interview.

In ensuring that comprehensive and representative data are collected during an interview, the interviewer needs to familiarise themselves with the interview processes and schedule (Hammersley & Atkinson,1995). The researcher in this study is trained in conducting interviews and has worked as a volunteer in qualitative research; she possesses a repertoire of skills and techniques which aided in collecting quality data during the interview. For example, the researcher rehearsed the processes before the interview, which made the researcher conversant with the procedures and allowed the discussion to flow naturally. Also, listening attentively to the participants as they recounted their experiences aided the quality of the data collected in the interview.

According to McGrath et al. (2018), an interviewer needs to be an excellent listener to ensure a productive interview. Therefore, in demonstrating good listening skills, the researcher maintained eye contact for the most of the interview, avoided interrupting the participants, used verbal affirmation and paraphrased answers for reflection, asked for clarifications, paid attention, and used open and subjectively neutral body language, nodding, smiling, looking interested and making encouraging noises during the interview (Giger **2017**; McGrath et al., 2018).

Interview guides were adjusted and fine-tuned during the interview to suit the participant's understanding. According to Liljedahl et al. 2015**,** questions might be misunderstood based on some factors like context, age and literacy. Therefore, during the interview, the researcher reflected on whether the questions were understood and used follow-up questions to probe further for clarification. Research on topics such as illnesses, death and sharing personal experiences such as failure, stress, shame, mental health or harassment usually evoke uneasy emotions from participants in an interview (Busetto & Gumbinger, 2020). As this study explored the breast cancer patients' experiences, an outburst of emotions was anticipated. Knowing possible emotional outbursts enabled the researcher to best handle such occurrences (Busetto & Gumbinger, 2020). Therefore, the researcher was sensitive to the participants' reactions as they shared their experiences during the interview.

According to Varpio and McCarthy 2018, some participants can handle their emotions, and others might need assistance from the researcher/interviewer. Most interviewees managed their feelings during the interview except for three participants that had emotional upset. The researcher stopped the interview at this point. Still, the interviewees indicated an interest in continuing the interview after a while because they feel better talking to someone without being judged. Although the interviewees that got upset emotionally claimed to be alright afterwards, the researcher referred them for counselling at the hospital’s counselling centre, where the department was pre-informed before the interview on possible referrals for psychological counselling.

The researcher in this study acted in line with Kvale (1996) recommendation and thanked the participants for their time and allowed them to chat at the end of the interview. During the interview, numbers were assigned to each participant to ensure successful data analysis. The numbers helped the researcher link the recorded audio and field notes taken during the interview. This study took place in two different towns (Lagos and Ibadan); the first three letters of each city was used for identification., for instance, LAG for Lagos and IBA for Ibadan. The assigned numbers and towns' abbreviations were used to identify participants (LAG/001; IBA/001 etc.).

6.8 Reflexivity

Reflexivity is a continual process of engaging and articulating the place of the researcher and the context of the research. This process requires the researcher to self-reflect on oneself, relationship with participants and how this relationship could affect the participants' answers to the research question (Korstjens & Albine, 2018).

In research, the researcher must declare their position. The position of a researcher in the study could either be as an insider or an outsider researcher. For a researcher to be an insider researcher, the researcher must have experience in the subject area under study. The researcher is not a breast cancer patient in this research, although there is a theoretical understanding of breast cancer. In this regard, the position of the researcher is an outsider.

Considering the cultural context and settings for this research, the researcher could be an insider as this study was carried out in Nigeria. The researcher is a Nigerian and had lived in Nigeria for over three decades. Nevertheless, the researcher understood the implication of presumptions and biases in a study and was continuously reflexive hence, provided a scientific justification for decisions taken during the research. During the interview, the researcher consciously avoided asking leading questions. Also, theories adopted in this research were clearly explained, which conforms to Johnston, Bennett & Kajamaa (2018) report that explaining theories adopted in the study helps eliminate underlying assumptions in the analysis.

6.9 Ethical Considerations

Ethical approval was obtained from the University of Sunderland, United Kingdom; Lagos University Teaching Hospital (LUTH) Lagos, Nigeria; University College Hospital (UCH) ethical committee and the Institute for Advanced Medical Research and Training (IAMRAT) at Ibadan. Also, a letter of introduction was issued to the researcher by the Director of Studies. University of Sunderland's Ethics Committee issued an ethical approval certificate after an official application. The introductory letter served as a means of identification which enabled the researcher to obtain ethical clearance/approval from the selected breast cancer treatment facilities stated above. The ethical approval from the facilities granted the researcher and her assistants' access to breast cancer patients. Before their enrolment into the study, written and verbal consent were sought and obtained from potential study participants. Also, approval for tape recording was sought before the interview. Respondents were informed of their right to withdraw during the interview.

Nevertheless, their right to withdraw ends as data analysis commences. Confidentiality was assured to the interviewees, as well as their anonymity. Data from the interviews were coded and kept under safety while electronically stored data in a password-protected database. All information about the participants was handled in line3 with GDPR (2018) stipulations. (See the approval letters in Appendix iv).

6.10 Data collection

In this study, the interview method of qualitative data collection was adopted. A qualitative interview is an informal conversation with a relaxed character to gain insights into a person's subjective experiences, motivations, and opinions (Hak, 2007; Hijmans & Kuyper, 2007). In conducting the interviews, a semi-structured interview approach was adopted, which involved using an interview guide. Interview guides are guiding questions used in an interview, supplemented by follow-up and probing questions dependent on the interviewee's responses (DeJonckheere & Vaughn (2018). The interview guide used in this study was developed by the researcher, with the questions derived from the previous research (systematic review) and existing literature (Busetto, Wick & Gumbinger, 2020),

Before the interview, permission was sought for the audio recording, and all the participants consented. Two research assistants helped the researcher during the data collection as one of the research assistants was taking notes, and the other was recording while the researcher moderated the interview. Data collected stopped after the 30th interview as saturation was attained.

6.11 Data Processing and Analysis

6.11.1 Data Processing

The recorded audio and notes taken during the interview were processed in readiness for the analysis. According to Sutton (2015), processing data after collection helps remind the researcher of situational factors that may be important during data analysis, making data analysis and interpretation more systemic and logically progressive. Therefore, in processing data for this study, the following steps were used:

I. Protecting the electronic data: This was done by saving the audio recorded interview in two separate password encrypted devices to keep safe and unauthorised data access. The rationale for keeping in two devices is to prevent total loss; in cases of loss from a device, the data can be accessed from the second device. Nevertheless, there is no record of data loss from any of the devices used for the data storage in this study.

II. Transcription of the audio recorded Interview: The audio recorded Interview was transcribed in written form. This transcription was done verbatim to avoid missing any information passed on during the interview.

III. Translation: This study conducted only one interview in a local language (Igbo) with others in English. During the translation phase, the Igbo interview was translated to English to ease the data analysis and interpretation and back to the igbo language to check content validity.

IV. Data linkage: Each participant's data, including the transcribed and observation notes taken during the interview, were linked. A pre-determined code was assigned as a means of identification for each coupled element of data for analysis.

The interviews were recorded using a digital audio recorder. Digital audio record is preferred to the tape recorder as they offer sophisticated functions like background noise cut and easy transfer and maintenance of the audio files as soft copies. The audio record was saved on two password-protected storage devices at the end of each interview –a flash drive and a drop box. Keeping two copies of each interview record in separate devices ensures the interview data are not completely lost if one copy was corrupted. Furthermore, to maintain the confidentiality assured to the participants, access to the devices was strictly on a need-to-know basis; hence only the researcher and the Director of the study had access to the devices.

Furthermore, all the interview records were transcribed verbatim from audio to written form by the researcher on the same day they were conducted. The transcriptions were done manually by the researcher. Where necessary, the interview transcripts were translated from the local language to English. The transcripts were then analysed using the thematic analysis method for qualitative research.

6.11.2 Data analysis

The audio recordings from the interview were transcribed using the exact words delivered by the interviewee. This aligns with researchers King and Horrocks (2010) and Busetto et al. (2020) on transcribing audio recordings verbatim during data analysis. The verbatim transcription helped in capturing the intended experiences of the breast cancer patients in the study. Data processing is followed by data analysis, which is considered the most complex stage of qualitative research (Thorne, 2000; Maguire and Delahunt, 2017). Data analysis performed in an organised manner can be transparently communicated and shared with others. Trustworthiness can be easily achieved when researchers are clear and transparent on how data was analysed and the assumptions that informed the analysis (Maguire and Delahunt, 2017). There are various methods on how to conduct qualitative research data analysis. These methods include content analysis, narrative analysis, discourse, and thematic analysis.

Content analysis is adopted when evaluating words, phrases or textual content and their meaning in data. It is the technique of replicating and validating inferences from the text, verbal communication and other datasets (Boettger and Palmer, 2010). The narrative analysis acknowledges that people's stories are essential and underpin their social identities. In narrative research, the researcher is not interested in separating the stories into themes or patterns. Instead, people recognise and appreciate their lived experiences through storytelling (Wong and Breheny, 2018). Discourse analysis revolves around language and its effect on data (Kamalu and Osisanwo, 2015). Finally, the thematic analysis identifies and classifies themes and patterns within qualitative data (Maguire and Delahunt, 2017). The researcher followed the 6-step outline of thematic analysis as popularised by Braun & Clarke (2006;2012).

In analysing the transcribed data from this study, the thematic analytical process was adopted. According to Castleberry and Nolen (2018), thematic analysis is a commonly used method in analysing qualitative data such as interview transcripts. It can achieve different research questions, aims, and objectives about people's lived experiences and views. In this study, the thematic analysis process aligned with the research objective of exploring the treatment experiences of breast cancer patients in Nigeria while identifying sociocultural factors that impact their treatment and outcomes. The thematic process is a six-step process that includes familiarisation with data, Coding, generating themes, reviewing themes, defining and naming themes and finally, the write-up stage (Braun and Clarke, 2006 Nowell et al., 2017). Although the six-step is a practical process targeted at achieving trustworthiness in thematic analysis, the framework is a valuable guide but must not be followed religiously or linearly; steps can overlap or be skipped, depending on the size and complexity of the data (Nowell et al., 2017; Maguire and Delahunt, 2017).

6.11.2.1 The six-step thematic analysis processes

(Braun and Clarke, 2006; Nowell et al., 2017).

Familiarisation with data: The opening step in any qualitative analysis is reading and re-reading the transcripts. The data were collected through interviews and observational notes, taken during the interview. Familiarisation of data commenced from the data collection stage, transcription stage, data processing stage, and finally, the analysis stage. According to Braun and Clarke (2006), before Coding, the researcher should endeavour to go through the complete dataset at least once. This is because ideas and themes may be formed with the familiarisation of the depth and breadth of the data set (Braun and Clarke 2006). In this study, the researcher familiarised herself with the processed data by repeatedly going through them. The researcher read and re-read the processed data severally, seeking patterns, meanings, and possible themes. Finally, the researcher identified patterns in the processed data used for the Coding.

Coding: Coding is the second stage in the six-stage of the thematic data analysis. According to Braun and Clarke (2006), Coding involves organising data in a systematic and meaningful way after familiarisation with the data has been completed. Coding condenses extensive data into small meaning units and allows the researcher to concentrate on specific features of the data (Nowell et al., 2017). Creswell (2014) stated that the methodological process of data coding requires detailed information to be analysed and classified into themes that depict the subject of interest. Therefore, this stage encompasses the preliminary generation of codes from collected data. In this study, the following codes were formed after mastering the pattern in the processed data: Knowledge, perception, signs, symptoms, physical examination, health-seeking behaviours, treatment options, treatment efficacy, treatment refusal, number of occurrences, family support, societal support, body image, gender role, religion, spirituality, culture, medication accessibility, medication affordability, personality, lifestyle, self-help, biopsy, scan, suggestion, and advice. The above codes were derived from the reported experiences of breast cancer patients in Lagos and Ibadan, Nigeria.

Generating themes: The third phase involves the movement from codes to themes. It starts after the preliminary Coding and collation of data have been proceeded. There is no universal rule on what makes a theme. However, according to Braun & Clarke (2006), the theme should relate significantly to the data compared with the research question and depict some repetitive response pattern within a given data set. As Braun & Clarke (2006) explain, there are no hard and fast rules about what makes a theme. At this stage, themes and subthemes were generated; subthemes are a subset of theme that involves clusters of codes that have or share the same feature or characteristic (Braun & Clarke, 2012). In developing the themes, subthemes could be formed from the generated codes, and finally, into themes. The researcher examined the codes in this study and ensured that the codes fit into subthemes and themes, respectively. For instance, codes on religion, spirituality, and fate were related to one another and pointed towards religious belief. These codes were used to form the subtheme' religious belief', as they considered people's relationship with the supernatural being. Also, culture and tradition formed the sub- theme' cultural belief'. The sub-themes on religious and cultural beliefs were used in developing the theme 'Beliefs'. The themes were descriptive and described patterns in the data relevant to the research question. The following themes were generated: proficiency and viewpoints, signs and symptoms, health consciousness, treatment experiences, support, femininity, beliefs, medical experiences, psychological factors, alternative treatment, diagnosis and recommendations.

Reviewing themes: According to Braun & Clarke, 2006, this phase is all about quality control and quality assurance. It involves a repetitive process through which the preliminary themes are reviewed and compared with the coded data and the complete data set (Braun & Clarke, 2012). The soundness of individual themes was examined to tell if the themes correctly mirror the meanings in the data set. A new code might be inserted if the researcher discovered an important issue not covered by an existing code. The end product of this phase is for researchers to have a good grasp of the different themes, from cohesion to making sense of the story behind the data (Braun & Clarke, 2006). The proposed themes were reviewed in this study, with codes and subthemes re-examined. After the review, the codes were confirmed, and the generated themes were re-confirmed.

Defining and naming themes: The fifth phase involves intensive analysis of thematic analysis and investigation into its final finished product (Braun & Clarke, 2012). It involves the unambiguous specification of themes into specific and unique patterns. Each theme must tell a story, and the researcher must write a thorough analysis identifying the story behind each theme. For Pope, Ziebland, & Mays (2000), theme names should be practical and concise to indicate to the reader a view of what the theme is all about. This is when the researchers reflect on how the particular theme aligns into the complete story related to the research questions. Therefore, a robust thematic analysis should contain themes with a unique focus, are related but not repetitive and address the research question (Braun & Clarke, 2006). In this study, themes addressed every aspect of the research questions and objectives, formed the complete story of the treatment experiences of breast cancer patients and identified sociocultural factors that impact their treatment experiences. The researcher reflected on the themes and confirmed their relevance in interpreting the findings.

The write-up stage: For this research, the final report is a dissertation. The final report presented a persuasive narrative about the collected and analysed data. The narration is logical, clear and written in a scholarly manner. The sequence of the theme is essential. Themes should link logically and eloquently and flow from previous themes to communicate articulately about the data. According to Nowell et al. (2017), the analytic trustworthiness of research will rest on the logic and consistency of the argument. The credibility of the entire process will depend on how the researcher deploys the data to support the idea and produce a convincing account (Starks & Trinidad, 2007). In ensuring the study's trustworthiness and credibility, all results, whether unexpected or those that fail to correspond to the studied phenomenon, must be discussed (Coˆt'e & Turgeon, 2005). All themes were presented as trustworthy and credible in this study and explained the research findings.

The thematic approach could be either inductive or deductive. In analysing data for this study, the researcher used an inductive approach to identify common topics, patterns of meaning, and ideas that formed the themes. A total of ten themes was created from the transcribed data. And they include knowledge and perception, signs and symptoms, health consciousness, treatment experience, beliefs, femininity, support, medication, number of occurrences and recommendations.

6.12 Trustworthiness

For qualitative research to be considered trustworthy, the researcher needs to demonstrate that data collection and analysis processes were conducted in a consistent and precise manner to assure the credibility of the research. The data collection and analysis methods must be recorded, systematized, and disclosed in detail.

According to Lincoln & Guba (1995), the one way that researchers persuade themselves and readers that their research findings are worthy of attention is via trustworthiness. In discussing the trustworthiness of research, credibility, transferability, dependability, and confirmability are considered. In this study, the researcher assured that all areas relating to this study's trustworthiness, as presented above, were addressed.

6.12.1 Credibility

According to Noble and Heale (2019), credibility refers to the trustworthiness of a study and how believable the study findings are. Several techniques could be adopted to ensure the credibility of the qualitative conclusions; these techniques include persistent observation, prolonged engagement, data collection triangulation, and researcher triangulation. In this study, the researcher adopted the researcher triangulation approach to testing for the study's credibility. Triangulation means using multiple datasets, methods, researchers, or theories to answer the study's research question (Bhandari, 2022). As stated above, triangulation could be the data collection or the researchers (Noble and Heale, 2019).

In this study, the researcher triangulation was adopted which considers the involvement of several researchers in the data collection and analysis processes. During the data collection for this study, the researcher recruited research assistants that aided the data collection process. These research assistants were trained in the data collection processes; hence, they were knowledgeable. Also, the researcher carried out the data analysis processes under the supervision of two senior researchers (the researcher's director of studies and the second supervisor). The involvement of multiple researchers in this study assured the credibility of the study findings by verifying the findings (Bhandari, 2022; Noble & Heale, 2019; Johnson et al., 2017).

6.12.2 Transferability

According to Nowel et al., (2017), transferability is generalizability of inquiry and applying the study findings to other contexts and situations. Therefore, the likelihood of transferability of study findings could be established even though researchers cannot completely say that their research outcomes are transferable base on the data interpretation (Devault, 2019).

In transferability, the researcher has to provide a detailed description of all the processes so that researchers and readers who intend to transfer the study findings can do so. In this research, the researcher addressed the issue of transferability by clearly presenting all processes involved in the study, sampling technique and data collection (Forero, 2018). The purposive sampling technique is a sampling method that ensures transferability. Purposive sampling, a non-probability sampling, is used to maximize specific data relative to the context in which data was collected (Devault, 2019). This study adopted the purposive sampling technique, which was reported to ensure that the collected data is relative to the context where it was collected. Also, using purposive sampling ensured that the participants' characteristics were directly related to the research questions. By clearly presenting these processes, the researcher has made the work available to be judged by researchers and readers on its transferability quality.

6.12.3 Dependability

According to Korstjens & Albine 2018, dependability considers the stability of the study findings over time. To confirm dependability in this research, the researcher presented a well-documented, clearly, traceable, and logical research process to ensure the stability of the findings. This process is in line with the report of Devault (2019) that providing adequate contextual information about a study ensures dependability. This study offered appropriate contextual information, and the research process was supported by the approvals from the researcher's director of studies and a second supervisor. Dependability is commonly used interchangeably as credibility Devault (2019)

6.12.4 Confirmability

Confirmability refers to how the research findings could be confirmed by other researchers (Korstjens & Albine, 2018). Confirmability of research is established when credibility, dependability and transferability are achieved (Tobin & Begley, 2004). the confirmability of this research was assured as credibility, transferability and dependability were achieved.

Also, in line with the works of Koch (1994) and Nowell (2017), this research met the confirmability criteria as it included justifications for methodological, theoretical, and analytical choices made in the study. This makes it easier to understand better how and why decision**s** were made. Also, this study demonstrated that the study findings were derived from the collected data and not from the researcher's imagination.

6.13 Results

6.13.1 Participants' socio-demographics

The socio-demographic characteristics of the research participants are detailed in Table1 (below). A total of 30 participants were recruited for the study. The participants' relationship status differed; 13% were single, 56.7% were married, 10% were separated/divorced, and 20% were widowed. The place and classification of the participants' treatment facilities (public and private-owned facilities) were also recorded. Those participants that attended treatment at the public facilities numbered 67%, whilst 33% attended private facilities.

During the analysis of the qualitative interviews, the thematic analytical process, which involved Coding and forming themes, was systematically implemented. As a result, the following themes were developed: Proficiency and viewpoints, signs and symptoms, health consciousness, treatment experience, beliefs, femininity, support, medication, number of occurrences and recommendations. The themes were formed above in the generating themes section of the thematic analysis process.

6.13.2 Proficiency and viewpoints of breast cancer patients

The codes that formed this theme were knowledge and perception. The researcher explored the participants' knowledge and perception of breast cancer by understanding what breast cancer meant to them as individuals and their perceptions before and after their diagnosis.

6.13.2.1Knowledge

Poor knowledge of breast cancer before diagnosis was reported majorly by participants (18). Although some agreed they had heard about the condition in passing, they did not have any detailed knowledge of breast cancer before their diagnosis. There were several examples of the limited knowledge that the participants reported.

> *Yes, I have heard about breast cancer on the radio and television, but I did not know it until after my diagnosis.*
>
> *(LAG/19)*
>
> *I had no idea of what breast cancer was before I was diagnosed. So I started reading online about breast cancer and learned about it after I got it.*
>
> *(LAG/7)*

Participants' current knowledge of the cause of breast cancer was explored during the interview. However, participants demonstrated a poor understanding of breast cancer causes. Irrespective of that, over 60% of the participants reported not knowing the cause of breast cancer. Below is a response from a participant that believed her breast cancer was inflicted on her by someone.

> *A few days before I started feeling pains in my breast, I felt something like a needle entering my breast. That needle caused me pains. When I finally got to the hospital, I was told I had breast cancer. My enemies gave me breast cancer.*
>
> *(LAG/15).*

6.13.2.2Perception

Before and after their diagnosis, patients' perceptions about breast cancer were commonly reported. In several cases, there was a change in perception after their diagnosis. Before diagnosis, 50% of the participants recorded negative perceptions of breast cancer, such as seeing it as a 'death sentence'. Some participants (10%) also perceived breast cancer as a fatal disease that takes people's lives because of the following reasons: late detection, not reporting to the hospitals for proper treatment, fear and lack of financial support. About 30% of the participants perceived breast cancer as a potentially treatable and survivable condition, and 10% were not specific on their perceptions before diagnosis. These views can be seen in participants' responses below-

> *Breast cancer is a severe illness that must be managed in time. Unfortunately, most people who have issues with it do not take care of it on time. It kills in time when you leave it for so long without reporting to the hospital for treatment. I knew this before I was diagnosed.*
>
> *(LAG/4).*
>
> *When I got the news of my breast cancer, I cried. I cried and was like; I will die and leave my children. But, after much counselling, I decided to give it a shot. I am a widow with five children; I need to live for my children.*
>
> *(IBA/20)*

Most of the participants perceived breast cancer as a condition affecting only women. See the quote below as evidence of this perception.

> *I never knew I could have breast cancer because I thought it was a female disease. However, my perception changed after my diagnosis, which contributed to my not reporting to the hospital for treatment early.*
>
> *(LAG/10).*

Over 60% of participants changed their perception after being diagnosed with breast cancer and began their treatment. This could be attributed to the reassurance given to them by the healthcare staff. This change in perception can be seen in one of the participant's responses below:

> *My perception of breast cancer before I reported at the hospital was based on hear-say. For instance, I was told that going for chemotherapy can kill a person and so so so…… but after my diagnosis, my perception changed with faith. The doctor I met here at the hospital helped and insisted I undergo chemotherapy. So I did and am still on it. I am still alive and getting better.*
>
> *(IBA/23).*

6.13.3 Signs and symptoms

Participants reported the signs they noticed that prompted them to go for diagnosis. Most of the participants (80%) observed a lump (painless or painful) in their breast, 6.7% experienced continuous vomiting and 13.3%of the participants reported swollen neck. Below is a response from one of the participants that reported vomiting as her symptoms.

> *Unlike some people that saw a lump in their breasts, I didn't. I always felt like vomiting and suspected the presence of the worm in my stomach. I kept buying medications to deworm myself. I was buying drugs for worms thinking its worms. It got worse instead of improving. Finally, I went to the hospital, and after running some tests, I was told it was breast cancer.*
>
> *(LAG/12)*

The interview sought information on who discovered the breast cancer symptoms. Most of the participants reported noticing it by themselves, while spouses/partners saw a few. The response below is from one of the participants.

> *My husband was the one that observed the lump. I was reluctant to go to the hospital because it was just a tiny lump. But, my husband insisted I get to the hospital, saying he knows my breasts more than I do (She laughs).*
>
> *(LAG/ 1)*

Furthermore, among the participants that reported a lump in their breast, over 80% reported noticing the lump on their right breast.

6.13.4 Health consciousness

The following codes formed the health-conscious theme: Physical examination and health-seeking behaviour.

Physical examination: Health education and awareness of breast cancer in women always emphasise the need for regular self-examination of the breasts concerning the timing of their menstrual cycles. There is much less emphasis placed on Men's self-examination of breast tissue. Routine physical examination of the breast is key to early breast cancer detection. This awareness is evident in the number of women who noticed the lump in this study.

More than 90% of the participants whose symptoms were a lump in their breast felt the lump by themselves. Only a few reported that their spouses/partners felt the node first. This can be seen in a response by a participant below.

> *As I said earlier, I am a health-conscious person, and I take my health seriously. I was just examining myself one day, and I saw something. I just said no! this is not supposed to be there. So I did the examination again, and ah, this thing is still there. So I rushed to the hospital to see their advert on TV. After the investigation, Lo and behold, it was breast cancer. I could not believe it.*
>
> *(LAG/4).*

Health-seeking behaviour: Participants' responses on visiting the hospital for assessment, diagnosis and clinical management varied. Although most participants demonstrated positive health-seeking behaviour by going to the hospital for formal diagnosis, more than half of them only came forward for treatment after other treatment options failed them. They saw the hospital as their last resort, hence reporting when their conditions must have gotten worse.

Some participants stated their reason for seeking alternative treatment first as lack of funds for orthodox treatment and fear of losing their breast to mastectomy. Below are some responses from participants on their health-seeking behaviour.

> *When I noticed the lump, I started using herbs to treat it. I used the herbs for a long while, and when I saw the herbs were not working and my pain was increasing, I came to the hospital.*
>
> *(LAG/15).*
>
> *One day, I was bathing, and I noticed a stiff lump by the side of my breast; I kept quiet. Then, while cleaning, I checked and still felt the lump there the next day. I spoke to my daughter, and*

> *she encouraged me to get to the hospital, and I went immediately. After running a series of tests at the hospital, the result showed breast cancer.*
>
> *(IBA/18).*

How long it took participants before reporting to the hospital was also considered. The majority of the participants (98%) who reported poor health-seeking behaviour waited for months before reporting to the hospital for assessment, formal diagnosis and treatment. The participants said their decision was influenced by ignorance, fear, and lack of money. This was illustrated by one of the respondent's comments below.

> *I wasted months taking soursop leaf juice (She sighs). I boiled and drank the water from the leave and didn't go to the hospital. While I took it, it seemed to be effective, but after some months, say like six months, I noticed it's not improving at all. I spoke to my sister, who insisted I visit the hospital. After running some tests at the hospital, my doctor told me that my breast cancer had advanced to stage IV.*
>
> *(IBA/17).*

6.13.5 Treatment experience

The codes that made up this theme include treatment options, treatment efficacy, treatment refusal and number of breast cancer occurrences.

Treatment options and sequence: Participants' treatment options were explored during the interview. All participants in the study had either undergone or were still undergoing chemotherapy. Over 70% of the participants underwent surgery (mastectomy and lumpectomy). Mastectomy was most frequent. Radiotherapy was common among patients with cases of breast cancer reoccurrence. On the staging of the disease condition, only a few participants knew their disease stage at diagnosis.

Concerning the individual sequencing of treatment, a third of the participants who had undergone chemotherapy and surgery had their chemotherapy before surgery. In contrast, the remaining two-thirds had their surgery before chemotherapy. Radiotherapy seemed to be their last treatment option, especially for patients with local reoccurrence where another surgery on the same breast was not advised. Find the response of a participant below:

> *I did a mastectomy first. After my mastectomy, my doctor booked me for six-courses of chemotherapy, then finally radiotherapy to clear the remaining traces of cancer. My radiotherapy is for five days, so I am here today.*
>
> *(LAG/9).*

Treatment efficacy: Apart from a participant who reported swollen breast tissue and increased pain as she commenced treatment, others reported improvement as soon as their treatment started.

> *My lump was a painless one. But, when I started my treatment, my breast got swollen, and I started feeling pains since I started my chemotherapy.*
>
> *(LAG/5)*

On the summary of their treatment experience, only three participants reported much less distressing experiences. While most participants recorded painful experiences, some could not describe their experiences because they do not have good background knowledge of breast cancer treatment; hence, they do not have expectations. This is evident in one of the responses from participants shown below.

> *Initially, they made a mistake; the first surgery was unsuccessful. The breast brought out another water. The water kept coming out, and the doctor had to repeat the surgery, which lasted for seven hours. My treatment experience was not good, but the doctors and nurses were excellent.*
>
> *(LAG/12).*

Treatment refusal: Some participants refused oncologists' recommended treatment options after their diagnosis. Many reasons were behind their treatment refusal. While some explained from the spiritual perspective, saying it is not their destiny, others decided the recommended treatment was too expensive, and some reported fear. Their refusal of the recommended treatment resulted in them seeking help from other sources like going to their churches for prayers, taking herbs, and taking drugs they bought online. Below are responses from two participants, which illustrate their experiences.

> *After my breast cancer diagnosis, I refused to come for my treatment at the hospital. Instead, I started buying some online drugs. The drugs I took tried to shrink my breast lump. Unfortunately, the shrinking became so much that my breast side started pumping water out and decaying. At that point, I decided that I needed to get to the hospital. That was why I returned to the hospital for treatment.*
>
> *(IBA/25)*
>
> *My reason for refusing surgery in the first place depends. I can't say it's between my God and me. It's not that I just refused surgery without reasons, as I said. It is between my God and me, and I thank God that I am still alive.*
>
> *(IBA/28)*

The study also explored the treatment side effects. Apart from the skin discolouration and hair loss resulting from chemotherapy, some participants reported severe weakness during their radiotherapy, while others said their fingers and arms got disfigured.

> *The chemotherapy cut my left hand (she shows her left arm). It is shorter than the other hand. It affected both hands.*
>
> *(IBA/23).*

Breast cancer recurrence: More than a third of participants had a local reoccurrence of breast cancer after their first diagnosis and treatment. Most of these participants that had reoccurrence were those that either abandoned their treatment halfway or refused to go for their follow-ups or refused the recommended appropriate treatment option; or reported having run out of money and hence, being unable to continue with their treatment.

> *I was diagnosed with breast cancer in 2017. I had a mastectomy and started my chemotherapy afterwards. I got tired of everything- going to the hospital and all that. I stopped my chemotherapy without completing it. Later last year, in June 2019, I started feeling pain in my hand towards my armpit. I went to see my doctor, and after some tests, he told me that the cancer was back. I was asked to start 6-course chemotherapy immediately, but I only did four courses because I ran out of money in September. In late December 2019, my condition got worse, and I felt fragile. I called my doctor on the 6th of January, and he asked me to see him today.*
>
> *(IBA/22).*

6.13.6 Support

The theme 'support' was derived from family and social support. The decision to use support as the theme was because both family support and social/community support focused on the participants' support in their journey through breast cancer. In addition, information on family and social support offered to the participants was explored.

Family support: Most of the participants (73.3%) reported getting support from their families in either moral, practical, or financial. However, although a more significant number of the participants accepted having good family support, six participants (20%) reported not getting enough support from their families. Two participants (6.7%) preferred not to discuss it. Below are responses from participants in this regard.

> *It has not been easy (crying). I don't have anybody to support me at all. My husband is not supportive in any way. So I am on this journey alone.*
>
> *(LAG/7)*

> *Yes, I have my family's support. However, having family support in your time of need depends on handling your family when you are okay. When you treat your family well, they will always be there for you and cannot abandon you in your time of need'.*
>
> *(LAG/10)*

Social support: Having social support is vital to breast cancer management. The absence of social support can lead to discrimination, anxiety, depression, and suicidal thoughts. Slightly above one-third of the participants (40%) reported having social support in their journey through breast cancer. Some of the participants who reported 'no social support' said that instead of getting social help, they had been discriminated against as though breast cancer is contagious. About eight participants gave their reason for not having social support as not letting people around them know to avoid being stigmatised. Below is a response from a participant on social support participants.

> *I didn't talk to anyone. Who will I talk to? It's only God that I speak to, as people do not support me. Look at me; people will come here to sit down and run away from seeing me. See how my breast peeled.*
>
> *IBA/25).*

6.13.7 Femininity

This is one of the themes of sociocultural factors formed from the codes of Body image and gender role. The sociocultural factors identified in this theme were specific to women, and considering that 93% of the participants were women, this is very important.

Body image: More than 80% of the participants reported body image as a challenge due to losing their breast to mastectomy, hair loss or skin colour discolouration to chemotherapy or disability in the arm or fingers due to radiotherapy. They also reported body image as a factor that makes some patients indulge in self-help to dissolve the cancer lump instead of coming to the hospital for treatment. Below are responses from participants.

> *I don't feel like my usual self now. I no longer feel comfortable as a woman, having lost one of my breasts. So many breast cancer patients I know avoided mastectomy because of this. I am currently considering a breast implant as I feel so uncomfortable.*
>
> *(LAG/4)*
>
> *When I was told I had breast cancer, I felt terrible. I was thinking of the trauma, how am I going to remove my breast.*

> *(IBA/ 21).*

Gender role: Most married participants in this study had their husbands' permission and support, except for two. The two married participants who did not have their husbands' permission also reported not having their husbands' support in their journey through breast cancer. This can be seen in a response from a participant below.

> *My husband has not supported me since I was told I have breast cancer. He practically does not talk to me as we speak. He never gave his permission for my treatment, saying he didn't have money for that. I manage to raise funds for my treatment by myself and with the help of my sisters.*
>
> *(*LAG/*14)*

6.13.8 Beliefs

This is another theme found in the sociocultural factors that could impact breast cancer treatment in the study. This theme was formed from the sub-themes religious belief and cultural belief; and codes from Religion, spirituality and culture.

Religion: This is one of the sociocultural factors that could impact participants' health-seeking behaviour and treatment. A total of 13 (43.3%) participants in the study reported religious impact on their treatment journey; 7 (23.3%) said no effect, while 10 (33.3%) were not comfortable discussing the topic. Out of the 13 participants that demonstrated the impact of religion through their breast cancer journey, nine reported a positive effect, and four said a negative impact. Some participants believed that it was the will of God that they have breast cancer (concept of a religious fatality). Below are participants' responses on the impact of religion on their journey through breast cancer treatment.

> *I am a member of the Redeem church, and my pastor told me medical help first while he backs me up with prayers. My pastor's assurance gave me the courage to commence my treatment.*
>
> *(LAG/. 14).*
>
> *I kept sowing seeds in church, praying and believing God for healing, but I had to get to the hospital when my condition got worse. I am a champion in seed sowing (She laughs). I delayed my treatment because my cancer was already in stage III when I finally reported to the hospital for treatment.*
>
> *(IBA/17)*

Spirituality: A total of 13 participants recounted the impact of spirituality on their journey through breast cancer. Some said participants held their relationship with God in high esteem and even refused their recommended treatment. This is illustrated in a response from a participant below:

> *I believed God allowed it to happen to me because it wouldn't have happened if not. If it didn't occur to me, I would not grant this interview or counsel breast cancer patients. So religion influenced me positively, and I was confident throughout my journey. I believe God has placed the doctors to take care of us.*
>
> *(LAG/1)*
>
> *My reason for refusing surgery in the first place depends (She paused). So I can't say it's between my God and me. It's not that I just refused surgery without reason; as I said, it's between my God and me, and I thank God that I am still alive.*
>
> *(IBA/28)*

Culture: The impact of culture was not reported among participants that took part in the study. Although most of the participants chose not to respond to this question, some responded but did not recognise the impact of culture on their journey through breast cancer. In contrast, one participant demonstrated the impact of culture, and she believed breast cancer was inflicted on her by an enemy. This participant's response highlights the culture of witchcraft that resonates in Nigeria.

6.13.9 Medication experience

This theme explored the experiences of breast cancer patients as regards the accessibility and affordability of their medication for treatment. Participants discussed their individual experiences concerning this.

Medication accessibility: How participants accessed medication and materials for treatment was explored. This medication accessibility is underpinned by the knowledge that accessibility to suitable or poor-quality medication can affect treatment outcomes. All participants obtaining their breast cancer treatment in the government-owned hospitals provided their medicines and materials while doctors administered the antidote. However, a more significant percentage of them (77%) reported buying their medications from pharmacies outside the government hospitals. Participants said that the medicines for their treatment are more expensive at government hospital pharmacies than at private pharmacies; hence, they buy from pharmacies outside government hospitals. Unfortunately, the quality of the medications purchased outside the government pharmacy is unconfirmed as no further quality checks are performed before administering these medications to patients. Participants reported that the drugs for their treatment are more expensive at the government pharmacy; hence their decision to patronise pharmacies outside the government hospital. The efficacies of these medications purchased outside the Government pharmacies could be queried, affecting treatment outcomes if they were substandard. Patients obtaining treatment from private treatment facilities provide their medication and add their treatment bills. Below is a response from a participant on medication accessibility.

> *I come to the hospital for my chemotherapy appointment with my drugs and materials for treatment. I buy them from a big pharmacy outside the hospital, where it's sold cheaper. But, unfortunately, buying here at the hospital pharmacy is very expensive.*
>
> *(IBA/30)*

Medication affordability: This was a great concern to all participants in the study. Treatment generally is costly and cannot be afforded by all. Most participants who stopped their medication linked their decision to a lack of money to afford the treatment. Materials and medicines needed for their treatment are very expensive, and the amount for the tests for proper diagnosis. Participants also reported that most breast cancer patients refused to say to the hospital for appropriate diagnosis and treatment due to the expensive nature of the treatment. This act of not reporting to the hospital due to no money drives patients to seek cheaper remedies elsewhere, such as going to churches for prayers and miracles and the use of herbs. This is evident in the response from participants, as shown below:

> *Breast cancer treatment is costly. Patients go as far as selling their properties just to afford their treatment costs. For example, patients on chemotherapy spend a lot of money on fruits and vegetables. I had even to buy chalcogen sold at ₦15,000 each and took six doses to boost my white blood cells.*
>
> *(LAG/6)*

6.13.10 Psychological factors

The impact of breast cancer treatment on participants' personalities and lifestyles was explored in the interview and analysed under psychological factors.

Personality: The interview explored how comfortable participants were discussing their breast cancer with people. The majority of the participants (66.7%) reported not being comfortable discussing their health condition with people; five participants (16.7%) reported being satisfied, while others (16.6%) were neutral in their response. In addition, the participants reported fear of being stigmatised by people, leading to isolation and depression. However, most of the recorded participants were comfortable discussing their condition with people, which built their confidence over time.

> *I wasn't comfortable discussing my breast cancer with people earlier, but I got my confidence back as time went on. I feel very comfortable discussing it now.*
>
> *(IBA/23)*

Lifestyle: Nineteen participants (63.3%) reported a change in their lifestyle due to having breast cancer. Some participants reported living a different life from what they were used to before their diagnosis, while others said that what matters to them at the moment is their life. Few participants wished their current situation were mere dreams of waking up to reality without breast cancer. Frustration was reported as well as patients feeling so devastated. Below is a response from a participant:

> *Ahhhhh! I changed o! If you see me before this breast cancer, I was like this (She demonstrated being fat). But now, see me, Nah! (Points at her lean body). I can never be the same again.*
>
> *(LAG 13).*

6.13.11 Alternative treatment

Some of the participants sourced alternative treatment after their diagnosis at the hospital, and some combined alternative treatment with orthodox medicine. These participants engaged in herbs; some self-help by buying unprescribed drugs from online merchants. Others started using spiritual materials like anointing oil, holy water, and mustard seeds. However, most of the participants that engaged in alternate treatment returned to the hospital for proper treatment after their choice must have failed them. The evidence of this can be seen in the response below.

> *I didn't return to the hospital for months after my breast cancer diagnosis. I started using natural treatment as some people said natural treatment removes the lump. I spent a lot of money on the natural treatment, close to ₦2,000,000.00 on herbs. After taking the herbs for months without improvement, I returned to the hospital. I was afraid of chemotherapy. People said many things about chemotherapy, which got me scared.*
>
> *(LAG/ 7)*

6.13.12 Diagnosis

This theme considered how breast cancer was diagnosed in patients. Participants reported biopsy, CT scan and mammogram for their initial diagnosis. Although most of the participants underwent one of the stated procedures, some also did two, if not the three. In addition, some participants (4) reported the sole use of mammograms for their diagnosis. These participants that reported mammograms also indicated that they did other procedures which failed to interpret their symptoms; hence, they were referred for a mammogram. See below a comment from a participant in this regard.

> *I went to the hospital and was sent for a scan. The scan didn't show anything, so they sent me for a mammogram. The mammogram saw something not communicated to me; instead, I was sent for a biopsy. The first biopsy said it was fat necrosis and not something serious. After a while, my breast kept increasing, and I had to get back to the hospital. I went for another biopsy which finally confirmed that it was breast cancer. (LAG/ 9)*

6.13.13 Recommendation

Most of the participants suggested the need to subsidise the financial cost of breast cancer treatment to ensure it is affordable for most people if not all. Other suggestions include more awareness of breast cancer in the grassroots areas and public gatherings, using local dialects to create awareness. Participants also suggested free breast cancer screening, training and retraining of health care workers, and some free prosthetics to replace the removed breast.

> *We are trying the support groups. Awareness should be made at churches, mosques, marketplaces and any social gathering. This awareness needs to be done in local languages for all better understanding.*
>
> *(IBA/24)*
>
> *Breast cancer treatment costs should be subsidised, as it's costly and the price keeps increasing. Radiotherapy used to be ₦350,000.00, but now it's currently ₦780,000.00 - ₦ ₦800,000.00. Many people cannot afford it. The government has privatised most services here in the government hospital, and the cost of treatment has increased since the private sector took over.*
>
> *(LAG/10)*

Participants' advice: Participants were advised based on their own experiences living with breast cancer. Most of the participants, especially those that delayed attending for diagnosis of the condition, encouraged everyone to seek medical help as soon as they noticed any signs or symptoms in their body. Also, there was advice on avoiding the use of herbs and self-help by participants whose breast cancer got worse due to herbal medicine for treatment. The issue of spirituality and cultural belief was not recorded in their advice. Some participants advised that health conditions should not be a spiritual battle that calls for prayers and miracles, and neither should it be thought of as having been inflicted on them by their enemies. The advice was also given on the need for routine medical check-ups, physical examination of the breast, and supporting breast cancer patients rather than stigmatising their condition. Below is a response from a participant in this regard.

> *Some breast cancer patients resort to their pastors and churches for healing instead of medical treatment. I strongly advise that people take their health seriously and act fast by going straight to the hospital when they see any sign. (LAG/9).*

7.0 CHAPTER SEVEN: QUANTITATIVE STUDY

7.1 Introduction

This chapter discusses the methodological approach adopted for the quantitative study and the results of the survey. The study's epistemology, positionality, design, eligibility criteria, sample size, sampling procedure, data collection instrument, pilot study, psychometric validation, data analysis, and results are discussed here.

7.2 Overview

According to Anjawon (2015), quantitative research is the numerical representation of and manipulation of observations to describe and explain the phenomena that those observations reflect. Anjawon presents Cohen's understanding of quantitative research, which involves empirical methods and statements (Anjawon, 2015). In unpacking the function of empirical information, he notes that they describe the fundamental nature of things in the real world, different from what ought to be the case. The quantitative study design could be experimental or non-experimental (Bowling, 2014a; Creswell, 2013). According to Creswell, 2013, an empirical study is a type of quantitative study involving the test of an impact of an intervention on an outcome after manipulation of variables has taken place. In non-experimental design, manipulation of variables is not allowed; hence, variables are measured based on their natural occurrence. This study involved measuring variables as they occurred with any manipulation; thus, a non-experimental approach was adopted. There are three types of non-experimental research which include descriptive, correlational, and causal-comparative research (Gross, 2019). However, some researchers like Hoy et al., 2015, concluded that only two types of quantitative research are experimental and non-experimental. According to Mertler (2014), a descriptive study describes and interprets the immediate status of an individual, setting, events or conditions. In contrast, both correlational and casual-comparative discover a situation and then measure the relationships between the two or more discovered variables with a difference in their statistical techniques for variable measurement. As this study described and interpreted participants' current treatment experiences and sociocultural factors that impact their treatment, the descriptive approach of the non-experimental research was adopted.

Descriptive research is known to answer the question of who? When? What? Where? And How? (Maxine & Pater, 2013). A descriptive study design could be observational or survey (Mertler, 2014). While an observational study sounds more like a qualitative approach, it is used in quantifying behaviours (Leedy & Ormrod,2013); the survey describes the characteristics of a group by describing their attitude, experiences, and behaviours (Fraenkel et al., 2012). According to McMillan (2012) and Fraenkel et al., 2012, a survey may be used to investigate the relationship between variables and data collection involves the administration of a questionnaire.

In conducting a survey, a sample of the target population is studied, and the results are used to draw inferences about the general population (Bowling, 2014a; Creswell, 2013). The difference between a survey study and a consensus study is that consensus includes all population members under study, whereas a survey does not. This is the significant difference between survey and consensus (Mertler, 2014). Survey design is the most common design in quantitative research, with descriptive, analytic longitudinal and cross-sectional surveys as its types (Bowling, 2014a). These designs differ in the number of times data is collected. For example, Analytical Longitudinal data is collected at different times. In cross-sectional and descriptive, information is collected once but varies as the descriptive describes characteristics; a cross-sectional study examines these characteristics (Cresswell, 2005). This study examined the treatment experiences and impact of sociocultural factors on breast cancer treatment outcome at a specific time (snapshot) when the study was conducted, thus adopting a cross-sectional survey design approach. Apart from giving a snapshot of the population, the cross-sectional study is cheap and can be undertaken efficiently.

7.3 Epistemology

Epistemology was introduced in philosophical English by a Scottish metaphysical writer and philosopher, James Frederick Ferrier, in 1854 (Thomson, 1964). Epistemology is a branch of philosophy concerned with the theory of knowledge (Slevitch, 2011; Audi, 2010). On the other hand, philosophy is a field of study that draws fundamental questions about the existence of nature, knowledge, mind, values, and reasons, among others (Williamson, 2008). Therefore, epistemology provides a strategic stance in answering fundamental philosophical questions (Dillion, 2014). It also comprises different approaches with the two commonly used techniques, interpretivism and positivism (Rescher, 2012). While Interpretivism adopts a subjective method with a qualitative stance, positivism is an objective and quantitative approach (Bryman, 2016).

The interpretivism approach explains reality by understanding people's points of view (Creswell, 2013). Using the interpretivism approach, the researcher is part of the research and interprets the data (Carson et al., 2001; Hudson and Ozanne, 1988). Interpretivism is interested in a specific, contextualised environment. It acknowledges that reality and knowledge are influenced by people within that environment (Carson et al., 2001). Nevertheless, the interpretivism approach is subject to biases; hence, it cannot be generalised (Bryman, 2016; Neuman, 2000; Hudson and Ozanne, 1988).

Positivism involves hypothesis testing and making deductions from the research (Creswell, 2014). The underlying principle of positivism is a scientific outlook on knowledge and the world (Slevitch, 2011; Thyer, 2008). Positivism adopts an objective approach where data can be observed and measured, hence quantitative (Creswell, 2014; Slevitch, 2011; Thyer, 2008). In the positivism approach, there is less likelihood of a researcher's bias occurring (Bryman, 2016). This approach emphasizes that there is only one unchanging truth that must be observed by the researcher (Creswell, 2014).

The positivism approach was adopted in this research as the most appropriate (Bruce, 2008). The positivism approach is considered the right approach for this research as it is quantitative and involves testing of hypothesis and making deductions from the study. Data was collected on the number of participants based on statistics for generalisability (Creswell, 2014). Using hypothesis testing, the socio-cultural factors that affect breast cancer treatment outcomes were identified, quantified, and statistically evaluated relationships. The mediating effect of the identified socio-cultural factors on breast cancer treatment outcome was also assessed using mediation analysis.

7.4 Positionality

Positionality is a statement where the researcher acknowledges and locate their views, values and belief in line with the research processes and the interpretation of the research findings (Holmes, 2020). Positionality is a practice that underpins the researcher's stance in the context of a study (Okely, 2020; Bourke, 2014). These researchers' stances can influence research processes such as the construction of research question(s), data collection, and data analysis in a study (Okely, 2020). In positionality, social, cultural, political, religious, economic, and educational factors within a community, an organisation, or a group of respondents are considered (Milner, 2007). For bias reduction, there is a need for the researcher to adopt a reflectivity approach (Brannick & Coghlan, 2007).

For this study, the researcher's reflexivity stems from the researcher's educational and professional background. The researcher is a social epidemiologist with an interest in chronic diseases. Social epidemiologist focuses on social determinants of health. hence, this study's title – the impact of sociocultural factors on breast cancer treatment outcomes. Although the researcher is interested in the study area, the researcher does not belong to the same group as the participants- not a breast cancer patient. Considering that the researcher is a woman and knowing that most women are prone to having breast cancer at some point in their lives increased the cooperation of the participants during the study. The researcher allowed positivism to guide the investigation while maintaining neutrality throughout the study. As this study is objective and quantitative, there is limited focus on positionality (Bourke, 2014).

7.5 Study design

An analytical cross-sectional study was conducted involving breast cancer patients between 18 and 75 years. The analytical cross-sectional study design is quantitative and gives a snapshot of the outcome, relatively inexpensive and less time-consuming (Bland, 2015). According to Levin, 2006, public health planning usually involves using a cross-sectional study approach to measure the outcome of interest in a given population. The questionnaire served as the survey instrument used for data collection in the study. The researcher developed and validated the questionnaire under the supervision of the director of studies and 2nd supervisor; to ensure that it answered the research questions in this study. The validated questionnaire was used to identify and investigate how sociocultural factors mediate breast cancer treatment outcomes. In addition, the analytical cross-sectional study design enabled inferences to be drawn from the findings of the sample population (Creswell, 2013).

7.6 Study eligibility criteria

Eligibility criteria describe the key features of a target population to be included in a study (Patino & Ferreira, 2018). They are characteristics that must be met to participate in a study (Williams, 2007). Eligibility criteria should be guided by the research question, objectives, and outcome measures (Hulley, 2007). Setting a guideline for participants' recruitment ensures that the results from the study will be due to what is under investigation (Patino & Ferreira, 2018). Below are the study inclusion criteria that the population/person met to be eligible to participate in the study.

7.6.1 Inclusion criteria

- Breast cancer patients between the ages of 18 and 75.
- Breast cancer patients undergoing active treatment have completed their active treatment within the last two months.
- Breast cancer patients receiving treatment from any of the four selected facilities in this study.
- Breast cancer patients who have been picked and given their informed consent to participate in the study.

7.6.1.1 Justification of the inclusion criteria

- Breast cancer patients who are undergoing active treatment or have just completed their active treatment within the last two months were included in the study. This is because this study focused on the impact of sociocultural factors on breast cancer treatment outcomes.
- The reason behind selecting this age group (18-75) is that the prevalence used in this study was taken from this population in Nigeria.
- Only breast cancer patients receiving treatment from the selected hospitals were included to ensure accurate data was collected and measured.

- Ethical issues were considered as participation in the study was voluntary; only breast cancer patients who consented to participate were included.

7.6.2 Exclusion criteria and their justification

- Individuals who are not breast cancer patients nor undergoing treatment. These exclusion criteria ensured that the right population for this study was recruited and the study aim was attained.
- Age group (less than 18years old. Apart from ensuring that adults who could consent to participate in the study are recruited, the prevalence of breast cancer is very low among individuals less than 18years.
- Breast cancer patients obtaining treatment in hospitals not included in the study were excluded.

7.7 Sample size

7.7.1 Sample size determination

The sample size used in this study was determined using Bluman's formula (2004).

$$n = \frac{Z^2pq}{(d)^2}$$

Where, n= desired sample sizez= 1.96 (@ 95%confidence limit)

p= proportion of occurrence: prevalence of breast cancer in Nigeria = 0.05 (Azubuike et al., 2018)

q= proportion of non-occurrence (1-p= 0.95)

d= margin of error (0.03)

$$n = \frac{(1.96)^2 \text{ x } (0.05)\ (0.95)}{(0.03)^2}$$

$$n = \frac{3.8416 \text{ x } 0.05 \text{ x } 0.95}{0.0009} = \frac{0.1825}{0.0009}$$

n = 202.75 i.e. approximately 203.

To account for possible non-response and attrition bias in this study, 10% was added to the above sample size to approximately give a total sample size of 223. A minimum of 230 participants were recruited in this study, for equal distribution among selected states and breast cancer treatment centres.

7.8 Sampling procedure

A multistage sampling technique was used in selecting participants for this study.

Stage 1: Selection of Cities

Purposive sampling: A purposive sampling technique was employed in the selection of cities where the study was carried out. This sampling method is preferred over random sampling as it ensures that heterogeneous towns with a more significant number of breast cancer treatment centres are captured. This study considered the accessibility to breast cancer patients and facilities in choosing a sampling method for this study. Using a simple random sampling method is inappropriate as there is no need for equal opportunity in all cities considering the current security challenges in the country. Also, the outcome of this research is not for generalisation but rather transferability and as such, allowing all cities to participate is not essential. The purposive sampling technique allows the researcher to choose where and who engages in the study. The researcher makes such a decision after considering accessibility to facilities, patients and data for the study. In this study, the researcher intends to select Lagos and Ibadan purposively.

The rationale for selecting Lagos state is based on the clustering of the breast cancer treatment centres in the state. Out of the 16 breast cancer treatment centres in Nigeria, one third are situated in Lagos state. Therefore, including Lagos in the study ensured that the survey captured the contextual issues that might apply to a substantial proportion of overall cancer patients in Nigeria. Also, Lagos state is the biggest heterogeneous city in the southern part of the country, with people from different socio-cultural backgrounds well represented.

Also, Ibadan is a heterogeneous city comprising people from different ethnic groups and background; that shares different language, beliefs and cultures. As this study will be investigating how socio-cultural factors mediate treatment outcomes of breast cancer among women in Nigeria, selecting Ibadan as one of the cities to participate in this study is very appropriate. Furthermore, people’s culture and beliefs differ in how it affects their treatment. Therefore, Ibadan, a city with diverse cultures and beliefs, religions, and spirituality, needs to be included in this study. Furthermore, Ibadan has one of the best Teaching Hospitals in Nigeria, with a reasonable and affordable breast cancer centre.

Stage 2: Selection of breast cancer facilities.

The public and private breast cancer facilities were selected in this study using a multi-step method involving two steps.

Step 1: Selection of private breast cancer centres.

Ibadan and Lagos were not given equal opportunities to select private breast cancer facilities. This is because there was no functional private breast cancer facility in Ibadan in this survey; hence, only private hospitals in Lagos were included in the study. A simple random sampling technique was employed in the private facilities selection in Lagos. Numbers one to four were assigned to each of the four private facilities in Lagos, Nigeria. Each randomly selected number from the table represented one facility. This procedure was employed to select the second facilities included in the study. A total of two private breast cancer facilities were used in this study for data collection. Although the private breast cancer facilities are expensive to afford, including the facility will enable us to capture participants from different socioeconomic statuses. Also, as one of the hypotheses tested in the study was the relationship between the socioeconomic status of participants and their quality of life, capturing participants from different socioeconomic backgrounds was necessary.

Step 2: Selection of Public breast cancer centres

A total of two public breast cancer treatment centres were purposively selected and used for the study. The two public hospitals were Lagos University Teaching Hospital and the University of Ibadan Teaching Hospital; both are located in Lagos and Ibadan. This purposive sampling aims to ensure that the teaching hospitals where breast cancer treatment centres are available and affordable were selected for the study.

Stage 3: Selection of participants

Before selecting participants, the participant information sheet was issued to all the potential participants, which gave the participant all the vital information about the study. For each public facility selected in the study, eighty-five respondents were selected, and thirty participants were chosen from each private breast cancer facility. Considering the calculated sample size of 230 for this study, the abovementioned process was appropriate for attainment. Public facility (2x85) + private facility (2x30)= 230 participants. In selecting the participants, only breast cancer patients between the ages of 18–75years of age, undergoing treatment in the selected facilities and consented to participate in the study were recruited. A simple random sampling was employed to select participants until the total sample size was achieved. Consent was sought and obtained from the selected participants to participate in the study.

7.9 Materials and Data Collection

7.9.1 Measurement Tool/Instrument

In conducting quantitative research, questionnaires are the most common and routinely used research instrument for data collection (Young, 2016; Bowling, 2014a; Pushpanjali, Piddennavar & Mohan, 2017). Brown (2021) defined a questionnaire as a text-based question (printed or online) administered to a respondent and completed by the respondent to provide their opinion and answers to the series of questions offered. In Patel and Joseph's (2016) study, questionnaires were tools deployed in gathering and recording data about a phenomenon under investigation. According to Roopa & Rani (2012), a well-constructed questionnaire consists of fit-for-purpose questions, proper sequencing of questions, valid format and suitable scaling, which could lead to the overall success of the survey, as the views and feedback from the participant may be accurately represented. The WHO (2001) advised that questionnaires should be designed and targeted at fulfilling the research objective. Questionnaires are commonly used to consider participants' background and demographic information, report opinions about a phenomenon under study, consider participants' future intents and motivation, understand psychometric attributes, actual and concrete knowledge about an object, and subject others (Young, 2016). Therefore, a fit-for-purpose questionnaire was designed and used for the data collection in this survey.

7.9.2 Importance of a questionnaire

A questionnaire enables the standardisation of quantitative data collection so that data for analysis are rationally consistent and coherent (Roopa & Rani, 2012; Kelley, Clark, Brown, & Sitzia, 2003). Standardisation implies that the questions presented to all respondents are the same, and feedback is gathered using the same set of options, which assures consistency in the answers provided (Burns, 2000). A well-designed and responsibly distributed questionnaire becomes an essential tool by which statistically viable data are collected, and inferences are made about specific groups, an object of study or the entire population (Rattray & Jones, 2007a; Roopa & Rani, 2012; Goertz & Mahoney, 2012). Also, a well-structured questionnaire can capture information on behaviours, individual experiences, perceptions and attitudes in the research area under study. This means that qualitative variables can be collected using a questionnaire converted to numerical for analysis (Rattray & Jones, 2007a). According to Bowling (2014a) and Etikan & Bala (2017), a questionnaire provides a more economical data collection option (cost-effective alternative compared with other data collection methods), easy to administer (self-administered, researcher-administered or via the use of new media and devices). It can be used with a broader range of participants. The pace and ease of questionnaire distribution via the use of new media and devices (internet, social media and smartphones) make it more appealing to researchers (Mikhail, 2021; Stone, Kunaviktikul & Conway (2020).

In this study, the questionnaire was used to ensure the standardisation of the statistically viable data collected and used to make inferences on the understudy. Responses of the breast cancer patients under investigation. This study's questionnaire collected data from 230 participants on their breast cancer experiences, perceptions, health-seeking behaviours, and quality of life. This can be seen in questions 23-39, 40 -49,50-52 and 53-67 in the questionnaire, as seen in Appendix D.

7.9.3 Questionnaire Criticism

Notwithstanding the popularity of the questionnaire data collection technique within and outside academia, there has been criticism about its appropriateness for a thorough investigation into people's perceptions, practices, and actions. The understanding that data collection via questionnaires is easy to perform breeds inadequate planning, culminating in inaccurate data and discriminatory assumptions. A survey requires time, effort, and thorough planning (Mikhail, 2021; Roopa & Rani, 2012). Another reason for this criticism is that close-ended questions are frequently used in questionnaires (Bowling, 2014a). Also, in using a questionnaire for data collection, the researcher usually has prior knowledge and well-grounded information about the phenomenon to be studied, which could introduce the researcher's bias in the study

In this study, to circumvent the drawback associated with close-ended questions, the reliability and validity aspects of the questionnaire were tested and confirmed using two approaches. Firstly, by conducting a qualitative interview to develop and design the question and conducting a pilot study before producing the final questionnaire distributed to the respondents for this study (Choy, 2014). Furthermore, prior knowledge of the phenomena under study equipped and aided the researcher in developing an extensive and comprehensive fixed set of possible options for every close-ended question.

7.9.4 Questionnaire Development

Researchers can develop their questionnaire or adopt an existing one when conducting a survey (Mathers, Fox & Hunn, 2007). Nowadays, there are already developed questionnaires covering extensive study areas and phenomena. The apparent advantage of using pre-existing questionnaires is that many have been validated and tested for reliability (Hyman, Lamb & Bulmer, 2006). Nevertheless, some situations call for the development of a new questionnaire. Such cases could be when the existing questionnaires cannot measure the variables of interest nor address the research aim. Also, when the research subject is underrepresented in literature, a questionnaire could be developed. In this study, most of the questions in the questionnaire were created by the research with only questions on the quality of life adopted from the European Organisation for Research and Treatment of Cancer- Quality of Life Questionnaire -Breast Cancer 23 (EORTC-QLQ-BR23). In developing other sections of the questionnaire, the aim and objective are prioritised and attained (Etikan & Bala, 2017). Therefore, steps proposed by Roopa & Rani (2012) were adopted in planning and developing the questionnaire in this study. These steps involved writing down the variables of interest, determining the required information and the interrogation sequence, shaping the questions to be asked, pretesting and developing the final survey document (Pushpanjali, Piddennavar & Mohan, 2017). Developing most of the questionnaire sections is underpinned by the fact that there are no existing questions that assessed the impact of sociocultural factors as mediators of breast cancer treatment and outcomes.

7.9.5 Characteristics of a good questionnaire

1. A good questionnaire must have its target participants clearly stated from the outset. The population from which the researcher desires to generalize from must be defined. Socio-demographic factors such as age, education, religion, ethnicity, educational background, social class etc., of the target population must be considered (Etikan & Bala, 2017).

In this study, the target participants were breast cancer patients undergoing treatment in the selected hospitals in Lagos and Ibadan, Nigeria. In addition, the participants' socio-demographic characteristics such as age, education, gender, income, employment, religion, place of residence, marital status, and tribe were considered. The socio-demographic consideration of the participants is evident in questions 1- 9 of the questionnaire.

2. A thoroughly developed questionnaire should meet the research aim and objectives (Etikan & Bala, 2017) and reduce the common problem associated with many kinds of research like un-answered questions. It must gather the most possibly accurate and complete data in a logical sequence. The information that the researcher needs to know from participants must align with the objectives and goal of the research. This information can be sourced through literature reviews (Anyanwu et al., 2016), being aware of existing problems like the one they set out to study, being abreast with the knowledge gap in the area of study and how they plan to build on the existing knowledge (reference). The use of targeted small groups and non-formal qualitative interviews with selected participants to assess the quality of the questionnaire before surveying the primary study population is required to enhance clarity on what information is needed in the actual study (Etikan & Bala, 2017; Anyanwu et al., 2017; Choy, 2014).

In this study, the developed questionnaire met the aims and objectives. This study aimed to investigate the impact of sociocultural factors as a mediator on breast cancer treatment outcomes. The research objectives include: determining the knowledge level of breast cancer among the study participants; surveying sociocultural variables that possibly impact breast cancer treatment outcomes using a semi-structured questionnaire; establishing which of the identified sociocultural factors are mediators of the effect of breast cancer outcomes; and investigate the impact of the mediating variables in explaining the indirect effect of breast cancer treatment on outcomes'.

In the questionnaire for this study, questions 10 – 22 addressed the first objective in this study, questions 40 -52 addressed the second and third objectives, while questions 52 -67 addressed the fourth objective. Furthermore, the quality of the developed questionnaire was assessed before commencing data collection for the study through a systematic review, qualitative and pilot study. The systematic review helped the researcher search extensive literature and identify the gap in the literature in the study area.

In addition, the qualitative study enabled the researcher to gain knowledge of the existing problem under investigation, which informed the development of the questionnaire. The pilot study assessed the quality of the questionnaire and was conducted using approximately 5% of the calculated sample size (10). The 10 participants were breast cancer patients undergoing treatment at the Federal Medical Centre Owerri, Imo state. The outcome of the pilot study was used to modify some of the questionnaire's questions. In addition, the pilot study helped confirm the validity and reliability of the questionnaire.

3. A good questionnaire must identify various possible means of reaching targeted respondents in survey research (Roopa & Rani,2012; Young, 2016). The methods are face-face, via telephone, mailed questionnaires or web-based questionnaires. Depending on the preferred mode of reaching the targeted audience, the format will differ to align with the preferred method. The best practice is that personal data gathering should be deployed to search for sensitive or confidential information. The choice of the effective way to use can be subjected to various factors such as accessibility to the targeted group, the phenomenon under study, available resources, and the literacy level of the participants, among others (Mathers, Fox & Hunn, 2007).

In this study, face to face administration of the questionnaire was deployed. However, this approach delayed the data collection process because of the ongoing COVID-19 pandemic travelling restriction during this research. The research setting in Nigeria required the researcher to travel out of the country for the data collection. The quest for personal information collected underpinned the choice of face-to-face administration of the questionnaire. The face-to-face approach was mostly research-administered except for some participants that preferred self-administration. The self-administered was in the presence of the researcher

7.9.6 Question types

In determining the response structure of the questionnaire, the researcher should ensure that each question should be able to assist in testing one or more research questions identified in the study design by focusing on the questionnaire content (Pushpanjali, Piddennavar & Mohan, 2017). There are two categories of response structure: opened-ended and closed-ended formats (Patel & Joseph, 2016), though some scholars identified matrix questions and contingency/cascade questions as other formats of questionnaire response structures (Pushpanjali, Piddennavar & Mohan, 2017; Roopa & Rani, 2012). These response structures are defined based on the response format captured in the questionnaire (Patel & Joseph, 2016).

7.9.6.1 Open-ended questions

Questions without predetermined response options are called open-ended questions (Roopa & Rani, 2012). This set of questions is unstructured, and participants respond freely without being limited to a predetermined set of options (Roopa & Rani, 2012). According to Patel & Joseph (2016), open-ended questions allow participants to present their answers in their own words.

These questions are frequently used in in-depth interviews but can also be deployed in structured quantitative interviews (Patel & Joseph, 2016). An unstructured questionnaire will allow the researcher to explore and ask more detailed and robust questions (Roopa & Rani, 2012). However, the challenge with open-ended questions, primarily when used on a significant number of participants, is the ability to generate diverse responses that may be problematic and challenging to analyse (Young, 2016). For most open-ended questions to be statistically analysed, answers should be coded, and this coding process takes time and resources. According to Krosnick & Presser (2010), some participants' handwriting in presenting their answers could be challenging to interpret, hence a problem with the open-ended question. In this study, the researcher did not include open-ended questions to avoid difficulty in the analysis.

7.9.6.2 Closed-ended questions

The closed-ended format offers the respondent multiple-choice questions. Respondents' responses are constrained to a specific set of responses (Kuhn, 2020). The closed-ended questions were used in this study to collect data. According to Mathers, Fox & Hunn (2007), possible responses to closed questions are well-defined beforehand. Participants' options are confined to the pre-coded answers, which facilitates straightforward interpretation and analysis of gathered data. The findings of the systematic review and the interviews informed the pre-coded answers for the closed-ended questions.

Nevertheless, the responses provided for closed-ended questions may be biased, as answers that the respondents would not have considered might be delivered to them on a platter (Patel & Joseph, 2016). Furthermore, close-ended questions can lead to frustration as most respondents would like to be expressive and would want to respond beyond the set of options provided in the questionnaire. This can be managed by providing a column for narrative feedback (Etikan & Bala, 2017). In this study, options such as 'others, please specify' were included. This answer option was provided to allow the participants to express themselves in their feedback. Although close-ended questions are likely to encourage correct guessing from respondents (Krosnick & Presser, 2010), providing multiple answer options addressed this problem. In summing up the discussion, Acharya (2010) stated that close-ended questions are tough to construct while open-ended ones are problematic to analyse. In structuring questions for a survey, most researchers adopt a mixed-method approach, which involves using both open-ended and closed-ended questions (Kuhn, 2020). In this study, closed-ended questions mainly were adopted.

7.9.6.3 Contingency questions

The other questions mentioned earlier are contingency questions (also known as cascade or filter). Contingency questions include presenting more than one question in a progressive format (Farrell, 2016). The inquiry is responded to only if the participant gives a detailed response to the preceding question (Pushpanjali, Piddennavar & Mohan, 2017). It is a distinct form of closed-ended question frequently used for a subset of participants (Farrell, 2016). The researchers ask filtered questions, and only a subset of respondents can respond to the question, and others can skip the question/s if not applicable. This eliminates asking questions that are not appropriate and useful to a particular group of respondents (Etikan & Bala, 2017). This question format ensures that respondents only respond to questions tailored to their experience and opinion, thus guaranteeing the outcome's efficiency and reliability.

7.9.6.4 Matrix question

In reality, these might not be seen as a question style but as the format is presented (Pushpanjali et al., 2017; Henderson, 2021). Matrix question provides synonymous answer sets to multiple-choice questions (Henderson, 2021). The questions are in a table and can fulfil the need for several variable data on a respondent. In this study, the table rows display the questions to participants, and the column section provides a set of predetermined response options that align with the questions in the row. The main disadvantage of these question structures is the challenge involved in the data entry and analysis (Acharya, 2010; Pushpanjali et al., 2017b

In structuring the questions for this study, the mixed-method approach was adopted. The reason for adopting the mixed-methods approach is to ensure that data on all variables for the research was gathered. Although the open-ended, closed-ended, matrix and contingency questions' formats were used in structuring the questions for this survey, the closed-ended question accounted for more than 50% of the questions.

Apart from the questions that had 'others…, please specify' as an option, only the question on the birth year was open-ended. The choice of making the year of birth an open-ended question instead of giving different age options was informed by the study context- Nigeria. The researcher is a Nigerian and understands the norm of not disclosing age by Nigerians; hence, asking for the participants' age or age group might lead to missing data on the age variable. Considering the importance of the variable 'age' in the study, the researcher devised another way to get this information by asking for the participants to write their year of birth instead of ticking an age/age range option.

Contingency questions were also used in questions 11 - 12, 25 -26, 27 - 28 and 36 -37. For instance, question 11 was ***'Have you heard about breast cancer before your diagnosis? Have you heard about breast cancer before your diagnosis?'*** and question 12 says***: 'If yes, where did you first hear about breast cancer?'.***

Some of the questions in the questionnaire for this study were presented in the Matrix question format. This is evident in questions 40 to 52 in the questionnaire. These questions were provided in tabular form, with the questions in rows and the response options in columns. In addition, the responses in synonymous sets were provided and instructions on how to answer the questions. See the example below – an instruction for questions 40-49: '*Kindly answer the questions below by choosing and ticking the option from SA to D.* SA - Strongly agree; A – Agree; U – Undecided; SD - Strongly disagree; D – Disagree'.

7.9.7 Questionnaire language

The study context was considered when developing the questionnaire and choosing the language. The study was conducted in Nigeria, where English is their official language (Lingual Franca). The questionnaire developed In English was later translated to Yoruba, Hausa, and Igbo. Yoruba is the local language of the study's cities (Ibadan and Lagos). Yoruba is the most common local language spoken by the indigenous people of Ibadan and Lagos.

Nevertheless, visitors that have lived in these places tend to understand and speak the Yoruba language fluently. Visitors in the cities were also considered when designing the questionnaire, translating questions from the English version to Ibo and Hausa. Pidgin- English is another language that most people could understand in the study context, but this was not considered during translation into different languages. Not translating the questionnaire to Pidgin-English is because it is best understood when spoken than when written. Again, as the researcher and the research assistants were conversant with the Pidgin-English, they could easily administer the English language question using pidgin-English. In doing the translation, individual translators were recruited for each language. The primary criteria for recruitment were the translators' ability to read, write, and understand the English language and the Language to be translated into. In validating the translated copy of the questionnaire, a multi-linguist that understands the three local languages and English was employed. The multi-linguist confirmed 100% similarities in the questionnaire versions. The researcher also re-assessed the Ibo language version as Ibo is her first language. The second research assistant re-assessed Yoruba and Hausa versions, respectively, as he understands both languages.

7.10 Pilot study

To ensure validity, reliability and fairness in any live examination, materials for the data collection must be pre-tested. According to Cambridge assessment English, pretesting ensures that every item in a live exam is pitched at the right level and that the contents are appropriate. Rothgeb 2008 described pretesting as a dress rehearsal of survey administration and procedures. Pre-testing is a critical examination of the survey instrument that determines if the survey will function adequately as a valid and reliable research tool (Converse & Presser, 1986). The instrument for this quantitative data collection was pre-tested at Owerri in Imo state. Five per cent of the desired sample size (approximately 12 participants) were tested. The pilot study ensured that questions on the questionnaire were understandable, estimated the maximum time for completion of questionnaires, facilitated necessary corrections, trained the field assistants on how best to manage specific scenario and capture information, and checked the effectiveness of instruments for essential data collection. After conducting the pilot study, the identified problems were addressed appropriately. In the questionnaire, birth year was asked instead of age. The rationale for the choice of the question was underpinned by the pilot study results with the study context considered. The study was carried out in Nigeria, where people do not feel comfortable answering a direct question about how old they are. This was evident in the pre-test result, where only 3 out of the 12 participants stated their age, five wrote their year of birth and four stated adults. The researcher tried to device another means of getting data on their age without directly asking how old are you or what is your age? Considering that only four missing values were recorded on this variable, it could be said that the change in the question format served the purpose.

The question on the participants' stage of breast cancer at diagnosis was not answered in the pretest. Their reasons were that their doctors did not inform them or could not remember. This led to the researcher's decision to get this information on their breast cancer stages at diagnosis from their doctors. The instruments for data collection were face validated by my supervisors; corrections were made and appropriately modified to suit the objectives of this study.

7.11 Psychometric validation

Psychometric validation is also known as the psychometric soundness of instruments used in scientific trials and outcomes studies (Hughes, 2018). Psychometric validation in this study ensured that the data collection instrument assessed what it was meant to measure (Hughes, 2018). In this study, serious thought was given to research outcomes and the thoroughness of the survey **(**Heale and Twycross 2015). Thoroughness, in this instance, means the degree and length in which the researchers covered to improve the quality of the work (Heale and Twycross 2015). The significant measures that demonstrate the extent of diligence a researcher has deployed in carrying out a study are known as validity and reliability (Bryman, 2016), and the process of assessing the validity and reliability of a data collection instrument is referred to as Psychometric validation (Bowling, 2014a). The reliability and validity of the instrument for data collection were confirmed in this study.

7.11.1 Reliability

This refers to the extent to which measures are devoid of errors and, as a result, produce consistent outcomes (Lakshmi and Mohideen, 2013). Incorporated in the above definition is replicability or repeatability of outcomes or findings (Robinson, 2009; Bryman, 2016). Researchers with quantitative bias are typically concerned with demonstrating that the instrument of measurement deployed in their research is stable (Golafshani, 2003). Establishing stability in the measurement instrument helps assure users of the instrument or result of its dependability and reliability. Reliability is the overall consistency of a chosen measure (EL Hajjar, 2018). The reliability of this study was tested, and the techniques used in measuring the reliability of the data collection instrument consist of; internal consistency, test-retest and interrater.

Internal consistency: This reliability test influences how all aspects of the test correlate to all other factors. If multiple diverse factors are used to obtain information about a discrete construct, at that point, the set of data is considered reliable (Roopa & Rani, 2012). This is a significant element of an acceptable and high-quality research tool. For Bryman (2015), it is used in ascertaining the consistency of data from a respondent when placed side by side to determine whether their feedback on one criterion agrees and relates to the feedback on other parameters. The most frequently used internal consistency method is the Cronbach Alpha coefficient. When using Likert scales, the Cronbach Alpha coefficient is seen as the most suitable measure of reliability (Robinson, 2009; Lakshmi and Mohideen, 2013). In this study, Cronbach's alpha was used to ascertain how closely related a set of test items was (Robinson, 2009; Lakshmi and Mohideen, 2013). Some of the questions in the instrument were in Likert scales format; hence, the use of the Cronbach Alpha coefficient test was deemed appropriate.

Figure 24: Result for the Cronbach Alpha Coefficient Reliability test

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.565	.708	10

The above test result of the Cronbach Alpha coefficient gave a value of 0.708 for the questionnaire. According to George and Mallery (2003), this value indicates an acceptable internal consistency of the items (variables) used in the questionnaires.

Test-Retest reliability: This is sometimes known as Stability Test, and is calculated through correlation (Gravesande, 2019). It is used to measure instrument stability over time (Bowling, 2014a). It is the extent to which data are constant through a given test replication (Roopa & Rani, 2012). The best and quickest means to estimate reliability is supervising and administering the test to the same participants using the same set of questions and concepts at two different intervals under the same conditions and correlating the two responses (Taherdoost, 2016; Bryman, 2015). A statistical evaluation is then performed between respondents' test scores for each period they complete the test (Heale and Twycross 2015). However, to achieve the best result, there is a need to manage the interval range (Bryman, 2015). A concise interval range will exaggerate the correlation level since the participant's memory is still fresh from the initial test. However, an interval range that is too long may warrant that some factors the researcher is attempting to measure may have changed (Robert, 2004). In this study, the same questionnaire was administered to 12 selected participants who met this study's inclusion criteria at two different intervals and under the same condition. The interval period given was seven days (Patel & Joseph, 2016).). The choice of 7 days was underpinned by the evidence from the studies by Robert (2004) and Patel & Joseph (2016); on not using too short or too long interval periods during test-retest. All the responses were compared to ascertain the correlation level.

In analysing the result of the test-retest reliability, the row to the column between the two observations, administrations, or survey scores was matched on the Correlations table. The Pearson Correlation is the test-retest reliability coefficient, the Sig. (2-tailed) was the *p*-value interpreted. The N was the number of observations that were correlated. From the analysis result, the correlation was significant at 0.01 and 0.05 levels (2-tail), respectively, which is evidence of the test-retest reliability. The *p*-value is less than 0.05**,** and the Pearson correlation coefficient is above 0.7; there is evidence of test-retest reliability. The similarity rate of 93% was recorded for the test-retest reliability test.

Inter-rater reliability: Inter-rater reliability, also known as inter-observer reliability, refers to the degree of consistency amongst different raters/observers carrying out a test on the same phenomenon using the same measurement instrument (Taherdoost, 2016). Although the test-retest and inter-rater are similar, the difference is that in the inter-rater, a different person administers the questionnaire the second time (Bowling, 2014a). In the inter-rater, the reliability of the data collection instrument and the measures used in gathering the data was assessed to ensure that data were collected thoroughly, and identical outcomes can be replicated. (Taherdoost, 2016). In order words, the inter-rater assesses if different outcomes could be achieved when another person administered the same instrument to a particular participant. Statistical procedures are used to quantify inter-rater reliability to provide analytical evidence that the identical outcomes are not accidental (Krippendorf, 2004). In piloting this research, we adopted both self-administered and researcher administered questionnaire approaches; hence could only test for the inter-rater reliability on completed questionnaires that were researchers administered. Seven questionnaires were issued by the researcher and re-administered to the same participant on a later date by one of the research assistants. The Kappa test was adopted to analyse the inter-rater reliability test results. Altman (1999) provided guidelines for interpreting the strength of agreement Value of K. when the strength of agreement is greater than 0.02 and less than 0.20, it is said to be poor; from 0.21 to 0.40 is considered fair; 0.41 to 0.60 is moderate; 0.61 to 0.80 is good while 0.81 to 1.00 is very good. In this study, the kappa test result shows a record of high inter-rater reliability.

7.11.2 Validity

Validity is a crucial element for assessment and measurement as a whole. It deals with how concepts are correctly measured by data collection instruments (Bryman, 2016; Heale and Twycross, 2015). Validity has two critical parts broadly categorized as internal and external (Patino & Ferreira, 2018). Internal validity focuses on whether the research outcomes are legitimate as a result of group selection and how data was captured and analysed. External validity is sometimes known as 'generalizability'. In addition, external validity encompasses the transferability of results from one study to another (Lakshmi & Mohideen, 2013). Different types of internal validity were adopted in this research, including face validity, construct validity, content validity, and criterion validity approaches. In this section, we will be addressing the issues of both internal and external validity.

Content Validity: This type examines whether the instrument sufficiently includes all the content it should cover regarding variables (Heale &Twycross, 2015). Content validity wants to determine if the instrument covers all the variables and construct it set out to measure (Taherdoost, 2016). Overall, content validity encompasses the evaluation of new research instruments to eliminate undesirable items and include what needs to be captured in the construct domain (Boudreau et al., 2001). For studies investigating participants' attitudes, behaviours, perceptions or knowledge of a specific concept, content validity is crucial (Roberts et al., 2006). According to Taherdoost, 2016, a pilot study can serve as a tool for assessing content validity. In this research, content validity was performed using a pilot study conducted in Owerri, Imo state Nigeria. The pilot study was used to validate the content of the data collection instrument (Taherdoost, 2016). The outcome of the pilot study demonstrated that the questions in the questionnaire were appropriate for answering the research questions. The questionnaire was updated after the pilot test, and this confirmed the content validity of the data collection instrument. See the pilot study section for further details.

Face Validity: Face validity examines the appearance of the data collection instrument for viability, legibility, style consistency, formatting and language usage and clarity at face value (Roopa & Rani, 2012). According to Oluwatayo (2012), face validity refers to the investigators' personalized assessment of the importance of the measuring tools as to whether the instrument seems to be necessary, rational and explicitly clear. Face validity is considered subjective, unscientific, and the weakest type of validity at best or not even a form of validity (Taherdoost, 2016; Bowling, 2014a). Nevertheless, according to Bowling 2014a, face validity is crucial as it ascertains if the instrument for data collection assesses the study's interest (Bowling, 2014a). In this study, the data collection instruments were face validated by the investigator's supervisors, who are experts in the field of the study. They assessed how the questions were presented and their relevance in the study. The experts also ensured the questionnaire was clear, understandable, and logical.

Construct validity: Construct validity is a validation process that considers the ability of the measuring instrument to measure an event under study. According to Bowling (2014a), construct validity is adopted to confirm if a measurement instrument designed to measure a specific event reflects that event that it is supposed to measure. Construct validity evaluates how effectively one can reach conclusions about test scores (Bowling, 2014a). Construct validity refers to whether inferences can draw inferences about test scores associated with the idea under study (Roopa & Rani, 2012). Construct validity is concerned with whether the measurement tool designed to measure a specific phenomenon or incident mirrors the phenomenon or incident it is measuring (Bowling, 2014a). The idea or concept must be well explained and transformed into a working and practical reality (Taherdoost, 2016; Heale and Twycross, 2015). In this study, a literature review was extensively carried out on the topic under study to identify measuring concepts like sociocultural factors that impact breast cancer treatment and outcomes. Existing questionnaire on breast cancer patients' quality of life measurement was also sourced in developing the instrument for data collection. This ensured that the instrument for data collection addressesed the research questions and objectives.

Criterion validity: This is the level to which a measure is associated with the result. Correlations can be performed to determine the scope to which the diverse instruments measure the similar variable (Taherdoost, 2016). A test can possess criterion validity if suitable for envisaging performance or conduct in another scenario, irrespective of whether the situation is in the past, present, or future (Taherdoost, 2016). It can be deployed to distinguish between groups or make a forecast about future outcomes. Criterion validity basically denotes how test scores can envisage precise criterion variables using external criteria (Roopa & Rani, 2012). A correlation test was carried out to ascertain criterion validity in this study. The result of the correlation test can be found in the results section of this chapter.

External Validity: External validity refers to the degree to which the research outcomes are generalizable specifically for the population that the sample is assumed to represent (Patino & Ferreira, 2018). Commonly known as 'generalizability', external validity has to do with whether the results produced by the study are transportable to other populations of interest (Lakshmi and Mohideen, 2013). External validity covers the scope of conclusions drawn from a particular research sample to a broader population (Heale and Twycross 2015). Generalizability has to do with assumptions built on a sample from a delimitated population (Lesko et al., 2017). Transferability refers to assumptions based on a sample aimed at another population. In this study, the vital factors used in assessing external validity are sample size and the sampling method.

7.12 Data Collection

Data were collected from breast cancer patients who voluntarily consented to participate in the study by signing the written informed consent form. The data collection occurred at the selected breast cancer facilities on the participants' clinic days. The selected hospitals that include both the private and public hospitals were Lagos University Teaching Hospital, University College Hospital Ibadan, Lakeshore hospital, and Optimal cancer care centre. The hospitals also gave consent for their names to be included in the research. Data was collected from the consented 230 breast cancer patients in this study. The instrument for data collection was the questionnaire designed by the researcher and validated during the pilot study and by the research's supervisor. See the section on the development of the questionnaire for further details. The questionnaire was either self-administered or interviewer-administered, depending on the participants' preference.

Nevertheless, most of the participants in the study preferred self-administration of the questionnaire. The participants also completed the consent form before completing the questionnaires. The completed questionnaire was retrie ved from the participants upon completion. The collected data was analysed with details on the data analysis presented below.

7.13 Data Analysis

7.13.1 Missing data

In statistics, when there is no data value stored for some variables in observation, it is referred to as missing data (Allison, 2002). According to Rubin 1976, missingness of data occur when there are missing values in a data set. Missing data is a long-standing issue in social, health and epidemiological research (Allison, 2002; Wood, White, & Thompson, 2004). The missing data field was first initiated by Rubin in 1976. According to Kang 2013, missing data can occur in most research, irrespective of how well the study was designed and controlled. Allison 2002 also stated that a specific data set will have missing data on some variables in most cases.

7.13.1.1Reasons for missingness of data

Different reasons could account for the missingness of data. According to Allison 2002, missing data could result from an intentional refusal of participants to answer the question, lack of information or opinion needed to answer the question, and forgetfulness or overlooking of some questions. Also, participants withdraw from studies before they are completed for anonymisation purposes, and data entry errors could lead to missing data (Fernstad, 2019; Schork, 2020).

7.13.1.2Effects/problems of a missing data in a study

According to Kang 2013, missing data can reduce the statistical power of a study as the sample size decreases as a result of the missing data; introduce bias in the estimation of parameters, facilitate the representativeness of the samples, complicate the analysis of the study and lead to an invalid conclusion of an investigation.

7.13.1.3 Patterns of missingness

According to Mercaldo and Blume (2020), the pattern of missingness is grouped into three, namely, Univariate, Monotone and connected patterns; and are discussed below. A missing pattern is Univariate when only one variable has the missing pattern. The monotone pattern of missingness occurs when the variables are ordered so that missing data in one variable could lead to missing data in another variable. A pattern among the missing values is observed in monotone pattern of missingness. A good example of such pattern is seen in longitudinal studies with dropouts. The Third pattern of missingness if the connected and disconnected pattern. The connected pattern is usually observed if the observed data point could be reached from another data point through a sequence.

7.13.2 Types of Missing data

7.13.2.1 Missing Completely at Random (MCAR)

As the name implied, this type of missingness occurs when the missingness in your data is in a totally random pattern and independent from one another (Rubin, 1976; Chittayasothron and Niyato, 2021). Adam and Jyoti (2009) presented the same idea more graphically by saying that in MCAR, the missing of X as a value in research is not dependent on the observed Y or unobserved YX. When data in a study is missing at a specific time without any substantial reason, either by design, samples lost in transit or equipment failure, it is assumed that it is MCAR (Hedeker & Gibbons, 2006). In MCAR, the absence of data do not affect the estimated parameters; hence, they remain unbiased. This is the statistical advantage of MCAR, as power may be lost in design but not in the estimated parameters (Adam and Jyoti, 2009). According to Bland, 2015, in MCAR, the missingness is not related to the person being studied; for example, blood sample might be damaged in the laboratory leading to missing data.

7.13.2.2Missing At Random (MAR)

When data are missing at random, the missing values are systematically different from the observed values, but the systemic differences are fully accounted for by measured covariates (Little & Rubin, 2014; Wilkie, 2020).). Data missingness is referred to as MAR, when the probability of a value being missing in one variable is unrelated to the probability of missing data in another variable; but may be related to the value of the variable itself." (Nisbet, Elder & Miner (2009), When data is missing at random, it simply means that the missingness has something to do with the person, nevertheless, the missing data could be predicted from other sources about the person (Bland, 2015).

7.13.2.3Missing Not at Random (MNAR

The third missing data type is Missing Not at Random (MNAR). This simply means that a value is not missing at random either by MCAR or MAR (Kleinke et al., 2020). According to Bland (2015), this type of missingness is related explicitly to what is missing; for instance, a person refuses to attend a drug test because they had taken drug(s) the previous night. Vogt et al., 2014 are of the notion that this type of missingness introduces systematic bias in the estimated parameters, affecting the outcome of the research. Addressing the issue of MNAR in a dataset is complex and problematic and requires modelling the missing data for estimation (Mercaldo & Blume, 2020).

7.13.3 Techniques in handling missingness of data

Listwise Deletion: In dealing with missing data, the listwise deletion, also known as complete-case analysis, removes the data from cases with missing values (Enders, 2010). For instance, if there are three cases, A, B, and C, and the values in cases B and C are complete, but A is incomplete, this technique throws away case A, leaving only cases B and C for analysis. Enders (2010) noted that the fundamental advantage of listwise deletion is convenience, but it is also helpful in producing a typical case for all analyses. Listwise deletion is the most common in most statistical programs such as SPSS, SAS, BMDP, and Systat (Munro, 2005). Munro continued by stating that with the listwise deletion with this procedure, data can be deleted without the researcher's knowledge (Munro, 2005). Meyers et al. posit that this method is useful because it can be used in many multivariate techniques and usually does not require additional computation (Meyers, 2016). However, he pointed out some demerits of the method, which first leads to the loss of complex and expensive cases. Second, the reduction of samples can lead to errors. Third, because many cases are required for multivariate procedures, throwing away cases can make that impossible (Meyers, 2016). Fourth, Listwise deletion could introduce bias in parameters estimate; nevertheless, if the assumption of MCAR is satisfied, an unbiased estimate is produced.

Pairwise Deletion: According to Cameron et al., (2005), **the** pairwise deletion technique is better when compared to listwise deletion. In pairwise deletion, all information were used except only when the particular data point needed to test a specific assumption is missing; then, such information will be eliminated. All possible pairs of values and individual variables estimate marginal moments (Cameron et al., 2005). According to Warner (2013), each correlation is computed using data from all the participants who had non-missing values on that particular pair of variables. This means in each case study, even though there is a missing value, pairs within that case study are used instead of discarding the entire case. When various samples are used for different calculations, pairwise deletion is recommended to handle the missing data (Blattberg et al., 2008). Furthermore, Blattberg et al., (2008) concluded that one of the demerits of this technique is that it can only be used on a large sample size. Another demerit of using pairwise deletion produces biased standard errors (Brown, 2006).

Mean Substitution: The name of this technique infer replacement. According to Meyers et al., (2006), this technique replaces the missing values in a case with the mean of that variable. The mean substitution practice is based on the understanding that "the sample mean the vest estimate of the population mean" (Meyers et al., 2006). Fischetti (2018) believes that the mean is a reasonable estimate for a randomly selected observation from a normal distribution. It is seemingly confirmed that the mean substitution technique fixes the problem encountered in listwise deletion; nevertheless, it poses another issue as it produces biased variance estimates (Fischetti, 2018). Mean substitution discards the natural variability that would have taken place if the values were not missing (Fischetti, 2018). Furthermore, in mean substitution, sample sizes are increased without any new information added; hence, it is not a generally accepted technique for handing data missingness.

Regression Imputation: Rubin and Roderick (2019) posit that the regression imputation technique "replaces missing values from a unit by their predicted values from a regression of the missing variable on variables observed by the unit, usually calculated from units with both variables observed". As imputation is a process whereby the missing data is replaced with estimated values, regression imputation replaces missing data by using the regression method to predict the potential values of the missing elements (Wilkie, 2020; Fischetti, 2015). Nevertheless, regression imputation underestimates the variability of the missing values and does not consider the remaining characteristics of a data point, thus neglecting its nature (Chittayasothorn, 2021). Also, regression imputation treats all classes as the same (Wilkie, 2020).

Last Observation Carried Forward: According to Portney (2020), the Last Observation Carried Forward technique is used "when data are measured at several points in time." He stated that if a subject drops out in a research study with this method, the last data is used as the outcome. This conclusion by Portney (2020) was based on the assumption that the subject had continued stably rather than improving. One of the disadvantages of the Last Observation Carried Forward technique is that it can inflate or deflate the actual treatment effect. (Portney, 2020). Round (2016) avows that the assumption is that all unobserved data are identical to the last available data; however, there is no reason for such an assumption, and it is very likely that if the subject has continued, it may be opposite to what this technique assumes. One of the advantages of the Last Observation Carried Forward technique is its easy understanding and communication by statisticians.

Maximum Likelihood: This technique is prominent for dealing with missing data (Maydeu-Olivares and Millsap, 2009). There is an assumption that the observed data are a sample drawn from a multivariate normal distribution which is relatively easy to understand. According to Maydeu-Olivares and Millsap (2009), the Maximum Likelihood technique generates estimations with values linked with consistency, asymptotic efficiency, and asymptotic normality. Consistency implies that estimates will be roughly unbiased in large samples; Asymptotic efficiency suggests that values are almost efficient, while Asymptotic normality uses a normal approximation to calculate confidence periods (Hoffmann, 2017; (Maydeu-Olivares and Millsap, 2009). Hoffmann (2017) asserts that this technique is difficult to understand without a proper grounding in probability theory and statistics. The Technique is about generating "a statistical model that makes the patterns found in the data most likely." (John P. Hoffmann, 2017).

Expectation-Maximization (EM) is an iterative procedure that uses other variables to attribute a value (Expectation) and checks whether the value is most likely (Maximization). If the value is not most likely, it re-imputes a more likely value and continues to re-impute until it reaches the most likely value. This technique is an algorithm used for maximum likelihood estimation for incomplete-data issues, as it provides estimated values of missing data (Zeni, 2001; Ramachandra and Tsokos, 2009). The Expectation-Maximization is relevant and mostly used when there are enough statistics, as this technique has a linear maximisation (Dumka et al., 2020). Expectation-Maximization can be applied successfully under the E-step and M-step (Egiazanrian and Campisi, 2017). To fulfil the condition of the E-step, it is essential to calculate the conditional probability density function of the 'hidden variables' in the observed data (Egiazanrian and Campisi, 2017).

On the other hand, the M-step is fulfilled when analytical formulas for the updated equations of the parameters are present (Egiazanrian and Campisi, 2017). Expectation-Maximization imputations are better than mean imputations as preservation of relationship with other variables is assured, which is crucial when testing a linear regression or factor analysis. Nevertheless, this approach takes a long time to be carried out, especially on data with a high level of missingness. Also, this technique could produce bias on parameter estimates and underestimate the standard error; hence, referred to as a complex technique by some statisticians.

Multiple Imputation: the technique was brought to the limelight by Rubin in 1978 (Verbeke and Molenberghs, 2009; Wang, 2003). This technique involves replacing every missing value with more than one imputed value instead of substituting a single value for each lost. The primary aim is to combine the simplicity of imputation tactics with unbiasedness in point estimates and precision measures (Verbeke and Molenberghs, 2009). According to Wang (2003), the Multiple Imputation technique involves combining various imputation methods. For instance, expectation-maximization can be combined with maximum likelihood to provide a single data analysis.

Furthermore, Wang (2003) stated that this procedure creates a summary data set for imputing missing values from multiple data sets. The principle of this technique is that "imputed values should be random draws from the predictive distribution of the variable with missing data, conditional on the values of the observed variables' (Louise-Anne McNutt and Sarah Boslaugh, 2008). This technique starts with predicting the missing data using the existing data from other variables, replacing the missing data with the predicted values, and creating a complete data set known as the Imputed data set. This process is repeated depending on the number of iterations proposed by the researcher to form the multiple imputed data set. Multiple imputations incorporate the uncertainty associated with the estimation of the missing data and restore the natural variability of the missing values. Irrespective of the sample size and the number of missing data, multiple imputations are robust to the normality assumptions' violation.

Sensitivity Analysis: Katenka and Marchenko (2020) posit that this technique is used to measure the impact of assumptions necessary for a detailed analysis but cannot be verified. According to Hancock and Harring (2012), sensitivity analysis is used when studying missing data under a mixed-effects model when the data are MNAR. Sensitivity analysis assesses how a change in data or a model may influence the statistical inference of a model" (Hancock and Harring, 2012). It aims to "compare the results across the different analyses to understand better how much the inference about treatment effect relies on the assumptions regarding missing data" (Cappelleri et al., 2013).

In handling data missingness in this study, the multiple imputation techniques were adopted and analysed using the IBM SPSS version 27. The choice of the multiple imputation techniques is underpinned by the missingness evident in the collected data. The Little's MCAR test was used in testing for the type of missing data in the survey. The missing data in this study was concluded to be missing completely at random (MCAR); hence, the decision to adopt the multiple imputation techniques in accounting for the missingness of data in this survey.

7.14 Data preparation

According to Parke (2016), data preparation involves managing data, manipulating tasks, organisation of data, and conducting preliminary analysis. In preparing data for this study, cleaning and transforming raw data was carried out before processing and analysing the data. The raw data from the questionnaire were entered into a Microsoft excel sheet and further transferred to the IBM SPSS statistics 27 packages, where all processes involved in the data cleaning, processing and analysis took place. In addition, manipulation of tasks that included transforming the raw data into helpful information was done. The data organisation was followed by preliminary analysis, such as accounting for missing data in the dataset and multicollinearity. In preparing for analysis in this study, the researcher ensured that variables were at the acceptable measurement level for a statistical test required in answering the research questions. As part of the data preparation process in this study, discretization and dummy coding was conducted.

7.14.1 Discretization

According to Grzenda (2020), the discretization of continuous data helps to improve the quality of the raw data. The discretisation process also helps deal with outliers and influential observations in the dataset (Grzenda, 2020). Discretization involves the transformation of continuous into a discrete data form (Suresh, 2014). This process was necessary as variables such as age collected in their constant form were transformed into categorical data in this study. Discretization makes data easier to analyse (Grzenda, 2020; Suresh, 2014).

7.14.2 Dummy variable coding

Dummy variable coding is decategorizing discrete variables into dichotomous variables (Tabachnick & Fidell, 2013). Any numerical variable that could represent categorical data is referred to as a dummy variable (Antunes, 2021). In using dummy variables, important predictor variables collected in a qualitative format could be recorded and incorporated into regression (Grotenhuis, 2015). Dummy variables in this study were created via syntax, where responses are recoded into 0 and 1, where 0 = 'yes' and 1 = 'no'. In this study, variables such as gender were recoded to form a new variable dummy code for gender where 0 = male and 1= female. Again, as data in this study were analysed using logistic regression, dummy coding was necessary to transform nominal variables into dichotomous ones.

7.15 Statistical tests performed in the study

Data collected in this survey were quantitative data which were analysed statistically. There are different reasons for performing statistical analysis, including identifying trends and patterns, estimating frequencies of the responses, and testing hypotheses on relationships and associations between variables. Various statistical tests could be used in analysing variables statistically, namely: descriptive or inferential statistics. According to Satake (2015), descriptive statistics is used to describe relationships between variables within a population, while inferential statistical tests are conducted to draw inferences. These statistical tests could be used to address specific research questions in a study; hence, they are important (Ali and Bhaskar, 2016). This study used descriptive statistics to ascertain frequencies, percentages, and patterns of variables in the dataset. Also, inferential statistical tests are used to test for association (hypothesis) between variables to infer the population under study.

The following statistical tests were carried out in this study which includes:

- Multicollinearity:
- Correlation,
- Contingency tables
- Logistics regression
- Multiple regression.

The following underpinned the choice of the statistical approach used in answering the research questions:

- Types of variables (independent and outcome) in the study: the dependent variables (Health-seeking behaviour and quality of life) were categorical variables with two or more categories.
- Type of hypothesis test to ascertain the relationship between dependent and independent variables in the survey.

7.15.1 Multicollinearity

In a regression model, multicollinearity occurs when two or more highly correlated predictors (Vatcheva et al., 2016). Multicollinearity introduces biases and unstable standard errors, resulting in unrealistic interpretation of the research findings (Hoffmann and Shafer, 2015). According to Vatcheva et al., (2016), although the diagnosis of multicollinearity does not provide a solution to the problem under investigation, it understands the potential impact on the regression analysis outcome. Thus, it encourages careful interpretation of findings. Multicollinearity analysis in this study was carried out on the independent variables using the following tests: Value of Tolerance, Variance Inflation Factor (VIF), tolerance value, Condition index and correlation analysis. If the correlation coefficient result is equal to one, there is complete collinearity; but if the result is equal to zero, there is no collinearity. In interpreting the Value of tolerance, if the result is less than 0.1, there is a correlation, but there is no correlation; if it is more than 0.1, there is no correlation. Variance Inflation Factor greater than 10 shows correlation. The predictor variables tested for multicollinearity include the following predictor variables and their indicators:

Sociodemographics: *Age, gender and religion*

Socioeconomic factors: *The highest level of education attained, employment status and monthly income level.*

Cultural belief: *Culture and tradition affect my breast cancer treatment, and I sought traditional help before reporting to the hospital.*

Religious belief: *Religion affects my breast cancer treatment; I sought religious and spiritual help before reporting to the hospital and, having or not having breast cancer has something to do with God.*

Alternative medicine *Sought self-help via buying online supplement drugs before reporting to the hospital, sought religious and spiritual help before reporting to the hospital and 'sought traditional help before registering at the hospital.*

Support: *Satisfaction with family support and satisfaction with societal/community support.*

Marital status:	*Marital status and sought permission from my spouse before going to the hospital.*
BC stages at diagnosis:	*Stages 0, I, II, III, and IV.*

7.15.2 Correlation

According to Bormel and Ferguson (1994), cross-tabulation is a statistical approach used to analyse relationships between variables quantitatively. For example, Crosstabulation was used to understand the correlation between variables and how correlation could change from one variable to another. Cross tabulation assesses patterns, probabilities and trends in raw data and can also be called contingency tables or cross tabs (Bormel and Ferguson, 1994; Everitt, 1992). Using cross-tabulation to assess relationships between variables helps a researcher to draw impactful insights from large data sets.

This study's dependent (outcome) variables include ‘Quality of life’ and ‘Health-seeking behaviours’. Quality of life comprised three categories (Good, Fair and Poor), while the Health-seeking behaviours’ had two classes (Good and Poor). The IBM SPSS version 28 was used to analyse crosstabulation in this study. The results were structured into a table with the independent and dependent variables in rows and columns. The table presentation format of the cross-tabulation output helped the researcher to have an in-depth understanding of the participant's responses to each variable. The cross-tabulation output in this study showed the frequency and percentage distribution of the variables and the p-values from the Pearson chi-square test. According to Pallant (2013), the Pearson chi-square test of independence determines a statistically significant relationship between crossed variables. Therefore, the Pearson chi-square test was performed to ascertain statistically significant associations between the independent and dependent variables. The outcome of the cross-tabulation with a statistically significant relationship helped the research to fit the regression model that is best for the analysis.

7.15.4 Regression

In estimating an association between a dependent variable and one or more independent variables, regression analysis is used. Regression analysis is a statistical analysis that can model, predict, and estimate the strength of the association of variables (Ali- &Younas, 2021). According to Hosmer, Lemeshow, & Sturdivant (2013), variables in a regression model are referred to as dependent variables (outcome) and independent variables (predictor). Linear regression is used when the dependent variable is continuous and follows a normal distribution. Logistic regression is used when the dependent variable is categorical and not normally distributed (Montgomery, Peck, & Vining, 2012). In this study, the dependent variables ‘health-seeking behaviour’ and ‘quality of life’ were categorical variables; hence, this survey adopted the logistic regression models to assess the association between the dependent and independent variables.

Assumptions for regression analysis (Hosmer et al., 2013).

To ensure the fitness of the regression model adopted in this survey, the regression assumptions presented below were considered and met.

- Multicollinearity: For a regression model to be adopted, the correlation between variables should not be high. In this survey, multicollinearity analysis was performed using different tests (Variance Inflation factor, Value of Tolerance and Correlation), which presented a moderate correlation between variables in the survey.
- Sample size: For a regression model to be adopted, the sample size is expected to be large. In this study, a total of 230 sample sizes were used, which enables the adoption of the regression model.

7.15.4.1 Logistic regression

Logistics regression is also called the logit model and is used when the outcome variable (dependent) is categorical (Cokluk, 2010). Logistic regression is used for model fitting, estimation of relationships between dependent and independent variables, predicting the likelihood of event occurrence and confirming the observation (Park, 2013). Logistics regression has two models, namely binary and multinomial. The model type to adopt in logistic regression depends on the number of categories in the outcome variables(Shipe et al., 2019). The two dependent variables in this study were health-seeking behaviour and quality of life, with two and three categories, respectively; hence, both binary and multinomial logistic regression was modelled in this study.

Binary logistic regression

A binary logistic regression model analyses the relationship between two or more predictor variables and a categorical outcome variable with two levels of response (binary) (Shipe et al., 2019; Kassambara, 2018). In a binary logistic regression, the independent variables could be two or more, continuous or categorical, with two or more level responses (Kassambara, 2018). The binary response in a binary logistic regression could be ‘yes or no’ or ‘good or poor’ (Pallant, 2013). In this survey, the binary categorical outcome is health-seeking behaviour with two levels of responses, good and poor. Using binary logistic regression, the researcher assessed the effect of the predictors variable in explaining the outcome variable (Tabachnick & Fidell, 2013). This survey's binary logistics regression analysis output produced the odds ratio, Hosmer-Lemeshow goodness of fit test, Cox & Snell R-squared value, the Nagel Kerke R-squared value, and the Wald chi-square test.

Assumptions for binary logistic regression (Kassambara, 2018)

- Binary or ordinal logistic regression requires the dependent variable to be binary; for example, good or poor, yes or no etc. This study met this assumption as the dependent variable- health-seeking behaviour is binary with the categories ‘good’ and ‘poor’.
- A large sample size is required. The sample size in this study is 230, which is large enough for the binary logistics model to be adopted.
- The observations are independent of each other; they must not be repeated or matched. Therefore, there was no repetition of observations in this study.
- There should be the absence of high multicollinearity between the independent variable. The result of the multicollinearity in this study showed low collinearity among the independent variables.

Multinomial logistic regression

In modelling the outcomes of a categorical dependent variable with two or more categories, multinomial logistic regression is used to predict the outcomes based on the independent variables. In this study, the dependent variable – the quality of life comprised three categories, namely, good, fair and poor. Multiple categories are compared in multinomial logistic regression via the combination of the binary logit models. Multinomial logistic regression is a simple extension of binary logistic regression, and in using this model, the category of response is usually compared with the arbitrary reference category. The reference category used in modelling the multinomial logistic regression in this study was the ‘poor’ category. We used multinomial logistic regression to predict the categorical placement of a dependent variable on the independent variables. The independent variables used in for this model were dichotomous.

The maximum likelihood was used to estimate parameters and the probability of categorical membership in this model. Like other data analysis procedures, was thorough and included careful univariate, bivariate, and multivariate assessments. The Wald test and likelihood ratio analyze the importance of each of the independent variables in this study.

Assumptions of multinomial logistic regression

- Multicollinearity is estimated with simple correlations among the independent variables. This study met this assumption as the multicollinearity analysis did not show any high correlation among the independent variables.

- Sample size guidelines for multinomial logistic regression indicate a minimum of 10 cases per independent variable (Schwab, 2002). The sample size in the study was 230, which meets this assumption on sample size guidelines.
- Multinomial logistic regression is an attractive analysis; it does not assume normality, linearity, or homoscedasticity. However, in this study, the dependent variables are categorical, and parallel on the scattered plot; hence, they are not normally distributed nor linear.

7.15.4.2 Multiple regression

Multiple regression is a statistical technique used to analyze the relationship between two or more independent variables and dependent variables (Allison, Paul D, 1999). Multiple regression is used for numerous predictions on a dependent variable based on the observed values of the independent variables (Zaid, 2015. In this study, a multiple regression model was used to establish the effect of the independent variables on the individual dependent variables (health-seeking behaviour and quality of life) in the study (Gaurav, 2011).

In adopting the multiple regression model, the researcher determined the variation of the model and the contribution of each variable to the total variance. Different multiple regression analyses depend on the researcher's question of interest. The most common types of multiple regression analysis include stepwise, hierarchical and standard. In stepwise regression, predictor variables are entered into the regression equation, one after the other. The method of the predictor entry in the stepwise regression is based on the statistical criteria, where the predictor variable that contributes the most to the prediction equation is entered first. (Tabachnick & Fidell, 2013). In the hierarchical regression method, the order in which variables are entered depends on the researcher. The researchers can choose the order of variable entry, as no statistical criteria need to be met before a variable can be entered. The standard method adopted in this survey is the third most common multiple regression method. The standard multiple regression involves simultaneous entry of the predictor variable (**Keith**, 2019). Also, the predictor effect of each predictor variable on another is evaluated as the simultaneous entry is ongoing (Pallant, 2013). In this study, the independent variables were entered simultaneously.

As the dependent variables in this study were categorical, we did not adopt the multiple linear regression method; rather, multiple binary logistics regression and multiple multinomial regression models were used for the analysis. See the results section for details of the analysis outcome.

7.15.5 Quality of life assessment

In assessing the quality of life of breast cancer patients in this study, questions were adopted from the European Organization for Research and Treatment of Cancer - Quality of Life Questionnaire (EORTC QLQ-BR23). The EORTC QLQ-BR23 is a validated questionnaire by EORTC QLQ used to measure breast cancer patients' quality of life. The questionnaire was developed in 1996 with continuous updates to date. Quality of life is one of the outcome variables in this study; hence some questions were adopted from the EORTC QLQ-BR23, while other questions addressing other aspects of the study was designed by the researcher. The adopted questions from the EORTC QLQ-BR23 were fourteen and could be found in section F, questions 53-67 of the questionnaire for this study. These questions had their responses presented on the scales of 0-10, where 0 is excellent, and 10 is worst.

During analysis, the scales were re-coded to reduce the number of options and ease each question's analysis. Scales 0 and 1 were re-coded as 0; sacles 2 and 3 were recoded to 1; scales 4 and 5 were re-coded to 2; scales 6 and 7 were re-coded to 3; scales 8 and 9 were then recoded to 4, and scale 10 was recoded to 5. Questions on the quality of life were summed up based on the recoded scales. Responses with codes 0 or 1 were classified as good, codes 2 or 3 or classified as fair, while codes 4 or 5 were considered a poor quality of life.

For the quality-of-life level in the overall responses, the response scales were summed up with the highest score of 70 and the lowest was 0. The scores were presented in a quarterly format where we have the first quarter (0-27 score), second quarter (28-55 score) and last quarter (56-70). This quarterly format is in line with the coding system stated above. Participants whose response scores fell between 0 to 27 were considered good, the score between 28 to55 were fair, and scores of 56 to70 were poor quality in the study.

7.15.6 health-seeking behaviour assessment

In determining the health-seeking behaviours of participants in the study, three questions were used from the study questionnaire. Questions 27, 35 and 39 in section D of the questionnaire were used to determine the study participants' health-seeking behaviour. These questions had binary responses of yes or no. The ‘no’ response was awarded the score 0, while the ‘yes’ answer was awarded the score of 1. The questions were summed, the maximum score was 3, and the minimum score was 0. The scores were presented in two ranges, i.e. 0-1 and 2-3. Participants that recorded 0-1 scores were of good health-seeking behaviour, while those with scores of 2-3 were of poor health-seeking behaviour.

7.16 Results

All the breast cancer patients invited to participate in the study participated actively in the research. However, some participants did not attempt all the questions; hence, some unanswered questions. These unanswered questions introduced missingness to the data set. The missing data in the study was examined using Little's MCAR test to know the type of data missingness; if the data were missing completely at random or not. The Little's MCAR test showed no statistical significance, which means that data were missing completely at random (MCAR) ($\chi^2 = 6064.202$, DF $= 7431, p = 1.00$). `To account for data missingness in a study, an appropriate technique must be used, dependent on the type of missing data observed in the dataset. Regarding the previous section on techniques in handling data missingness, we adopted the multiple imputation method in accounting for missing data in this study. The multiple imputation method is very effective in accounting for missing data, not at random, hence, adopted in this study. The multiple imputations in this study were analysed using the IBM SPSS version 27. After the multiple imputations, the imputed data set (complete dataset) was used for the analysis and the final results were presented as pooled. Also, since all the recruited participants took part in the study, we could report a 100% response rate with some element of missingness.

7.16.1 Socio-Demographic Characteristics of the Respondent

Table 7 shows the socio-demographic characteristics of the respondents. A total of 230 participants took part in this study. The demographic features reported in this survey include age, gender, tribe, marital status, education, religion, place of residence, employment status, and income level. The mean age of the respondent was 48.89±11.17, with more than 78% of the respondents' ages falling below 59 years. The majority (94.8%) of the respondents were females, with about 60.4% of the respondents from the Yoruba tribe. Most (70.9%) of the respondents were married, while more than half of the participants had had tertiary education as their highest attainment. Three-quarters (74.1%) of the respondents in the study were Christians, with around four-fifths of the respondents (75.2%) residing in the western part of Nigeria. A total of 103 respondents in the survey were self-employed, with the most prevalent income being between ₦18000 and ₦50000.

Table 7: Frequency distribution of respondents' socio-demographic characteristics.

	Variables	n(230)	%
Age (Years)	<40	29	12.6
	40-59	151	65.7
	≥60	50	21.7
Gender	Male	12	5.2
	Female	218	94.8
Ethnicity	Igbo	49	21.3
	Yoruba	139	60.4
	Hausa	10	4.4
	Others (Urhobo,Bini,Tiv,Efik,Isoko,Ikwerre)	32	13.9
Marital Status	Married	163	70.9
	Single	19	8.3
	Widowed	38	16.6

	Divorced/Separated	10	4.2
The highest level of education attained	Postgraduate Education	21	9.1
	Tertiary Education	118	51.3
	Secondary Education	56	24.4
	Primary Education	21	9.1
	No formal Education	14	6.1
Religion	Christian	170	74.1
	Islam	56	24.5
	Traditional	3.2	1.4
Residence	Western	173	75.2
	Northern	14	6
	Southern	43	18.8
Employment status	Unemployed	15	6.5
	Employed	93	40.4
	Self-employed	103	44.8
	Retired	19	8.3
Average Income	<₦18000	33	14.4
	₦18000-50000	79	34.5
	₦50001-100000	62	26.9
	₦100001-300000	34	14.9
	>₦3000001	21	9.3

7.16.2 Knowledge of breast cancer

Table 8 shows the respondents' knowledge of breast cancer. About two-fifths of the respondents knew someone with breast cancer before being diagnosed. Most (73.1%) of the respondents had heard about breast cancer before being diagnosed, with more than two-fifths of the respondents reporting that they got to know about breast cancer from the media. However, most (75.3%) of the respondents felt that they did not have adequate knowledge of breast cancer before being diagnosed. In addition, the majority (98%) of the respondents did not consider being a woman as a risk factor for breast cancer. Sixty-nine per cent of the respondents report that getting older is not a breast cancer risk factor.

Table 8: Frequency distribution of respondents' knowledge of breast cancer

Variables	**Responses**	**n (230)**	**%**
Did you know anyone who had breast cancer before your diagnosis?	Yes	94	40.9
	No	136	59.1
Have you heard of breast cancer before diagnosis?	Yes	168	73.1
	No	62	26.9
Where did you first hear about breast cancer?	Family	3	1.3
	Friend/Spouse	41	17.8
	Media	103	44.8
	Seminar	1	0.4
	Doctor	24	10.4
	Do not know	58	25.2

Did you have any knowledge of Breast Cancer before diagnosis?	Yes	57	24.7
	No	173	75.3
Does being a woman increase one's chances of having Breast cancer?	Yes	5	2
	No	225	98
Does family history increase one's chances of having breast cancer?	Yes	86	37.3
	No	144	62.7
Does age increase one's chances of having Breast cancer?	Yes	71	30.9
	No	159	69.1

7.16.3 Respondents possible risk factors breast cancer exposure

Table 9 below shows the respondents' view of possible risk factors that increased their chances of developing breast cancer. Risk factors of breast cancer such as alcohol intake, exercise, number of childbirths, age at first childbirth, family history, undergone hormonal therapy and radiation therapy were assessed in the survey. Most (75%) of the respondents in this study have never drunk alcohol before, with the majority (90.4%) of the respondents reporting that they do not engage in any form of binge drinking (having five or more drinks in a sitting). Few (27%) of the respondents often engage in daily exercise, with more than two-fifths of the respondents reporting three to four childbirths. More than two-fifths of the respondents gave birth in the age group of 24-29years. Family history of breast cancer was also low; only 23.9% of the respondents reported having a family history of breast cancer. Approximately 70% and 80% of the respondents have never undergone hormone and radiation therapy.

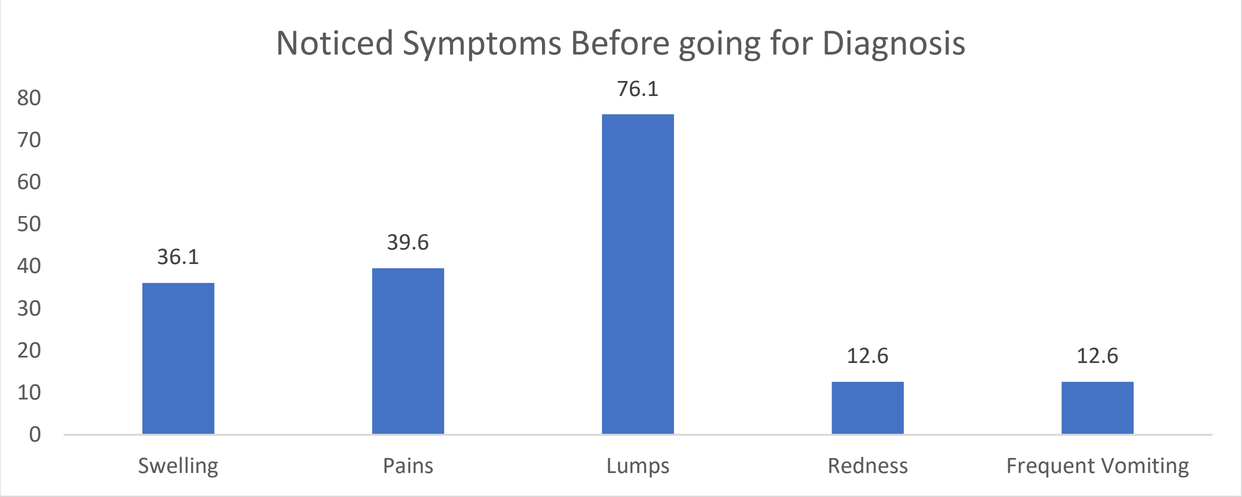
Table 9: Frequency distribution of respondents' possible risk factors for breast cancer

	Variables	n(230)	%
How often do you drink alcohol per week?	At least once every day	5	2.3
	3-4 times a week	11	4.7
	Once a week	5	2
	Every weekend	5	2
	On special occasions (Rarely)	32	13.9
	Never	172	75
Do you binge drink (5 or more glasses in a sitting)?	Yes	15	6.5
	No	208	90.4
	I prefer not to say	7	3.1
How often do you engage in exercise per week?	At least once every day	62	27
	3-4 times a week	39	16.9
	Once a week	11	4.8
	Every weekend	35	15.2
	On special occasions (Rarely)	42	18.3
	Never	41	17.8
How many childbirths?	No child	16	7
	1-2	64	27.8

	3-4	101	43.9
	5-6	27	11.7
	>6	6	2.6
	I prefer not to say	16	7
What was your age at first childbirth?	<18 years	3	1.3
	18-23 years	64	27.8
	24-29 years	93	40.4
	30-35 years	35	15.2
	≥36 years	5	2.2
	I prefer not to say	30	13.1
Does any member of your family had/have breast cancer?	Yes	55	23.9
	No	164	71.3
	I prefer not to say	11	4.8
Have you ever undergone hormone therapy?	Yes	41	17.8
	No	162	70.4
	I prefer not to say	27	11.8
Have you ever undergone radiation therapy(x-rays)	Yes	10	4.4
	No	182	79.1
	I prefer not to say	38	16.5

Figure 24 shows the symptoms noticed by respondents before going for diagnosis. Among the presented pre-diagnosis symptoms of breast cancer, the lump was the highest recorded, with about 76.1%. See the below figure for details on the reported pre-diagnosis symptoms recorded in this study.

Figure 24: Respondents observed pre-diagnosis symptom



7.16.4 Respondents' experience with Breast Cancer

Table 10 shows the respondents' experiences with breast cancer. Most (82.2%) noticed the sign of breast cancer themselves. The majority (96.1%) of the respondents identified their breast as the part of their body where the breast cancer sign was first observed. More than third fifths of the respondents visited the hospital within two days following the sign. Biopsy was the most reported test used for their cancer diagnosis (70.4%). Knowledge of the respondents' stage of breast cancer was satisfactory, although the accuracy of these were not established in this study. Breast cancer stages IV was the most (43.9%) reported in the study. The majority (86.5%) of the respondents were experiencing breast cancer for the first time, with about two-fifths of the respondents currently undergoing radiotherapy. Almost half of the respondents had surgical treatment (surgery) in the past, with more than two-fifths of the respondents undergoing chemotherapy before surgery. Uptake of treatments offered was popular (79.6%). More than half of the students bought their medication by themselves; (55%) usually bought their drugs from pharmacies located outside the hospital. About one-fifth of the respondents spend between five to eight months on treatment. Although approximately 80.2% of the respondents reported improved health as they received treatment, many (49.1%) of the respondents said they could not afford the required drugs because of cost.

Table 10: Frequency of respondents' experience of breast cancer

	Variables	n(230)	%
Who noticed the breast cancer sign first?	Myself	189	82.2
	Spouse/Partner	21	9.1
	Doctor	10	4.3
	Children	2	0.9
	I prefer not to say	8	3.5
Which part of the body was the sign noticed?	Breast	221	96.1
	Armpit	7	3
	Neck	2	0.9
Which of your breast was first affected?	Left	106	46.1
	Right	116	50.4
	I prefer not to say	8	3.5
Did you delay before visiting the hospital after you saw the sign	Yes	69	30
	No	153	66.5
	I prefer not to say	8	3.5
How long did you wait before going to the hospital?	No delay time	152	66.1
	1-6days	7	3.1
	1-4weeks	18	7.8
	1- 4months	27	11.7
	4-8months	15	6.5
	>8months	11	4.8
Which test did you do for your diagnosis?	Breast Ultrasound	24	10.4
	Biopsy	162	70.4
	Mammogram	28	12.2

	Don't know	16	7
At what stage was your breast cancer diagnosed?	Stages 0 and I	28	12.2
	Stages II and III	101	43.9
	Stage 4	101	43.9
Is this your first case of breast cancer?	Yes	199	86.5
	No	16	7
	I prefer not to say	15	6.5
Which treatment are you currently undergoing?	Chemotherapy	56	24.3
	Surgery	22	9.6
	Radiotherapy	91	39.6
	Use of drugs	26	11.3
	Do not know	26	11.3
	Hormone therapy	8	3.5
	No current treatment	1	0.4
Which treatment have you undergone?	Surgery	116	50.3
	Chemotherapy	61	26.6
	Radiotherapy	18	7.7
	Use of drugs	16	6.8
	No previous treatment	12	5.3
	Do not know	6	2.6
	Hormone therapy	2	0.9
Did you do chemotherapy before surgery?	Yes	101	43.9
	No	113	49.1
	I prefer not to say	16	7
Have you ever refused treatment at some point?	Yes	35	15.2
	No	183	79.6
	I prefer not to say	12	5.2
Do you buy your medication for treatment by yourself?	Yes	157	68.2
	No	56	24.4
	I prefer not to say	17	7.4
Where do you buy your medications?	Outside Pharmacy	126	55
	Hospital Pharmacy	68	29.5
	I prefer not to say	36	15.5
How long have you been undergoing treatment?	1-4weeks	7	3
	5weeks-4months	30	13
	5-8months	54	23.5
	9-12 months	14	6.1
	13months-4years	27	11.7
	>4years	4	1.7
	I prefer not to say	94	41
How affordable is your medication/treatment?	Affordability	26	11.4
	Expensive	113	49.1
	Very Expensive	71	31
	I prefer not to say	20	8.5
Is there any improvement as you undergo treatment?	Yes	185	80.2
	No	29	12.8
	I prefer not to say	16	7

7.16.5 Perceptions and Socio-Cultural Factors of Respondents

Data was collected and analyzed to assess the participants' perceptions and the possible impact of sociocultural factors on their breast cancer management. The questions were on the Likert scale with options for the participants to tick. Table 11 shows the respondents' perceptions and socio-cultural factors. More than two-fifths of the respondents disagreed that breast cancer affects their relationship with their partner. Less than two-fifths of the respondents disagreed that having breast cancer will affect their body image as women. About 36.1% of the respondents disagreed on the impact of religion on their breast cancer treatment and management. More than half of the respondents disagreed that traditions and culture affect their breast cancer treatment and management. More than two-fifths of the respondents disagree that having breast cancer has anything to do with God. About 62.2% of the respondents disagreed with seeking traditional help before going to the hospital. About two-fifths of the respondents agreed to have sought religious and spiritual help as divine intervention, and (63%) of the respondents never sought help through online supplement consumption. About 82.2% of the respondents agreed that breast cancer is curable if breast cancer is curable. About 70% of the respondents were highly satisfied with the support they received from their families, with few (31.3%) of the respondents being highly satisfied with the support they received from their local communities. More than half of the respondents were highly satisfied with their treatment. See table 11 below for more detail.

Table 11: Frequency of respondents' perception and sociocultural factors among respondents

	Variables	N(230)	%
Having breast cancer affects my relationship with my spouse/Partner	Agree	57	24.8
	Undecided	66	28.7
	Disagree	107	46.5
Breast cancer treatment affected how I feel like a woman (body image)	Agree	68	29.6
	Undecided	71	30.9
	Disagree	91	39.5
Religion affects my breast cancer treatment	Agree	72	31.3
	Undecided	75	32.6
	Disagree	83	36.1
Culture and tradition affect my breast cancer treatment	Agree	18	7.9
	Undecided	93	40.4
	Disagree	119	51.7
Having or not having breast cancer has something to do with God	Agree	37	16.1
	Undecided	86	37.4
	Disagree	107	46.5
	Agree	39	17

I sought traditional help before reporting to the hospital	Undecided	48	20.8
	Disagree	143	62.2
I sought my spouse's permission before reporting to the hospital	Agree	102	44.3
	Undecided	43	18.7
	Disagree	85	37
I sought religious and spiritual help before reporting to the hospital?	Agree	94	40.9
	Undecided	52	22.6
	Disagree	84	36.5
I sought self-help via buying online supplement drugs before reporting to the hospital	Agree	34	14.8
	Undecided	51	22.2
	Disagree	145	63
How satisfied are you with the support you receive from your family?	Satisfied	50	21.8
	Highly satisfied	161	69.9
	Neither satisfied nor Dissatisfied	13	5.6
	Dissatisfied	3	1.3
	Highly dissatisfied	3	1.4
How satisfied are you with the support you receive from your society/community?	Satisfied	58	25.2
	Highly satisfied	72	31.3
	Neither satisfied nor Dissatisfied	67	29.1
	Dissatisfied	26	11.3
	Highly dissatisfied	7	3.1
How satisfied are you with your breast cancer treatment?	Satisfied	56	24.4
	Highly satisfied	133	57.7
	Neither satisfied nor Dissatisfied	29	12.7
	Dissatisfied	7	3
	Highly dissatisfied	5	2.2

7.15.6 Measurement of Quality of life among Respondents

Table 12 shows the quality of life among respondents. On the level of pain and aches reported by respondents, 47.7% felt good. Also, above 50% reported having a good sleep. More than half of the respondents think their overall physical health is poor, with about 43% finding it good to cope due to treatment. About 54% of the respondents feel their quality of life is poor, with many (61.4%) of the respondents feeling not happy. About 60% of the respondents feel good about the level of their illness. However, about 77% of the respondents don't feel hopeful about their life.

Table 12: Frequency distribution measuring the quality of life among respondents

	Variables	n (230)	%
Having Aches and Pain	Agree	65	28.2
	Neutral	55	24.1
	Disagree	110	47.7
Sleep Change	Agree	46	19.8
	Neutral	47	20.5
	Disagree	118	51.1
Overall Physical Health	Good	49	21.4
	Fair	58	25.3
	Poor	123	53.3
Difficulty in coping as a result of treatment	Good	99	43
	Fair	62	26.8
	Poor	69	30.2
Good quality of life	Good	30	13
	Fair	75	32.6
	Poor	125	54
The level of happiness you feel	Good	21	3
	Fair	67	29.3
	Poor	141	61.4
To what extent are you fearful of your illness	Good	138	59.9
	Fair	40	17.3
	Poor	52	22.8
The extent to which your treatment has affected your employment	Good	105	45.7
	Fair	51	22.3
	Poor	74	32
To what extent has the treatment affected your work at home	Good	119	51.5
	Fair	42	18.4
	Poor	69	30.1
How much isolation do you feel is caused by your illness	Good	165	71.9
	Fair	34	14.7
	Poor	31	13.4
The level of your concern for your daughter or any of your female relatives	Good	102	44.3
	Fair	41	18
	Poor	87	37.7
How meaningful is your participation in religious activities	Very good	45	19.6
	Fair	21	9
	Poor	164	71.4
The level of your spiritual life after being diagnosed of breast cancer	Very good	38	16.3
	Fair	36	15.7
	Poor	156	68
How hopeful do you feel	Very good	19	8.3
	Fair	35	15.2
	Poor (not hopeful)	176	76.5

7.16.7 Multicollinearity result

Multicollinearity analysis was carried out on the independent variables in the study using the following tests: Value of Tolerance, Variance Inflation Factor (VIF), tolerance value, Condition index and correlation analysis. The results from the multicollinearity tests showed no severe correlation among the independent variables (predictors); hence, none was removed. See table 12 below for details.

Table 13: Multicollinearity test results

Variables		Collinearity		Condition index	Pearson Correlation
		Tolerance	VIF		
Sociodemographic characteristics	Age	0.98	1.02	6.06	1
	Gender	0.98	1.02	10.639	0.12
	Religion	0.99	1.01	24.78	0.07
Socioeconomic factors	Highest level of education attained	0.850	1.18	3.88	1
	Current employment status	0.995	1.01	6.19	0.04
	Monthly Income level	0.847	1.18	11.91	1
Cultural belief	Culture and tradition affect my breast cancer treatment	0.79	1.27	7.82	1
	Sought traditional help	0.79	1.27	9.56	0.46
Religious belief	Religion affects my breast cancer treatment	0.923	1.08	5.63	1
	Sought for religious/spiritual help	0.86	1.17	6.53	0.24
	Having or not having breast cancer has something to do with God	0.87	1.16	9.22	0.22
Alternative treatments	Sought traditional help	0.90	1.11	8.45	0.16
	Sought religious help	0.91	1.10	5.50	0.15
	Sought for self help	0.96	1.04	2.25	1
Family and societal support	Family support	0.94	1.07	6.45	1
	Societal support	0.94	1.07	9.78	0.25
Marital status	Marital status	0.92	1.09	4.037	1
	Sought for spouse's permission before reporting to the hospital	0.92	1.09	5.45	0.29

7.16.8 Crosstabulation results on the independent and dependent variables.

Table 14 below shows the result of the crosstabulation. The crosstabulation was performed between the independent and dependent variables. As discussed below, some independent variables showed a significant association with the dependent variables.

The association of the independent variables on health-seeking behaviour was tested. The result showed a statistically significant association between *'satisfaction with family support'* and participants' '*health-seeking behaviour'* (p-value at 0.016; X^2= 9.04). Also, there was a statistical association between participants' '*religion'* and their '*health-seeking behaviour*' (p-value of 0.002).

On the association between the independent variables and quality of life, there was statistical significant association between the following variables: '*Culture and tradition affect my breast cancer treatment*' and '*quality of life'* (p-value at 0.024; X^2= 11.26), *'I sought for traditional help before reporting at the hospital'* and '*quality of life*' (p-value at <0.001; X^2= 21.14), *'religion affects my breast cancer treatment'* and '*quality of life'* (p-value at 0.047; X^2= 9.65), '*I sought for spiritual/religious help before reporting at the hospital'* and '*quality of life*' (p-value<0.001; X^2= 24.78), *'I sought for my spouse's permission before reporting at the hospital'* and *'quality of life'* (p-value at <0.001; 21.26), *'breast cancer stage at diagnosis'* and *'quality of life'* (p-value at 0.001;), *'satisfaction with societal/community support'* and *'quality of life'* (p-value at 0.010; X^2= 9.3) and *'I sought for self-help via buying online supplement drugs before reporting at the hospital'* and '*quality of life'* (p-value at 0.000; 29.37).

Table 14: Descriptive table on crosstabulation of independent and dependent variables

		Health-Seeking Behaviours n(%) p-value			**Quality of life n(%) and p-value**			
		Good	Poor	p-value	Good	Fair	Poor	p-value
Religion	Christian	157(92.4)	13(7.6)	0.002 *	49(28.7)	63(36.8)	59(34.5)	0.300
	Islam	51(91.1)	5(8.9)		12(21.4)	17(30.4)	27(48.2)	
	Others	1(33.3)	2(66.7)		0(0)	1(33.3)	2(66.7)	
Age	Less than 40 years	27(93.1)	2(6.9)	0.203	10(34.5)	10(34.5)	9(31)	0.485
	40 – 59 years	139(92.1)	12(7.9)		44(29.1)	52(34.4)	55(36.5)	
	60 years and above	42(84)	8(16)		9(18)	18(36)	23 (46)	
Gender	Male	11(91.6)	1(8.4)	0.720	4(33.3)	2(16.7)	6(50)	0.350
	Female	199(91.3)	19(8.7)		57(26.3)	78(35.9)	82(37.8)	
The highest level of	Postgraduate education	20(95.2)	1(4.8)	0.660	6(28.6)	6(28.6)	9(42.8)	0.99

education attained	Tertiary education	106(89.8)	12(10.2)		31(26.3)	43(36.4)	44(37.3)	
	Secondary education	52(92.9)	4(7.1)		16(28.6)	17(30.4)	23(41.0)	
	Primary education	19(90.5)	2(9.5)		5(23.8)	9(42.9)	7(33.3)	
	No formal education	13(86.7)	1(13.3)		3(21.4)	5(35.7)	6(42.9)	
Marital status	Married	147(90.1)	16(9.9)	0.141	43(26.5)	57(35.1)	63(38.4)	0.943
	Single	19(100)	0(0)		5(26)	8(40.6)	6(33.4)	
	Widowed	37(97.1)	1(2.9)		12(31.4)	10(27)	16(41.6)	
	Divorced /Separated	7(70)	3(30)		1(10.4)	5(53.1)	4(36.5)	
Current employment status	Unemployed	15(100)	0(0)	0.231	4(26.7)	6(41.3)	5(32)	0.197
	Employed	87(93.5)	6(6.5)		35(37.6)	29(30.9)	29(31.5)	
	Self-employed	90(87.4)	13(12.6)		20(19.4)	41(39.8)	42(40.8)	
	Retired	18(94.7)	1(5.3)		2(10.5)	5(26.3)	12(63.2)	
Monthly Income	<₦18000	29(87.3)	4(12.7)	0.446	4(13.3)	15(46.4)	13(40.3)	0.183
	₦18000-50000	76(95.8)	3(4.2)		20(24.6)	26(32.9)	34(42.7)	
	₦50001-₦100000	56(91.1)	6(8.9)		17(27.6)	21(33.3)	24(39.1)	
	₦100001-₦300000	29(85.1)	5(14.9)		10(29.5)	12(34.8)	12(35.6)	
	>₦3000001	19(91.1)	2(8.9)		10(47.9)	6(30)	5(2.1)	
Culture and tradition affect my breast cancer treatment	Agree	16(88.9)	2(11.1)	0.804	4(22.2)	6(33.3)	8(44.4)	0.024*
	Neutral	84(90.3)	9(9.7)		32(34.6)	23(24.2)	38(41.2)	
	Disagree	110(92.4)	9(7.6)		25(21)	52(43.6)	42(35.4)	
I sought traditional help before reporting to the hospital	Agree	34(87.2)	5(12.8)	0.464	9(23.1)	10(26.4)	20(50.5)	<0.001*
	Neutral	43(89.6)	5(10.4)		25(52.5)	13(26.3)	10(21.2)	
	Disagree	133(93)	10(7)		27(18.9)	58(40.2)	59(40.9)	
Religion affects my breast cancer treatment	Agree	67(93.1)	5(6.9)	0.722	13(17.3)	31(42.6)	28(39.3)	0.047*
	Neutral	67(89.3)	8(10.7)		26(34.9)	18(23.5)	31(41.6)	
	Disagree	76(91.6)	7(8.4)		22(26.5)	32(38.7)	29(34.8)	

I sought religious and spiritual help before reporting to the hospital	Agree	83(88.3)	11(11.7)	0.251	23(24.5)	35(37.3)	36(38.2)	<0.01*
	Neutral	47(90.4)	5(9.6)		26(50.4)	14(27)	12(22.6)	
	Disagree	80(95.2)	4(4.8)		12(14.3)	31(37.3)	41(48.4)	
Having or not having breast cancer has something to do with God	Agree	32(86.5)	5(13.5)	0.493	12(32.4)	9(24.6)	16(43)	0.378
	Neutral	80(93)	6(7)		25(29.3)	31(36.5)	29(34.2)	
	Disagree	98(91.6)	9(8.4)		24(22.4)	40(37.3)	43(40.3)	
I sought my spouse's permission before reporting to the hospital	Agree	96(94.1)	6(5.9)	0.125	18(17.6)	37(36.3)	47(46.1)	<0.001*
	Neutral	36(83.7)	7(16.3)		22(51.2)	8(18.6)	13(30.2)	
	Disagree	78(91.8)	7(8.2)		21(24.7)	35(41.2)	29(34.1)	
Breast cancer stage at diagnose	Stage 0 and I	26(92.9)	2(7.1)	0.310	12(19.7)	8(10)	8(9)	<0.001*
	Stage II and III	95(94.1)	6(5.9)		37(60.6)	28(35)	36(40.5)	
	Stage IV	89(88.1)	12(11.9)		12(19.7)	44(55)	45(50.5)	
Satisfaction with family support	Satisfied	195(92.9)	15(7.1)	0.016*	53(25.3)	76(36.1)	81(38.6)	0.378
	Dissatisfied	14(73.8)	5(26.2)		8(42.9)	5(24.1)	6(33)	
Satisfaction with societal/community support	Satisfied	121(93.1)	9(6.9)	0.197	45(34.6)	42(32.5)	43(32.9)	0.010*
	Dissatisfied	89(89)	11(11)		16(16.2)	38(38.1)	46(45.7)	
I sought self-help via buying online supplement drugs before reporting to the hospital	Agreed	30(88.2)	4(11.8)	0.632	8(23.5)	5(14.1)	21(62.7)	0.000*
	Undecided	45(88.2)	6(11.8)		26(51.4)	11(22.2)	14(26.4)	
	Disagree	135(93.1)	10(6.9)		27(18.6)	64(44.4)	54(37)	

*Statistically significant

7.16.9 Univariable regression results

7.16.9.1 Quality of life

Univariable multinomial regression models with quality of life as the outcome variable showed a statistically significant association with the following independent variables: *monthly income*, *current employment status, breast cancer stages at diagnosis, satisfaction with societal support, I sought religious and spiritual help before reporting to the hospital, I sought for self-help via buying online supplement drugs before reporting at the hospital, Culture and tradition affect my breast cancer treatment*, and *I sought for traditional help before reporting at the hospital.* See table 15 for the estimates of the univariable models.

Participants with a '*monthly income*' of less than ₦18,000.00 are 85% less likely to have a good *quality of life* when compared to participants that earn a monthly income of ₦300,000.00 and above (OR: 0.15; CL: 0.03-0.79; p-value: 0.026).

On the *current employment status* of the participants, the likelihood of having a good *quality of life* was more among the employed participants than among the retired participants (OR: 4.33; CL: 1.09 – 17.18; p-value: 0.037).

Participants at *stages 0 and I at diagnosis* were about five times more likely to have a good *quality of life* when compared to participants at *breast cancer stage IV* at diagnosis (OR: 5.69; CL: 1.85 – 17.51; p-value: 0.002). A similar association was observed in *breast cancer stages II and III* at diagnosis (OR: 3.81; CL: 1.73-8.40; p-value 0.001).

The likelihood of having a good *quality of life* was more among participants '*satisfied with the level of societal/community support'* they received during their illness compared to those '*dissatisfied with the societal/community support'* they received (OR: 2.98; CL: 1.45-6.09; p-value 0.003).

Concerning the importance of seeking spiritual help for their breast cancer, the likelihood of having a good quality of life is higher among participants who reported neutral when compared to participants who disagreed (OR: 7.57, CL: 2.88-19.89; p-value 0.001).

Participants that reported neutrality regarding the use of *'self-help via buying online supplement drugs before reporting at the hospital*' were almost four times more likely to have a good *quality of life* than participants that disagreed (OR: 3.72; CL: 1.64-8.43; p-value 0.002). Also, an association was observed on fair *quality of life* among participants that agreed to '*seeking self-help via buying online supplement drugs before reporting at the hospital'*. Participants who agreed to 'self-help via buying online supplement drugs before reporting at the hospital' were 82% less likely to have a 'fair quality of life' compared to participants who disagreed (OR: 0.18; CL: 0.60-0.55; p-value 0.003).

Participants who neither agreed nor disagreed on '*culture and tradition affect my breast cancer treatment experience'* were 97% less likely to have a fair quality of life when compared to participants that disagreed (OR: 0.03; CL: 0.24-0.94; p-value 0.032). Conversely, among participants who agreed that 'culture and tradition affect my breast cancer treatment', no statistically significant association was recorded on fair quality of life (OR: 0.61; CL: 0.18- 2.000; p-value 0.80).

Participants who reported neutral on *'seeking for traditional help before reporting at the hospital'* were five times more likely to a have a *good quality* of life when compared to those that did not seek *'traditional help before reporting at the hospital'* (OR: 5.37; CL: 2.23; p-value < 0.01).

Independent variables on *age, gender, place of residence, the highest level of education attained, religion affects my breast cancer treatment, satisfaction with family support, I sought permission from my spouse before going to the hospital, and marital status* were not statistically significant when regressed with the dependent variable on quality of life.

Table 15: Multinomial logistics regression table on factors associated with quality of life among respondents.

Variables		**Quality of life**				
		Good		Fair		Poor
		OR (95%CI)	p-value	OR (95%CI)	p-value	(Ref)
Age	20-39 years	3.29(0.96-11.30)	0.06	1.42(0.45-4.45)	0.55	1
	40-59 years	2.140(0.86-5.31)	0.10	1.13(0.54-2.41)	0.74	1
	60-99 years (Ref)	0		0		
Gender	Male	0.96(0.26-3.56)	0.95	0.35(0.068-1.79)	0.21	1
	Female (Ref)	0		0		1
Religion	Christians	2.04(0.94-.44)	0.07	1.815(0.89-3.69)	0.10	1
	Non-Christians (Ref)	0		0		1
Place of residence	Eastern region	0.43(0.04-5.09)	0.50	1.69(0.36-7.85)	0.50	1
	Middle Belt region	0.20(0.03-2.31)	0.24	0.97(0.21-4.50)	0.97	1
	Northern region	4.81(0.49-47.60)	0.18	2.84(0.24-34.01)	0.41	1
	Southern region	1.71(0.52-5.63)	0.38	1.53(0.45-5.14)	0.49	1
	Western region(Ref)	0		0		1
Highest level of education attained	Postgraduate	1.19(0.20-7.15)	0.85	0.72(0.145-3.60)	0.69	
	Tertiary education	1.24(0.27-5.73)	0.78	1.02(0.28-3.72)	0.98	1
	Secondary education	1.25(0.25-6.21)	0.79	0.79(0.20-3.20)	0.74	1
	Primary education	1.23(0.19-7.69)	0.83	1.34(0.28-6.40)	0.71	1
	No formal education (Ref)	0	0	0	0	1
	<₦18000	0.15(0.03-0.79)	0.03*	0.835(0.18-3.90)	0.82	1

Monthly Income	₦18000-50000	0.26(0.07-1.00)	0.051	0.56(0.14-2.26)	0.41	1
	₦50001-₦100000	0.32(0.08-1.28)	0.11	0.62(0.15-2.62)	0.51	1
	₦100001-₦300000	0.38(0.09-1.66)	0.20	0.71(0.14-3.57)	0.67	1
	>₦3000001(Ref)	0	0	0	0	1
Current employment status	Unemployed	3.03(0.47-19.50)	0.24	2.79(0.511-15.2)	0.24	1
	Employed	4.33(1.09-17.16)	0.04*	2.11(0.61-7.32)	0.24	1
	Self-employed	1.60(0.40-6.46)	0.51	2.01(0.58-6.88)	0.270	1
	Retired(Ref)	0	0	0	0	1
Culture and tradition affect my breast cancer treatment	Agree	0.84(0.228-3.123)	0.800	0.61(0.18-2.00)	0.412	1
	Neutral	1.42(0.71-2.81)	0.319	0.03(0.24-0.94)	0.032*	1
	Disagree(Ref)	0		0		1
I sought traditional help before reporting to the hospital	Agree	0.99(0.40- 2.47)	0.983	0.53(0.22-1.27)	0.154	1
	Neutral	5.37(2.23-12.94)	<0.01*	1.26(0.48-3.30)	0.641	1
	Disagree(Ref)	0		0		1
Religion affects my breast cancer treatment	Agree	0.60(0.25-1.43)	0.252	0.977(0.47-2.04)	0.950	1
	Neutral	1.10(0.52-2.36)	0.801	0.51(0.23-1.12)	0.093	1
	Disagree(Ref)	0		0		1
I sought for religious and spiritual help before reporting to the hospital	Agree	2.17(0.94-5.00)	0.068	1.27(0.64-2.51)	0.489	1
	Neutral	7.57(2.88-19.89*)	<0.001*	1.55(0.58-4.15))	0.388	1
	Disagree (Ref)	0	0	0	0	1
Level of satisfaction with family support	Satisfied	0.49(0.16-1.59)	0.24	1.29(0.29-5.64)	0.73	1
	Dissatisfied (Ref)	0	0	0	0	1
Level of satisfaction with society support	Satisfied	2.98(1.45-6.09) *	0.003*	1.19(0.62-2.29)	0.606	1
	Dissatisfied(Ref)	0		0	0	1
I sought self-help via buying online supplement drugs before reporting to the hospital	Agree	0.72(0.28-1.85)	0.50	0.18(0.60-0.55)	0.003*	1
	Neutral	3.72(1.64-8.43)	0.002*	0.67(0.27-1.69)	0.398	1
	Disagree(Ref)	0	0	0		1
Stage of breast cancer at diagnosis	Stage 0 and 1	5.69(1.85-17.51	0.002*	1.08(0.34-3.40)	0.901	1
	Stage 2 and 3	3.82(1.73-8.40)	<0.001*	0.81(0.42-1.56)	0.531	1
	Stage 4(Ref)	0	0	0	0	

I sought for my spouse's permission before reporting at the hospital	Agree	0.53(0.24-1.15)	0.108	0.65(0.33-1.26)	0.200	1
	Neutral	2.31(0.94-5.67))	0.068	0.47(0.16-1.43)	0.186	1
	Disagree(Ref)	0	0	0	0	1
Marital status	Married	2.39(0.244-23.41)	0.45	0.63(0.14-2.83)	0.56	1
	Single	2.75(0.21-36.67)	0.44	0.85(0.14-5.31)	0.87	1
	Widowed	2.62(0.25-27.82)	0.43	0.45(0.08-2.42)	0.35	1
	Divorced/Separated (Ref)	0	0	0	0	1

7.16.9.2 Health-seeking behaviour

Univariable binary regression models with health-seeking behaviour as the outcome variable showed a statistically significant association between the '*level of satisfaction with family support'* received by participants and the participants *'religion'*. See table 16 for the estimates of the univariable models.

The likelihood of having good health-seeking behaviour was 78% less among participants satisfied with the level of family support they received during their illness than those dissatisfied with the *level of family support* they received (OR: 0.22; CL: 0.07-0.68; p-value 0.009).

Participants with *Islam religion* are more likely to have a *good health-seeking behaviour* when compared to those of *Christian religion* (OR: 10.28; CL: 4.11-25.75; p-value <0.001). On the other hand, a negative association was observed among participants with *other religions*, as they were 43% less likely to have a *good health-seeking behaviour* when compared to those of the *Christian faith* (OR: 0.57; CL:0.05-6.31; p-value 0.65).

Variables on the *monthly income, the highest level of education attained, current employment status, breast cancer stages at diagnosis, sought for self-help via buying online supplement drugs before reporting at the hospital, level of satisfaction with societal/community support, sought for my spouse's permission before reporting at the hospital, Religion affects my breast cancer treatment and Culture and tradition affect my breast cancer treatment, sought for religious and spiritual help before reporting to the hospital, I sought for traditional help before reporting at the hospital, and marital status* were not statistically significantly associated with health-seeking behaviour in the unadjusted model. Hence, they were not considered to fit the multivariable regression.

Table 16: Binary Regression table on factors associated with Health-seeking

	Variables	Health seeking Behaviour			
		Good			Poor
		OR	95% CI	p-value	
Age	20-39years (Ref)	0	0	0	1
	40-59years	0.97	0.20-4.61	0.964	1
	60-99years	0.46	0.09-2.39	0.357	1
Gender	Male(Ref)	0	0	0	1
	Female	0.95	0.12-7.78	0.964	1
Religion	Christians ((Ref)	0	0	0	1
	Islam	10.28	0.001*	4.11-25.75	1
	Others	0.57	0.650	0.05-6.31	1
Your highest level of education attained	Postgraduate (Ref)	0	0	0	1
	Tertiary education	0.45	0.06-3.67	0.455	1
	Secondary education	0.59	0.06-5.64	0.646	1
	Primary education	0.44	0.04-5.28	0.520	1
	No formal education	44605.8	0000	0.999	1
Monthly income	<₦18000(Ref)	0	0	0	1
	₦18000-50000	3.36	0.70-16.23	0.131	1
	₦50001-₦100000	1.49	0.36-6.20	0.587	1
	₦100001-₦300000	0.83	0.19-3.55	0.800	1
	>₦3000001	1.49	0.22-9.98	0.677	1
Current employment status	Unemployed(Ref)	0	0	0	1
	Employed				1
	Self-employed				1
	Retired				1
Culture and tradition affect my breast cancer treatment	Agree(Ref)	0	0	0	1
	Neutral	1.17	0.23-5.91	0.852	1
	Disagree	1.53	0.30-7.72	0.608	1
I sought for traditional help before reporting at the hospital	Agree(Ref)	0	0	0	1
	Neutral	1.27	0.34-4.73	0.727	1
	Disagree	1.96	0.63-6.10	0.248	1
Religion affects my breast cancer treatment	Agree (Ref)	0	0	0	1
	Neutral	0.63	0.19-2.01	0.43	1
	Disagree	0.81	0.25-2.67	0.73	1
I sought religious and spiritual help	Agree (Ref)	0	0	0	1
	Neutral	1.25	0.41-3.80	0.70	1
	Disagree	2.65	0.81-8.67	0.10	1

before reporting to the hospital					
Level of satisfaction with family support	Dissatisfied (Ref)	0	0	0	1
	Satisfied	0.22	0.07-0.68	0.009	1
Level of Satisfaction with societal/community support	Dissatisfied (Ref)	0	0	0	1
	Satisfied	0.60	0.24-1.51	0.281	1
I sought for self-help via buying online supplement drugs before reporting at the hospital	Agree(Ref)	0	0	0	1
	Neutral	1.00	0.26-3.85	1.00	1
	Disagree	1.77	0.52-6.04	0.36	1
Stage of breast cancer at diagnosis	Stage 0 and 1(Ref)	0	0	0	1
	Stage 2 and 3	1.22	0.23-6.39	0.82	1
	Stage 4	0.57	0.12-2.71	0.48	1
I sought for my spouse's permission before reporting at the hospital	Agree(Ref)	0	0	0	1
	Neutral	0.32	0.10-1.02	0.054	1
	Disagree	0.69	0.23-2.16	0.53	1
Marital status	Married(Ref)	0	0	0	1
	Single	7487	0000	0.999	1
	Widowed	3.82	0.49-29.91	0.202	1
	Divorced/Separated	0.34	0.07-1.69	0.186	1

7.16.10 Multiple regression: Quality of life.

Covariate variables significant in the univariable models (*participants' breast cancer stage at diagnosis, satisfaction with the level of societal/community support, sought for religious and spiritual help before reporting to the hospital, sought for self-help via buying online supplement drugs before reporting to the hospital Culture and tradition affect my breast cancer treatment, and sought for traditional help before reporting at the hospital)* were regressed on quality of life in a multiple regression model; while adjusting for confounders (*age* and *gender*).

In testing for the multinomial goodness-of-fit, the omnibus model coefficient tests using chi-square were tested. The omnibus tests of model coefficient using chi-square showed a statistically significant association $X^2(3,230)=397.87$, $p<0.136$. This result of statistically significant, which means that the model is fit for the data.

The pseudo-R-square presented the following results: Cox and Snell 0.339 and Nageikerke 0.382. This means that the independent variables explain 34% and 38% of the variance in the dependent variable. Independent variables that were significant at multiple multinomial regression on the quality of life *were 'breast cancer stage at diagnosis, 'sought for religious and spiritual help before reporting to the hospital' and 'sought for self-help via buying online supplement drugs before reporting at the hospital'.*

On the findings on *breast cancer stage at diagnosis* and *quality of life,* the likelihood of having a good *quality of life* was four-times more among participants with *breast cancer stages 0 and I at diagnosis* when compared to those at *stage 4 at diagnosis* (OR: 5.31; CL: 1.09-25.76; p-value 0.039). A similar positive association was evident among participants at *breast cancer stages 2 and 3 at diagnosis*. Participants with *breast cancer stages II and III at diagnosis* are more likely to have a *good quality of life* when compared to participants with *breast cancer stage IV at diagnosis* (OR: 2.71; CL: 1.01-7.25; p-value 0.047).

In seeking '*religious and spiritual help before reporting to the hospital*' for their breast cancer, the likelihood of having a good *quality of life* is higher among participants who agreed than those who said disagreed (OR: 3.02; CL: 1.05-8.70; p-value 0.041). This result is similar to that of participants that reported being neutral. Participants that reported neutral on 'sought for *religious and spiritual help before reporting to the hospital'* were four times more likely to have a good quality of life when compared to participants that disagreed (OR: 5.21; CL: 1.52-17.89; p-value 0.009).

Participants that agreed *to 'sought self-help via buying online supplement drugs before reporting at the hospital'* are 89% less likely to have a *fair quality of life* when compared to participants who disagreed (OR: 0.11; CL: 0.03-0.49; p-value 0.004).

In summary, the effect of most of the covariates was significant in univariable models (*participants' 'breast cancer stage at diagnosis, 'sought for religious and spiritual help before reporting to the hospital', and 'sought for self-help via buying online supplement drugs before reporting at the hospital')* on quality of life remained significant in the multiple regression model. The direction of their effect remained the same as in the univariable model, with some differences in the effect size in some instances (*breast cancer stage at diagnosis – stages 0 and I* (OR: 5.69; aOR: 5.31), *stages II and III* (OR: 3.82; aOR: 2.71); *sought for religious and spiritual help before reporting to the hospital* (neutral response OR:7.57; aOR:5.21); and *sought for self-help via buying online supplement drugs before reporting at the hospital* (OR: 0.18; aOR:0.11). Each of these independent variables significant in the multiple regression is expected to positively impact the quality of life after controlling for other variables in the model.

Table 17: Multiple Multinomial Regression table on factors associated with quality of life among respondents.

Variables		**Quality of life**				
		Good		Fair		Poor
		OR (95%CI)	p-value	OR (95%CI)	p-value	(Ref)
Age	<40	2.55(0.49-13.35)	0.269	1.04(0.24-4.53)	0.954	1
	40-59	1.31(0.37-4.66)	0.681	0.74(0.27-2.02)	0.557	1
	≥60 (Ref)	0		0		
Gender	Male	0.43(0.07-2.69)	0.363	0.19(0.03-1.35)	0.090	1
	Female (Ref)	0		0		1
Monthly Income	<₦18000	0.35(0.04-3.45)	0.370	0.49(0.66-3.61)	0.481	1
	₦18000-50000	0.53(0.09-3.09)	0.477	0.42(0.07-2.57)	0.350	1
	₦50001-₦100000	0.33(0.58-1.89)	0.216	0.46(0.08-2.63)	0.381	1
	₦100001-₦300000	0.39(0.06-2.42)	0.310	0.46(0.07-2.95)	0.414	1
	>₦3000001(Ref)	0	0	0	0	1
Current employment status	Unemployed	2.02(0.15-26.68)	0.593	3.89(0.48-31.38)	0.202	1
	Employed	4.15(0.57-30.01)	0.159	2.87(0.59-13.83)	0.196	1
	Self-employed	1.73(0.25-12.42)	0.579	2.86(0.59-13.83)	0.192	1
	Retired(Ref)	0	0	0	0	1
Culture and tradition affect my breast cancer treatment	Agree	0.71(0.14-3.75)	0.691	0.73(0.17-3.11)	0.670	1
	Neutral	0.47(0.16-1.38)	0.170	0.41(0.17-1.02)	0.055	1
	Disagree(Ref)	0		0		1
I sought for traditional help before reporting at the hospital	Agree	1.18(0.29-4.68)	0.817	2.06(0.56-7.53)	0.275	1
	Neutral	4.10(0.81-20.81)	0.088	4.9(0.93-25.95)	0.061	1
	Disagree(Ref)	0		0		1
I sought for religious and spiritual help before reporting to the hospital	Agree	3.02(1.05-8.70)	0.041*	1.65(0.72-3.80)	0.236	1
	Neutral	5.21(1.52-17.89)	0.009*	1.75(0.52-5.87)	0.362	1
	Disagree (Ref)	0	0	0	0	1
Level of satisfaction with society/community support	Satisfied	1.73(0.71-4.22)	0.233	1.36(0.61-3.07)	0.454	1
	Dissatisfied(Ref)	0		0	0	1
I sought for self-help via buying online supplement drugs before reporting at the hospital	Agree	0.45(0.11-1.80)	0.262	0.11(0.03-0.49)	0.004*	1
	Neutral	1.07(0.22-5.35)	0.931	2.73(0.06-1.33)	0.109	1
	Disagree(Ref)	0	0	0		1
Stage of breast cancer at diagnosis	Stage 0 and 1	5.31(1.09-25.75)	0.039*	1.39(0.28-6.81)	0.684	1
	Stage 2 and 3	2.71(1.01-7.25)	0.047*	0.64(0.27-1.51)	0.307	1
	Stage 4(Ref)	0	0	0	0	1

7.16.11 Multiple binary regression: Health-seeking behaviour

Covariate variables significant in the univariable models (*satisfaction with family support* and *religion*) were regressed on *health-seeking behaviour* in a multiple binary regression model.

The model summary produced results on the Cox and Snell R^2 (0.186) and Nagelkerke R^2 (0.248), implying that between 19% and 25% of the variance in the dependent variable is explained in the model by the independent variables.

The ominibus tests of model coefficient using chi-square presented a statistically significant association $X^2(3,230)=47.22$, $p<0.001$. This result of statistically significant means that the model is fit for the data.

From the multiple binary regression results on the outcome of *health-seeking behaviour*, only *religion* remained statistically significant. Participants with the *Islamic faith* are nine times more likely to have *a good health-seeking behaviour* when compared with the *Christian participants* (OR: 9.68; CI: 3.85-24.33; p-value: <0.001). On the other hand, there was no statistically significant association on participants with other religions compared with the *Christian religion* (OR: 0.35; CI: 0.03-4.78; p-value: 0.431).

Although *satisfaction with family support* was statistically significant in univariate analysis, this was not statistically significant in multivariate analysis (OR: 2.11; CI: 0.65-6.84; p-value: 0.214).

The covariate- *religion (Islam)* on health-seeking behaviour remained significant in the multiple binary regression model. The direction of the effect remained the same as in the univariable model with a difference in the effect size (*religion Islam* - OR: 10.28; aOR: 9.68). The independent variable *religion was statistically significant in the multiple regression and is expected to positively impact* the *health-seeking behaviour* of participants after controlling for other variables in the model.

Table 18: Multiple regression: Health-seeking behaviour.

Variables		**Health-seeking behaviour**			
		p-value	**OR**	**95% confidence interval**	
				Lower	**Upper**
Satisfaction with the level of family support	Dissatisfied(Ref)	0	0	0	0
	Satisfied	0.214	2.11	0.65	6.84
Religion	Christian(Ref)	0	0	0	0

	Islam	<0.001	9.68	3.85	24.33
	Other	0.431	0.35	0.03	4.78

7.17 Hypothesis results

Association between socioeconomic status and their health-seeking behaviour.

Different indications were used to test this hypothesis on socioeconomic factors and health-seeking behaviour, as seen in table 14. Among the SEFs indicator, religion showed a statistically significant association with health-seeking behaviour (OR: 10.28; CL 4.11-25.75; p-value 0.001). Therefore, we fail to accept the null hypothesis from the presented result by rejecting it and accepting the alternative hypothesis.

$H_{A}1$: There is a statistically significant relationship between socioeconomic factors and Health-seeking behaviour.

Association between socioeconomic status and their quality of life.

Among the variable indicators for socioeconomic factors, as seen in table 14, *monthly income* (OR: 0.15; CL: 0.03-0.79; p-value 0.03) and *current employment status* (OR: 4.33; CL 1.09-17.16; p-value 0.04) showed a statistically significant relationship with quality of life. From this result, we reject the null hypothesis by accepting the alternative hypothesis as presented below:

$H_{A}2$: There is a statistically significant relationship between socioeconomic factors and the quality of life of breast cancer patients.

Association between sociocultural factors and participants' health seeking-behaviour.

One of the variable indicators for sociocultural factors- only the *level of satisfaction with family support*, showed a statistically significant relationship with *health-seeking behaviour* (OR: 0.22; CL 0.07-0.68; p-value 0.009). This result indicates a statistically significant association between sociocultural factors and health-seeking behaviours. Therefore, we conclude this test by rejecting the null hypothesis and accepting the alternative hypothesis as stated below:

$H_{A}3$: There is a statistically significant relationship between sociocultural factors and the health-seeking behaviour of breast cancer patients.

Association between sociocultural factors and participants' quality of life.

Some of the SCFs indicators showed statistically significant association with the quality of life of breast cancer patients in the study. These indicators include *'sought for traditional help before reporting at the hospital'*– (OR: 5.37; CL 2.23- 12.94; p-value 0.01); *'culture and tradition affect my breast cancer treatment'* - (OR:0.03; CL 0.24-0.94; p-value 0.03);'sought for spiritual help'- (OR: 7.57; CL: 2.88-19.89; p-value 0.001); '*sought for self-help via buying online supplement drugs before reporting at the hospital'*- (OR: 3.72; CL:1.64-8.43; p-value 0.002); and *'level of satisfaction with societal/community support'* - (OR: 2.98; CL 1.45-6.09; p-value0.003). From the above test results, it could be concluded that a statistically significant relationship between *sociocultural factors* and participants' *quality of life* was observed. We, therefore, reject the null hypothesis and accept the alternative hypothesis by restating as follows:

H_A4: There is a statistically significant relationship between sociocultural factors and participants' quality of life.

Association between participants' stage of breast cancer at diagnosis and their health-seeking behaviour.

This test showed no statistically significant association between participants' *stage of breast cancer at diagnosis* and their *health-seeking behaviour* (OR: 1.22; CL: 0.23-6.39 p-value 0.82) and (OR: 0.57; CL:
0.12-2.71; p-value 0.48). From the results presented here, We fail to reject the null hypothesis and conclude by stating thus:

$H_0$5: There is no statistically significant relationship between participants' stage of breast cancer at diagnosis and their health-seeking behaviour.

Association between participants' stage of breast cancer at diagnosis and their quality of life.

In testing the hypothesis on the association between participants' *stage of breast cancer at diagnosis* and their *quality of life*, a statistically significant association was reported (OR: 5.69; CL: 1.85-17.51; p-value 0.002) and (OR: 3.82; CL: 1.73- 8.40 p-value 0.001). With this, we reject the null hypothesis and accept the alternative hypothesis by making this conclusion and restating the hypothesis thus:

H_A6: There is a statistically significant association between the stage of breast cancer at diagnosis and their quality of life.

8.0 CHAPTER 8: DISCUSSION

8.1 Introduction

This chapter reiterates the research problem and objectives, summarises the key findings of this study and compares the results of this study with existing evidence. Also, this chapter addressed the strength and limitations of the study, practice, policy and implications of the study findings. Finally, this study's findings are discussed in the context of the research questions for clarity and better understanding.

8.2 Reiteration of the research problem and questions

Breast cancer is a significant global health issue affecting people from all world regions (WHO, 2022). Although previously considered the disease of the developed nations, developing countries like Nigeria face an increase in prevalence and mortality from breast cancer (Public health England, 2018; WHO, 2015). With the low survival rate, this increase in prevalence and mortality rates calls for attention (Ghoncheh et al., 2015; Sushma et al., 2017), especially in a context with limited data on the situation like Nigeria (Vanderpuye et al., 20017). Knowing that breast cancer has globally standardised treatment procedures leaves researchers with the question of the reason for the low survival and high mortality rates of breast cancer in Nigeria. The quest to understand the treatment experiences of breast cancer patients in Nigeria and possible factors that could interfere with their treatment and outcomes gave birth to this study. In addressing this issue in Nigeria, some researchers have reported poor breast cancer facilities, inadequate resources, and little attention on the impact of sociocultural on breast cancer treatment and outcomes. According to Tetteh and Faulkner (2018**),** sociocultural factors affect pre-and post-treatment experiences of patients. This study explored the treatment experiences of breast cancer patients in Nigeria, focusing on the impact of sociocultural factors on their treatment and outcomes.

This study answered the following research questions: what are the treatment experiences of breast cancer patients in Ibadan and Lagos, Nigeria? What are the possible sociocultural factors affecting Nigeria's breast cancer treatment and outcomes? Are there associations between the identified sociocultural factors (independent variables) and patients' treatment outcomes (dependent variables) in Ibadan and Lagos, Nigeria? Which of the identified sociocultural factors have the most significant association with breast cancer treatment outcomes in Ibadan and Lagos, Nigeria?

8.3 Summary of key findings

This exploratory mixed-method study explored breast cancer patient's treatment experiences in Nigeria with a focus on the impact of sociocultural factors on breast cancer treatment and outcomes. The results from the qualitative analysis identified religious beliefs, cultural beliefs, family support, social/community support, gender role, body image and alternative medicine as sociocultural factors that impact breast cancer treatment and outcomes in Nigeria. A survey was conducted to test the findings of the qualitative study on a larger population. The results from the qualitative research were significant for a larger population apart from the body image, which was not statistically significant in the quantitative study. These findings suggest that the identified SCFs could impact Nigeria's breast cancer treatment and outcomes. For improved breast cancer treatment and outcomes, the potential impact of sociocultural factors should be considered. The findings of this study closed the literature gap by providing evidence of the effects of sociocultural factors on breast cancer treatment and outcomes in Nigeria.

8.4 Comparison with existing literature

The findings of this study are compared with the existing works of literature on the research focus. Finally, this section is discussed in line with the research questions, as shown below.

8.4.1 What are the treatment experiences of breast cancer patients in Ibadan and Lagos, Nigeria?

Health service delivery limitation has been implicated in the survival rate of cancer disease in Africa (Galukande, Wabinga and Mirembe, 2015). Cost of treatment and distance of travelling to access treatment can bring about treatment interruption, which has been reported as a frequent occurrence in breast cancer treatment in Africa (Lukong, Ogunbolude & Kamdem, 2017; Mutebi et al., 2020). In a study of breast cancer treatment inequality in sub-Saharan Africa, Nigeria had the highest rate of untreated breast cancer patients than other nations such as Uganda and Namibia (Foerster et al., 2019). Evidence in this study was the refusal of some treatment options by breast cancer patients in Nigeria. Reasons for this refusal were both financial and personal, as reported in the result section of this work. Some treatment options were also refused due to prior experience with such treatment and its side effect (Joseph et al., 2012; Norsa'adah et al., 2012).

Prior studies show that cancer detection screening, such as Magnetic Resonance Imaging (MRI), ultrasound, and mammography screening provides high detection benefits in cancer screening (Berg et al., 2012). These screenings are not cheap; hence, the mammographic screening program in countries like the UK and the USA. These programs invite women of breast cancer age to periodic free breast screening. The absence of such a program in LMICs like Nigeria means that the patient bears the total cost of screening. Anyone living below poverty might not attend due to affordability. This cost report can account for the increased cases of diagnostic and treatment delays in LMICs and high cancer mortality (Pace and Shulman, 2016). The findings from this study support this evidence.

The government and independent pharmacies dispense cancer treatment medications in Nigeria. From our result, participants reported that the private-owned pharmacies dispense at a cheaper and more affordable cost than the government-owned pharmacies. The evidence that hormonal therapy for cancer treatment is accessible in low-income countries, yet continents such as Africa still record higher breast cancer mortality (Vanderpuye et al., 2017).

Participants reported lumps, swellings, pains, redness, and frequent vomiting as the observed signs and symptoms of breast cancer, with lumps as the most reported pre-diagnosis symptom. This report is in line with the findings of Agbokey et al., (2019, where lumps and pains were the most common reported symptoms of breast cancer. Nevertheless, this finding did not align with that of Azubuike (2017), where pains (57.4%) in the breast were the most reported sign and symptom of breast cancer.

Health seeking behaviour is an essential factor to consider in breast cancer management, as it plays a vital role in the decision making of women with breast cancer (Ogunkorode et al., 2020). Evidence has linked poor health-seeking behaviour to adverse outcomes of breast cancer treatment. Reporting to the hospital for treatment as soon as the signs and symptoms of breast cancer are observed, adhering to treatment procedures, and non-refusal of recommended treatment are all considered in assessing breast cancer patients' health-seeking behaviour. Some reasons for delayed presentation at the hospital were the patient's misinterpretation of signs and symptoms of breast cancer, cultural influences, and fear of the side effects of treatment (Agbokey et al., 2019; Ogunkorode et al., 2020). Most participants in this study reported good health-seeking behaviour, with over 66% visiting the hospital within 48 hours of observing the symptoms. This report on the health-seeking behaviour could be attributed to the high breast cancer awareness reported in this study. This report differs from Agbokey et al. (2019), where most participants had waited for 3months and above before seeking health at the hospital.

Breast cancer patients' stage of breast cancer at diagnosis is proven to impact breast cancer treatment. Delay in hospital presentation leads to the advancement of the cancer stage at diagnosis (Caplan, 2014). In addition, early detection of breast cancer is considered the first step to a positive breast cancer treatment outcome. Evidence has shown an improved survival rate among breast cancer patients at their early stages at diagnosis (Wambua et al., 2022; Caplan, 2014). It further explained that patients with advanced and metastasis stages of breast cancer at diagnosis were 3.8 and 4.4 times at higher risk of dying, respectively, than those in their early stages at diagnosis (Wambua et al., 2022). According to Mayo Clinic 2020, breast cancer stage ranges from 0-IV. However, most participants reported stages II and III breast cancer at diagnosis. This finding supports that of Dagne et al., 2019, with most participants in their study recording stage III breast cancer.

8.4.2 What are the possible sociocultural factors affecting Nigeria's breast cancer treatment and outcomes?

This study suggests that sociocultural factors such as religious belief, cultural belief, family and societal support, alternative medicine, body image, and gender-role influence breast cancer treatment and outcomes in Nigeria.

The cultural belief was identified as one of the sociocultural factors impacting Nigeria's breast cancer treatment and outcomes. Although culture was reported in this study, the frequency was low; only one participant reported the impact of culture in the qualitative research. In the survey, about 8% of the participants reported the impact of culture, and 17% agreed to seek traditional help before diagnosis. The low frequencies recorded for cultural belief could be attributed to the participants' educational attainment in the study, where most of them had attained tertiary and postgraduate levels of education. According to Raghupathi & Raghupathi (2020), adults with higher educational attainment tend to understand better health and how some factors such as culture influence health; hence, they make better health decisions. The findings of this study support the results of studies by Osuchukwu et al., 2021; Wiafe, 2017; and Karikari, 2018). Nevertheless, the reported frequencies were not the same, and the difference in these reports could be because of the study settings and year of study.

This study also reported religious belief as a sociocultural factor that affects breast cancer treatment and outcomes in Nigeria. Religious belief considers the participants' relationship with their God and their mode of worship. Participants in the qualitative and the quantitative studies reported the impact of religion on their breast cancer treatment in this study. To further confirm the role of religious belief on breast cancer treatment, more than 40% of the participants in the survey agreed to have sought religious and spiritual help for healing before reporting to the hospital. In this study, women refused treatment at some point while waiting for miraculous healing from God. This result agrees with another study conducted in Nigeria by Rumen (2014) and other studies conducted in Africa (Osuchukwu et al., 2021; Wiafe, 2017; and Elewonibi & Belue, 2019). A report from Elewonibi & Belue (2019) study stated that women who went for breast cancer screening were tagged as unfaithful. Also, according to Wiafe (2017), patients engage in prayer sessions while waiting for a miracle; this wait/delay leads to the late presentation at the hospital. Unfortunately, late presentation at the hospital has been linked to the advanced stage of cancer at diagnosis, thus affecting their treatment and outcomes. Also, the findings from a systematic review by Osuchuwku et al., (2021) evidenced the impact of religious belief on breast cancer management in West Africa. They concluded the need to integrate the effects of religious belief for improved treatment outcomes.

This study identified family support as a sociocultural factor impacting Nigeria's breast cancer treatment and outcomes. Family support affects the ability of breast cancer patients to manage their condition.

About 73.3% and 70% of the qualitative study and survey participants in this study agreed to be highly satisfied with the support they received from their families. This finding aligns with Lin (2016) and Salakari (2017), which identified family support as a crucial sociocultural factor affecting breast cancer treatment. Furthermore, evidence linked family support to the mortality rate of breast cancer. Conversely, adequate family support was related to improved treatment, and lack of family support was associated with increased mortality after breast cancer diagnosis (Chou et al., 2012).

The importance of societal support in breast cancer management cannot be overemphasised. This study identified the impact of social support on breast cancer treatment and outcomes. The quantitative study findings reported that only 31.3% of the participants were highly satisfied with their support from society/local communities. The said inadequate support affects breast cancer patients' screening, diagnosis and treatment. This finding agrees with that of Thompson et al., (2017), Spatuzzi et al., (2016) and Suwankhong & Liamputtong (2016). Also, this identification of the impact of social support on breast cancer management supports the findings of Hosseini et al., 2020; Asobayire &Barley, 2015 & Aziato& Clegg-Lamptey, 2015). In the study by Aziato & Clegg-Lamptey (2015), the insufficient societal support received by breast cancer patients could be evidence of social stigmatisation faced by breast cancer patients in their local communities.

The study by Galukande, Wabinga and Mirembe (2015) reported the availability and use of traditional healers as one of the challenges associated with follow-up of treatment experiences of breast cancer patients in Africa. In addition, this group were said not to keep the healthcare record of their patients nor share any history with the national healthcare system in these countries. These findings by Galukande et al., (2015) were supported by the results of this research. Furthermore, this study's findings on the impact of seeking religious/spiritual help on breast cancer treatment also support the evidence of Xing et al., (2018) study, where spiritual help was linked to the quality of life of breast cancer patients. Also, on seeking self-help for breast cancer treatment, this study finding supports the report of the study by Chin et al., (2021), where self-help was identified as a mediating factor in the quality of life of breast cancer patients.

Body image has been identified as a sociocultural factor impacting Nigeria's breast cancer treatment and outcomes. Body image is about physical appearance and has been identified to affect breast cancer treatment decisions such as mastectomy. Body image has been indoctrinated by culture to reinforce its norms to gain societal approval, and this is evident in prior studies (Cash and Smolak, 2011; Tiggemann, 2011). This study identified body image as one of the sociocultural factors impacting breast cancer treatment and outcomes in Nigeria. The impact of body image reported in this study also aligns with the findings of Guedes et al., (2018), where body image was said to affect breast cancer treatment. This factor has been linked to participants" refusal to accept appropriate treatment options such as mastectomy and chemotherapy, resulting in loss of breast and hair, respectively (Saeed et al., 2021).

This refusal of treatment due to protecting body image affects the treatment and outcomes of breast cancer patients in Nigeria.

Gender role deprives women of being sole or independent decision-makers when deciding on their health and otherwise (Aziato L, Clegg-Lamptey, 2015). In the Nigerian context, the customary court and traditional marriage system bestow upon the man the responsibility for the economic, social and general welfare of his wife and their children, making them the head of the family (Martei, Vanderpuye, & Jones (2018). Nigeria is a country that holds culture and tradition in high esteem, and most cultures require wives to inform and seek authorisation from their husbands whenever they need to visit a health facility (Martei, Vanderpuye, & Jones, 2018). To avoid being divorced, married women must respect their husbands' views on morality and virtue. Gender role was evident in this study as a sociocultural factor impacting Nigeria's breast cancer treatment and outcomes. Most participants in the interview and over 44% in the survey sought permission from their husbands before reporting to the hospital. The identified gender role in this study supports the studies discussed above.

8.4.3 Are there associations between the identified sociocultural factors (independent variables) and patients' treatment outcomes (dependent variables) in Ibadan and Lagos, Nigeria?

Sociocultural factors and health-seeking behaviour

In this study, there was a statistically significant association between religion and the health-seeking behaviour of participants. The Islam participants were more likely to have a good health-seeking when compared to the Christian participants with an inverse case when participants with 'other religions' were compared to the Christian faith. The report in this study supports the findings of Sen & Kumkale (2016); Melvin et al., (2016); Leyva et al., (2015), where religion demonstrated a statistically significant association with the health-seeking behaviours of breast cancer patients. Nevertheless, this statistically significant association between religion and health-seeking behaviour was not evident in the findings of Mirabai et al., 2022 hence, it differs from the findings of this study. The possible reasons for this disagreement in results could be associated with the sample size and the study population.

Also, the level of family support showed a statically significant relationship with the health-seeking behaviour of breast cancer patients. The findings showed that the likelihood of having good health-seeking behaviour was 78% less among participants satisfied with the level of family support they received than those who reported dissatisfaction. This result agrees with the findings of the studies by Norsa'adah et al., (2012) and Yu et al., (2014). The study by Yu et al., (2014) explained that most breast cancer patients that agreed to have family support demonstrated poor health-seeking behaviour as they needed to get the help of their family members before reporting to the hospital. It further explained that reliance on family decisions usually prolongs the treatment commencement time.

Sociocultural factors and quality of life

Culture was statistically significant in the participants' quality of life in this study. Participants that reported being neutral on the role of culture in their treatment experience were 97% less likely to have a fair quality of life when compared to those that disagreed. This finding agrees with Iskandrsyah et al., (2014).

This study showed a statistically significant association between alternative treatment (religious/spiritual help, traditional help and self-help) and patients' quality of life. On seeking spiritual help, participants who reported being neutral had a higher likelihood of a good quality of life when compared to those that disagreed with seeking spiritual help before registering to the hospital. In the qualitative results, the religious group served as the patients' support system, giving them reasons not to give up on their condition while encouraging them to go for their treatment (Holt et al., 2009). Conversely, participants who did not seek spiritual help in this context are at higher risk of poor quality of life, as reported in this study. This finding supports Xing et al., (2018), where a statistically significant association was noted between spiritual intervention and the quality of life of breast cancer patients. This study finding also agrees with the results of Jinbing et al., (2018), where spirituality was associated with decreased pain and lower symptom burden in black patients in their study. Jinbing et al. (2018) further explained that spirituality and seeking spiritual help are essential and multidimensional elements of `black culture, which provides support and care for them in times of adversity.

An association between self-help and quality of life was evident in this study. Participants who agreed to have sought self-help before visiting the hospital were 82% less likely to have a fair quality of life when compared to participants that disagreed with seeking self-help before going to the. This study's finding supports the findings of Chin et al., (2021).

The association between social support and quality of life showed a statistically significant result. The likelihood of having a good quality of life was more on participants who were satisfied with the social support than those dissatisfied with the support they received from society/local communities. The findings of social support and quality of life, support that of a study by Wells et al., (2014). Conversely, lack of societal support was associated with poor quality of life. Also, in the studies by Eom et al., (2013); Kroenke et al., (2013); Leung (2014); Li (2016) & Ng (2015), the importance of social support for breast cancer management was evidenced.

8.4.4 Which of the identified sociocultural factors have the most significant association with breast cancer treatment outcomes in Ibadan and Lagos, Nigeria?

This study suggests the identified sociocultural factors that significantly impact breast cancer treatment and outcomes. The result of the multivariate regression showed that *religion affects participants' health-seeking behaviour. A statistically significant relationship was evident in the association between religion and the health-seeking behaviour of participants. Also, the multivariate regression on quality of life* showed a statistically significant effect *with alternative treatment ('sought for religious and spiritual help before reporting to the hospital' and 'sought for self-help via buying online supplement drugs before reporting at the hospital) and breast cancer stage at diagnosis.* The above-mention sociocultural factors that were significant in the multivariate regression model as concluded to have a more substantial impact on breast cancer treatment and outcomes in Nigeria. This finding is in line with the results of Caplan (2014), where the breast cancer stage is established to have a very significant association with breast cancer treatment and outcomes. The association is explained as a delayed presentation at the hospital, which could lead to advanced-stage breast cancer at presentation, resulting in poor treatment outcomes and a high mortality rate. Also, early detection of breast cancer has been associated with decreased mortality and increased survival rate (Caplan, 2014). Furthermore, the result on the association between breast cancer stage on quality of life supports the works of Aouras (2018).

In a study by Calcagni et al. (2019), an association was reported between alternative medicine and the quality of life of breast cancer patients. This report by (Calcagni et al., 2019) is supported by the report of findings of this study. Also, the results of this study on the significant impact of alternative treatment on patients' quality of life align with the findings of Akhtar et al., 2018. In their study, about half of their participants sought alternative treatment before reporting to the hospital. Furthermore, the reasons for seeking alternative treatment by breast cancer patients have been associated with orthodox treatment cost, availability of treatment facilities, and accessibility to treatment, which is linked to delays in getting immediate appointments at the hospital.

8.5 Practice, policy and research implication

This mixed-method study provided evidence on the treatment experiences of breast cancer patients in Nigeria, while identifying sociocultural factors that impact their treatment and outcomes. This study is the first to provide evidence on the impact of factors like 'breast cancer stage at diagnosis on breast cancer treatment and outcomes in Nigeria.

The findings of this study provided evidence of the need to improve breast cancer awareness in Nigeria with a focus on sociocultural factors that impact its treatment and outcomes. Improved awareness is important as the proposed strategies for breast cancer management in Africa did not include addressing sociocultural factors as one of the strategies. According to Vanderpuye et al., (2017), the proposed strategies range from poor availability of basic and modern systemic therapies, inadequate access to radiotherapy, and poor nursing care and surgery.

This study proposes the need for similar research to be conducted in all parts of Nigeria to inform policy on the impact of SCFs on BC treatment and outcomes. Although this study's findings could be used for transferability, the same cannot be said for generalizability. Conducting this similar research in all parts of the country will provide national data on Nigeria's study interest and improve policy decision-making.

8.4 Strengths and limitations of the study

8.4.1 Strength of the study

This is the first study exploring the treatment experiences of breast cancer patients in Nigeria, focusing on the impact of sociocultural factors as mediators of breast cancer treatment and outcomes. Although some researchers conducted relative studies, such as the study by Kuteyi & Fasoranti on 'social capital: an exploratory investigation of experiences of women with breast cancer in Lagos, Nigeria; their research focus differed from that of this study. The Kuteyi & Fasoranti (2020) study focused on social capital and considered the general experiences of breast cancer patients. Also, another relative study conducted by Elewonibi & Belue, (2019) was on the 'influence of SCFs on BC screening in Nigeria. Also, the study by Elewonibi & Belue, (2019) differed from this study based on its focus on breast cancer screening and not on treatment. The findings of this study have closed the gap in the literature in this research area in Nigeria.

8.4.2 Limitations of the study

- Insecurities: Due to the safety issues of both researcher, research assistants and participants in the study, the study setting was purposively selected to exclude the area of high risk of insecurity from this study. This purposive selection of the study settings with low-security threats excluded potential participants living in the high-risk security areas from the survey. Nevertheless, the researcher selected other breast cancer facilities in two major cities in Nigeria, where people from all parts of the country visit for their breast cancer diagnosis and treatment.

- Covid-19 travelling restrictions: Another limitation of this study was the travelling restriction due to the COVID-19 pandemic, where borders were closed to manage the infection internally. This travelling restriction affected the study data collection as this study was conducted in Nigeria, West Africa. This restriction delayed the data collection period hence, prolonged the proposed time for the completion of this work. Nevertheless, the researcher ensured that the data collection took place as soon as the travelling restriction was lifted before the final lockdown.

- Covid -19 area: Also, as this study was conducted during the COVID-19 era, most breast cancer patients were reluctant to get to the hospital for treatment. This could be linked to the fear of getting infected with COVID-19 during hospital visits. This limitation affected the sample size of this study. Therefore, the researcher extended the data collection period and ensured that the calculated sample size represented the population under investigation accurately.

- Getting ethical approval: The researcher experienced some challenges getting ethical approval from one of Nigeria's previously chosen breast cancer facilities. Upon enquiry, the researcher was informed that other researchers who submitted their ethical application almost eight months before this study's ethical application were yet to get approval. The researcher was told that approval of research for data collection in that hospital is the responsibility of one person who claimed to be too busy with other things but ethical approval. To ensure the availability of data for this study, another study setting was chosen, with ethical approval sought and gotten, and a successful data collection was completed,

- Cancellation of training on mediation analysis: This research involves evaluating the effect of the sociocultural factors that mediate breast cancer treatment and experiences using mediation analysis. The researcher was scheduled twice for the mediation analysis training, and both pieces of training were cancelled because of the COVID -19 pandemic. To ensure that the objective study effects of SCFs on BC treatment and outcomes were achieved, the researcher adopted multiple regression to determine the results of the identified sociocultural factors on treatment and outcomes of breast cancer.

- Inability to collect data from all parts of the country: As this study is self-sponsored, only two cities were selected. Although the findings of this study cannot be used for generalizability, the results are transferable.

9.0 CHAPTER NINE: CONCLUSION AND RECOMMENDATION

9.1 Conclusion

It is worrisome to know that a treatable health condition like breast cancer accounts for higher deaths among the Nigerian population. This burden becomes more concern knowing that there are standardized treatments for breast cancer globally. Therefore, there was a need for other possible factors that impacted the treatment and outcomes. This study explored the treatment experiences of breast cancer patients in Ibadan and Lagos, Nigeria, focusing on sociocultural factors that influence breast cancer treatment and outcomes. The findings of this study identified sociocultural factors that impact breast cancer treatment and outcomes in the study area. This study also identified the need for similar research in other parts of Nigeria. Fulfilling this identified need will enable research to close the existing literature gap on breast cancer patients' treatment in other parts of Nigeria and produce national data on the impact of sociocultural factors on breast cancer treatment and outcomes in Nigeria. This study also presented a need to address the issues of religious belief, cultural belief, family and social support in developing intervention and awareness of breast cancer in Nigeria.

This exploratory mixed-method research has closed the literature gap by providing evidence on the treatment experiences of breast cancer patients in Ibadan and Lagos Nigeria, focusing on the impact of sociocultural factors on breast cancer treatment and outcomes.

9.2 Recommendations

Men's involvement in breast cancer education: there is a need to involve men in breast cancer education. This study presented an increase in male breast cancer prevalence compared with most previous studies. In addition, the knowledge of breast cancer needs to be improved, especially in men, as apart from being susceptible to breast cancer, the knowledge will equip them to support their spouses as they journey through breast cancer.

There should be an emphasis on the role of sociocultural factors in breast cancer treatment and outcomes during breast cancer awareness programmes. As identified in this study, sociocultural factors impact breast cancer treatment and outcome; hence, this could be emphasized during breast cancer education /awareness for improved treatment and outcomes.

Free breast cancer screening: Early detection of cancer has been linked to breast cancer's treatment outcome and survival rate. In this study, the most common reported breast cancer stages at diagnosis were stages II and III. These advanced stages at diagnosis could contribute to poor treatment experience and high mortality rates in Nigeria.

Government subsidy on breast cancer treatment cost: the cost of breast cancer treatment in Nigeria seems high and more problematic than the average monthly income of patients. In a study where less than 10% of the participants earn N300,000 and above, affording treatment costs over N1,000,000 will be a financial burden. Again, out-of-pocket medical payment is mainly practiced in Nigeria's health, promoting health inequality. Also, delay in hospital presentation has been linked to a lack of funds for orthodox treatment. This study recommends the subsidy of breast cancer treatment costs by the Government, and this will enable patients to report to the hospital for orthodox treatment

Provision of functional breast cancer facilities in different parts of Nigeria: The selection of cities for this research was influenced by the availability of breast cancer treatment facilities. Most participants in the study travelled far to access breast cancer facilities for their diagnosis and treatment. This unavailability of breast cancer treatment centres in most Nigerian cities could contribute to patients seeking an alternative medicine that they could easily access in their communities. Therefore, availability and accessibility to functional treatment centres should be prioritised as intervention strategies.

Encourage similar research in other parts of Nigeria: This research was conducted in Ibadan and Lagos, Nigeria. Although its findings can be used for transferability, they can not be used for generalizability. Therefore, conducting similar research in other parts of the country is important, providing national data on this study’s interest.

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Downloaded: 06/01/2020

Approved: 14/08/2019

Vivian Osuchukwu

School of Nursing and Health Sciences

Program: PhD

Dear Vivian,

PROJECT TITLE: Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as a mediator of breast cancer treatment and outcomes.

APPLICATION: Reference Number 004035

On behalf of the University ethics reviewers who reviewed your project, I am pleased to inform you that on 14/08/2019 the above-named project was **approved** on ethics grounds, on the basis that you will adhere to the following documentation that you submitted for ethics review:

- University research ethics application form 004035 (form submission date: 06/08/2019).

- Participant information sheet 1008927 version 1 (17/07/2019).
- Participant information sheet 1008926 version 1 (17/07/2019).
- Participant information sheet 1008127 version 3 (15/07/2019).
- Participant consent form 1008128 version 1 (20/03/2019).

If during the course of the project you need to deviate significantly from the above-approved documentation please email ethics.review@sunderland.ac.uk

For more information please visit:
https://www.sunderland.ac.uk/research/governance/researchethics/

Yours sincerely

John Fulton

Ethics Administrator

LAGOS UNIVERSITY TEACHING HOSPITAL
HEALTH RESEARCH ETHICS COMMITTEE

PRIVATE MAIL BAG 12003, LAGOS, NIGERIA
e-mail address: luthethics@yahoo.com

LUTH

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LUTH HREC REGISTRATION NUMBER: NHREC: 19/12/2008a
Office Address: Room 107, 1st Floor, LUTH Administrative Block
Telephone: 234-1-5850737, 5852187, 5852209, 5852158, 5852111

20th November, 2019

NOTICE OF EXEMPTION

PROJECT TITLE: "TREATMENT EXPERIENCES OF BREAST CANCER PATIENTS IN LAGOS AND ABUJA, NIGERIA: THE IMPACT OF SOCIOCULTURAL FACTORS AS MEDIATORS OF BREAST CANCER TREATMENT ON OUTCOMES".
HEALTH RESEARCH COMMITTEE ASSIGNED NO.: ADM/DCST/HREC/APP/3329
NAME OF PRINCIPAL INVESTIGATOR: OSUCHUKWU VIVIAN CHINONSO
ADDRESS OF PRINCIPAL INVESTIGATOR: DEPT. OF NURSING, COLLEGE OF HEALTH SCIENCES, UNIVERSITY OF SUNDERLAND, UNITED KINGDOM.
DATE OF RECEIPT OF VALID APPLICATION: 13-11-19

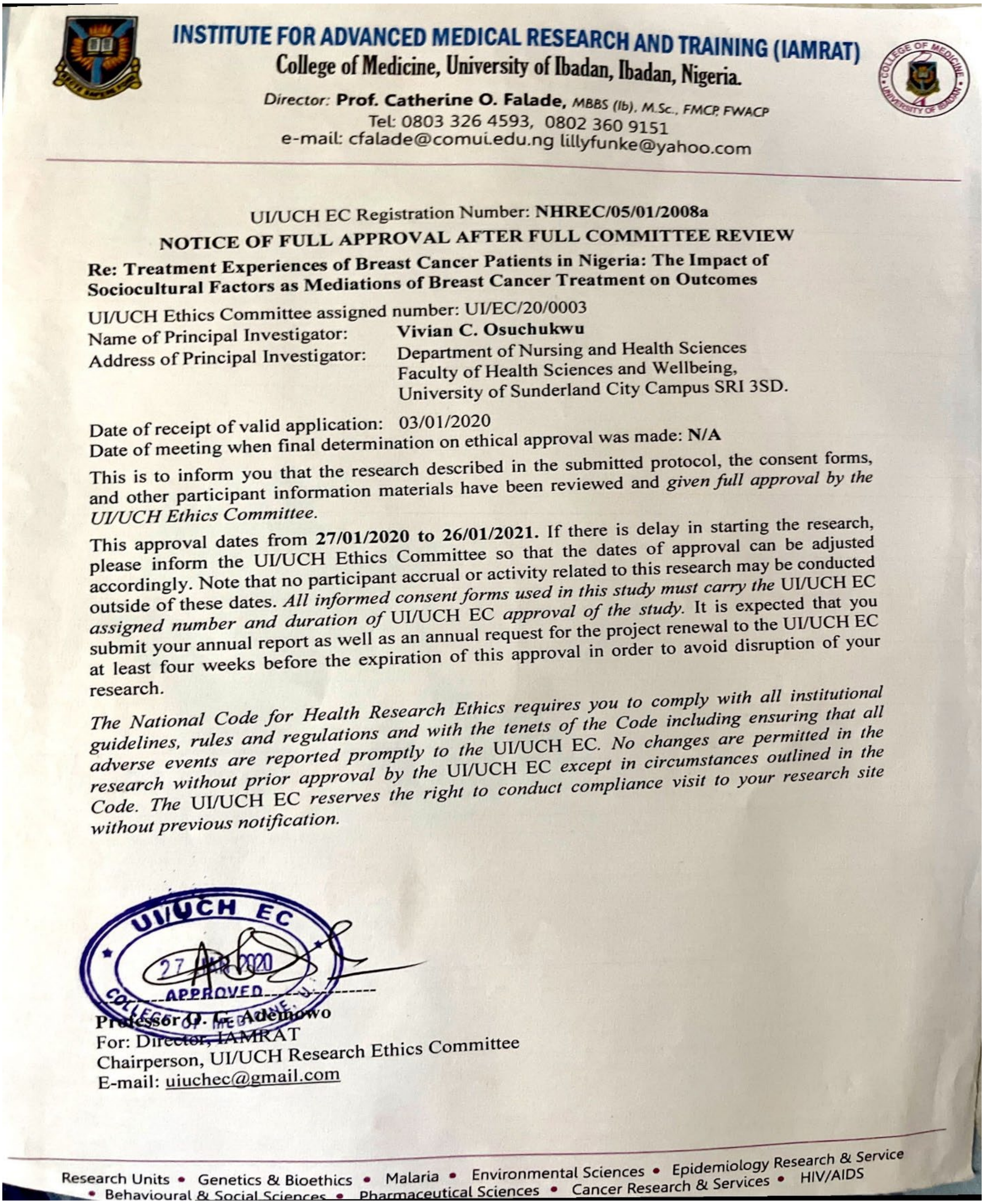
This is to inform you that the research described in the submitted protocol, the consent forms, and all other related materials where relevant have been evaluated and are exempted from full review by the Lagos University Teaching Hospital Health Research Ethics Committee (LUTHHREC).

All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research.

The National code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the HREC. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the code. The HREC reserves the right to conduct compliance visits to your research site without previous notification.

HEALTH RESEARCH & ETHICS COMMITTEE
CHAIRMAN
LUTH

PROF. N. U. OKUBADEJO
CHAIRMAN, LUTH HEALTH RESEARCH ETHICS COMMITTEE



INSTITUTE FOR ADVANCED MEDICAL RESEARCH AND TRAINING (IAMRAT)
College of Medicine, University of Ibadan, Ibadan, Nigeria.
Director: **Prof. Catherine O. Falade,** *MBBS (Ib), M.Sc., FMCP, FWACP*
Tel: 0803 326 4593, 0802 360 9151
e-mail: cfalade@comui.edu.ng lillyfunke@yahoo.com

UI/UCH EC Registration Number: **NHREC/05/01/2008a**

NOTICE OF FULL APPROVAL AFTER FULL COMMITTEE REVIEW

Re: Treatment Experiences of Breast Cancer Patients in Nigeria: The Impact of Sociocultural Factors as Mediations of Breast Cancer Treatment on Outcomes

UI/UCH Ethics Committee assigned number: UI/EC/20/0003
Name of Principal Investigator: **Vivian C. Osuchukwu**
Address of Principal Investigator: Department of Nursing and Health Sciences
Faculty of Health Sciences and Wellbeing,
University of Sunderland City Campus SRI 3SD.

Date of receipt of valid application: 03/01/2020
Date of meeting when final determination on ethical approval was made: **N/A**

This is to inform you that the research described in the submitted protocol, the consent forms, and other participant information materials have been reviewed and *given full approval by the UI/UCH Ethics Committee.*

This approval dates from **27/01/2020 to 26/01/2021.** If there is delay in starting the research, please inform the UI/UCH Ethics Committee so that the dates of approval can be adjusted accordingly. Note that no participant accrual or activity related to this research may be conducted outside of these dates. *All informed consent forms used in this study must carry the* UI/UCH EC *assigned number and duration of* UI/UCH EC *approval of the study.* It is expected that you submit your annual report as well as an annual request for the project renewal to the UI/UCH EC at least four weeks before the expiration of this approval in order to avoid disruption of your research.

The National Code for Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the Code including ensuring that all adverse events are reported promptly to the UI/UCH EC. *No changes are permitted in the research without prior approval by the* UI/UCH EC *except in circumstances outlined in the Code. The* UI/UCH EC *reserves the right to conduct compliance visit to your research site without previous notification.*

UI/UCH EC
27 [illegible] 2020
APPROVED
COLLEGE OF MEDICINE, U

Professor O. G. Ademowo
For: Director, IAMRAT
Chairperson, UI/UCH Research Ethics Committee
E-mail: uiuchec@gmail.com

Research Units • Genetics & Bioethics • Malaria • Environmental Sciences • Epidemiology Research & Service • Behavioural & Social Sciences • Pharmaceutical Sciences • Cancer Research & Services • HIV/AIDS

University of
Sunderland

30th December 2019.

To whom it may concern

LETTER OF ATTESTATION (RE: VIVIAN CHINONSO OSUCHKWU)

I write to attest that Vivian Chinonso Osuchukwu is a PhD student under my supervision at the Faculty of Health Sciences and Wellbeing, University of Sunderland, United Kingdom.

Vivian Chinonso Osuchukwu is currently conducting research on 'Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as mediators of breast cancer treatment on outcomes'. It is hoped that this research will make a valuable contribution to knowledge in the current field of practice, which directly impacts patient care.

We would be sincerely grateful for your kind assistance regarding her data collection, which is taking place in Nigeria.

Yours faithfully,

Prof. Catherine Hayes
Director of Study/
Supervisor T:
+44(0)1915152523

E: catherine.hayes@sunderland.ac.uk
P:https://www.sunderland.ac.uk/about/staff/health-paramedic-clinical- sciences/catherine_hayes

University of
Sunderland

Date: 22nd December, 2019

The Chairman,
Ethics committee,
University of Ibadan,
Ibadan, Oyo state
Nigeria.

Dear Sir/Madam,

APPLICATION FOR ETHICAL APPROVAL.

I am writing to apply for ethical approval for my PhD research data collection. The decision to carry out my research at the University of Ibadan Teaching Hospital was informed by the high-quality treatment options they offer to cancer patients. Also, as a Nigerian, I chose to carry out my research in my country to contribute my quota to a positive health care outcome.

I am currently undergoing my PhD studies with a research group at the University of Sunderland, United Kingdom. The research is centred on the treatment experiences of breast cancer patients in Nigeria, and I, alongside my supervisory team, investigate the effect of sociocultural factors as mediators of the effect of breast cancer treatment on outcomes.

The proposed data collection will be conducted using previously piloted and validated questionnaires in conjunction with face to face interviews. The questions asked will explore patients' experiences while focusing on the identification of sociocultural factors affecting breast cancer treatment and outcomes. The University of Sunderland Ethics Committee have reviewed and approved the data collection instrument and is satisfied that the process will not negatively affect the well-being of patients and the normal activities of the hospital.

The findings from this study will benefit the health sector and provide evidence on the impact of sociocultural factors as mediators of breast cancer treatment. This will also provide evidence to hospitals on the factors that interact with the treatment they offer their patients in determining outcomes. As a stakeholder linking us to participants, you will have access to our preliminary findings before wider dissemination in conferences and peer-reviewed journals.

Many thanks in anticipation of your approval, and we look forward to working with you.

Yours sincerely,

Vivian Osuchukwu

PhD Researcher,

Department of Nursing and Health Sciences,

Faculty of Health Sciences and Wellbeing,

University of Sunderland City Campus SR1 3SD.

Email: **vivian.osuchukwu@research.sunderland.ac.uk**.

Mobile: +44 7383534767

University of Sunderland

STUDY TITLE

Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as mediators of breast cancer treatment and outcomes.

CONSENT FORM

- I have read the Participant Information Sheet for this study and have explained the study's details.

- My questions about the study have been answered to my satisfaction, and I understand that I may ask further questions at any point.

- I understand that I am free to withdraw from the study within the time limits outlined in the Information Sheet, without giving a reason for my withdrawal or to decline to answer any particular questions in the study without any consequences to my future treatment by the researcher.

- I agree to provide information to the researchers under confidentiality as stated in the Information Sheet.

- I voluntarily consent to participate in this study

Participant’s Signature: ____________________________ **Date:** ___________

Participant’s Name (Printed): ____

Contact details: ____

Researcher’s Name (Printed): VIVIAN OSUCHUKWU

Researcher’s Signature: ___________________________

Researcher's contact details:

Vivian Osuchukwu

Room 208, Design Center,

The University of Sunderland.

Telephone: +447-383-534-767

Email: **vivian.osuchukwu@research.sunderland.ac.uk**

University of
Sunderland

Treatment experiences of breast cancer patients in Nigeria: the impact of sociocultural factors as mediators of breast cancer treatment on outcomes.

Interview guide

1. What were your perceptions of breast cancer treatment before your diagnosis?
2. When you were diagnosed with breast cancer, did any changes occur in your perceptions of breast cancer treatment?
3. What factors changed your perceptions of breast cancer treatment if any?
4. How do you perceive breast cancer treatment now?
5. How do you feel about your breast cancer experience?
6. Do you have any suggestions for improving awareness of breast cancer?

QUESTIONNAIRE FOR RESPONDENTS

Section A: Socio-Demographic Data (Instruction: please tick only one answer per statement)

1. **In what year were you born? ....**
2. **What is your gender?** a). Female [ ], b). Male [ ], c). Prefer not to say [ ],
3. **What tribe are you?** a). Yoruba [ ], b). Hausa [ ], c). Igbo [ ], d). Other ………………. (Please specify)
4. **What is your current marital status?** a). Single [ ], b). Married [ ], c). Widowed [ ], d). Divorced/separated [ ], e). Other ……………………………….. (*Please specify*)
5. **What is your highest level of education attained?** a). No formal education [ ], b). Primary education [ ], c). Junior secondary education [ ], d). Senior secondary education [ ], e). Tertiary education [ ], f). Post graduate education [ ].
6. **What is your Religion? a).** Christian[ ], B). Islam [ ], c). Traditional [ ], d). No religion e). Other ……………………… (Please specify)
7. **Where do you live? ....**
8. **What is your current employment status?** a). Unemployed [ ], b). Employed [ ], c). Self-employed [ ], d). Retired [ ], e). Other………………………………… (Please specify).
9. **What is your monthly income range?** a). Less than N18, 000 [ ], b). N18, 001- N50,000 [ ], c). 50, 001- 100, 000 [ ], d). 100, 001 – 300,000 e). 300, 001 and above (f) Prefer not to say [ ].

Section B: Knowledge of breast cancer

10. **Did you know anyone who had breast cancer before your diagnosis?** Yes [ ], No [ ], Prefer not to say [ ].
11. **Have you heard about breast cancer before your diagnosis?** Yes[ ], No [ ], Prefer not to say [ ].
12. **If yes, where did you first hear about breast cancer?** a). Media (Television, Internet, billboard, flyers etc.) [ ], b). Doctor [ ], c). Friends/ spouse [ ], d). Others (Please specify) ………………………………………………...
13. **Do you know about breast cancer treatment before your diagnosis? ?** Yes[ ], No [ ], Prefer not to say [ ].
14. **What factors increase one's risk of having breast cancer? (Multiple choice)** a). Being a woman [ ], (b). Punishment from God [ ], (c). Family History [ ], (d) Age [ ], e). Others (please specify) ……………

Section C: Possible risk factors

15. **How often do you drink alcohol?** a). Never [ ], b). Every day [ ], c). 3-5 times a week [ ], d). Once a week [ ], e). only on weekends [ ], f). on special occasions [ ].
16. **Do you engage in binge drinking? (5 or more drinks in a sitting)?** a). Yes [ ], b). No[ ], Prefer not to say [ ].
17. **How often do you exercise?** a). Never [ ], b). Every day [ ], c). 3-5 times a week [ ], d). Once a week [ ], e). only on weekends [ ], f). on special occasions [ ].
18. **How many number of childbirths?** (a). 0 [ ]. (b). 1 -2 [ ], (b). 3 - 4[ ]. (c). 5 - 6 [ ], (d). 7 and above [ ].
19. **If you have had a child, what age range were you when you had your first baby?** a). 18-23years [ ], b). 24-29years [ ], c). 30- 35years [ ], d). 36 and above [ ].
20. **Have any member of your family had/have breast cancer? ?** Yes [ ], No [ ], Do not know [ ], Prefer not to say [ ].
21. **Have you undergone menopausal or postmenopausal hormone therapy before been diagnosed with breast cancer?** Yes [ ], No [ ], Do not know [ ].
22. **Have you undergone Radiation therapy (radiotherapy) before been diagnosed with breast cancer?** Yes [ ], No [ ], Do not know [ ].

Section D: Patients' Experience

23. **What symptom(s) did you notice before going for diagnosis?**
    a). Swelling: Yes [ ], No [ ], Do not know [ ].
    b). Pains: Yes [ ], No [ ], Do not know [ ].
    c). Lump: Yes [ ], No [ ], Do not know [ ].
    d). Redness: Yes [ ], No [ ], Do not know [ ].
    e). Frequent vomiting Yes [ ], No [ ], Do not know [ ].
    e). Other (please specify) ………………………..
24. **Who noticed the sign first?** a). Myself [ ], b). Spouse/partner [ ], c). Doctor [ ], d). Prefer not to say [ ].
25. **Which part of your body did you notice the sign?** a). Breast [ ], b). Neck c). Armpit [ ], Others (please specify) ……………
26. **If your answer to question 25 is breast, Which of your breasts were affected?** a). Left [ ] b). Right [ ] c). Prefer not to say [ ]
27. **Did you visit the hospital immediately you saw the sign?** a**).** Yes [ ], b). No [ ], c). Prefer not to say [ ].
28. **If your answer to question 27 is no, how long did you wait before going to the hospital?** a). 1 - 6 days[ ], b). 1 - 4 weeks [ ], c). 1 – 4 months d). 4 – 8 months, e). 8 – 12 months, f). one year and above
29. **Which test did you do for your diagnosis?** a). Mammogram screening [ ], b). Biopsy [ ], c). Breast ultrasound [ ], d). Do not know [ ].
30. **At what stage was your breast cancer diagnosed?** a). Stage 0 [ ], b). Stage 1 [ ] , c). Stage II [ ], d). Stage III [ ], e). Stage IV [ ], f). [ ], Do not know [ ].
31. **Is this your first case of breast cancer?** a**).** Yes [ ], b). No [ ], c). Prefer not to say [ ].
32. **Which treatment are you undergoing?** a). Surgery [ ] b). Chemotherapy [ ] c). Hormone therapy [ ] d). Biological therapy [ ] e). Radiotherapy [ ]. f). Do not know [ ].
33. **Which treatment have you undergone?** a). Surgery [ ] b). Chemotherapy [ ] c). Hormone therapy [ ] d). Biological therapy [ ] e). Radiotherapy [ ]. f). Do not know [ ].
34. **Did you do chemotherapy before surgery?** a**).** Yes [ ], b). No [ ], c). Prefer not to say [ ].
35. **Have you ever refused treatment at some point?** a**).** Yes [ ], b). No [ ], c). Prefer not to say [ ].
36. **Do you buy your medications for treatment by yourself?** a). Yes [ ], b). No [ ], c). Prefer not to say [ ].
37. **If you answered yes to question 36, where do you buy them from?** a). Hospital pharmacy [ ], b). Outside pharmacy [ ], c). Prefer not to say [ ].
38. **How affordable is the medication?** a). Affordable b). Expensive c). Very expensive d). Very affordable
39. **Any improvement as you undergo treatment?** a**).** Yes [ ], b). No [ ], c). Prefer not to say [ ].

Section E: Perceptions and socio-cultural Factors

Instruction: Kindly answer the questions below by choosing and ticking the option from SA to D.
SA - Strongly agree A - Agree U – Undecided SD - Strongly disagree D – Disagree

S/N	ITEMS	SA	A	U	SD	D
40	**Having breast cancer affect my relationship with my spouse/partner**					
41	**Breast cancer treatment affected me being a woman**					
42	**Religion impacts on breast cancer treatment**					
43	**Culture and tradition impact on breast canc treatment**					
44	**Having or not having breast cancer has something to with God**					
45	**I sought for traditional help before reporting at t hospital?**					

46	**I sought for my spouse's permission before reporting to the hospital?**					
47	**I sought for religious and spiritual help before reporti to the hospital?**					
48	**I engaged in self-help via patronizing and consumpti of online hormonal drugs/supplements?**					
49	**Do you think breast cancer is curable?**					

Instruction: Kindly answer the questions below by choosing and ticking the option from HS to HD.
HS – Highly satisfied S – Satisfied N – Neither satisfied nor dissatisfied NS – Not satisfied HD – Highly dissatisfied

S/N	ITEMS	HS	S	N	NS	HD
50	How satisfied are you with the support from your family?					
51	How satisfied are you with the support from society?					
52	How satisfied are you with your treatment?					

Section F: Quality of Life

Instruction: Please answer all of the following questions based on your life ***at this time****. Kindly circle the number from 0 - 10 that best describes your experiences:*
To what extent are the following a problem for you:

53. **Aches or pain**? No problem 0 1 2 3 4 5 6 7 8 9 10 severe problem
54. **Sleep changes**? No problem 0 1 2 3 4 5 6 7 8 9 10 severe problem
55. **Rate your overall physical health:** Extremely poor 0 1 2 3 4 5 6 7 8 9 10 excellent
56. **How difficult is it for you to cope presently, as a result of your illness?** Not at all difficult 0 1 2 3 4 5 6 7 8 9 10 very difficult
57. **How difficult is it for you to cope presently, as a result of your treatment?** Not at all difficult 0 1 2 3 4 5 6 7 8 9 10 very difficult
58. **How good is your quality of life?** Extremely poor 0 1 2 3 4 5 6 7 8 9 10 excellent
59. **How much happiness do you feel?** None 0 1 2 3 4 5 6 7 8 9 10 a great deal
60. **To what extent are you fearful of your illness?** No fear 0 1 2 3 4 5 6 7 8 9 10 extreme fear
61. **To what degree has your illness and treatment interfered with your employment?** No problem 0 1 2 3 4 5 6 7 8 9 10 severe problem
62. **To what degree has your illness and treatment interfered with your activities at home?** No problem 0 1 2 3 4 5 6 7 8 9 10 severe problem
63. **How much isolation do you feel is caused by your illness?** None 0 1 2 3 4 5 6 7 8 9 10 a great deal
64. **How much concern do you have for your daughter(s) or other close female relatives regarding breast cancer?** None 0 1 2 3 4 5 6 7 8 9 10 a great deal

65. **How important to you is your participation in religious activities such as praying, going to church or temple?** Not at all 0 1 2 3 4 5 6 7 8 9 10 very important

66. **How much has your spiritual life changed as a result of your breast cancer diagnosis?** Less important 0 1 2 3 4 5 6 7 8 9 10 more important

How hopeful do you feel? Not at all 0 1 2 3 4 5 6 7 8 9 10 very hopeful