# GENETIC COUNSELLING AWARENESS FOR BREAST CANCER AMONG RELATIVES OF PATIENTS WITH CANCER IN A TERTIARY HEALTH INSTITUTION, BENIN CITY, EDO STATE.

**BY**

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**UNIVERSITY OF BENIN, BENIN CITY,**
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**OCTOBER, 2025**

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**IN PARTIAL FULFILLMENT OF THE OF THE AWARD OF BACHELOR OF NURSING SCIENCES[BNSC], FACULTY OF NURSING, UNIVERSITY OF BENIN, BENIN CITY.**

**OCTOBER, 2025.**

# DECLARATION

This is to declare that this research project titled " **GENETIC COUNSELLING AWARENESS FOR BREAST CANCER AMONG RELATIVES OF PATIENTS WITH CANCER IN A TERTIARY HEALTH INSTITUTION, BENIN CITY, EDO STATE** " was solely carried out by **OSAJI OGECHUKWU ANNASTESIA**. It is solely the result of my work except were acknowledged as being derived from other person(s) or resources.

**MATRICULATION NUMBER**: ____________________

**IN THE (FACULTY/SCHOOL): NURSING SCIENCES, UNIVERSITY OF BENIN, BENIN CITY.**

**SIGNATURE: ____________________**

**DATE: _________________________**

# CERTIFICATION/APPROVAL

This is to certify that this project was carried out by **OSAJI OGECHUKWU ANNASTESIA** with matriculation number **BMS2009015.** Faculty of Nursing science under the supervision of **PROF F.U. OKAFOR.**

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Student Sign & Date

**PROF F.U. OKAFOR** ____________________________

Project Supervisor Sign & Date:

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Head Of Department (MED-SURG) Sign & Date

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**EXTERNAL EXAMINER** Sign & Date

# ACKNOWLEDGMENT

I would like to express my heartfelt gratitude to God, for His divine guidance, wisdom, and strength throughout this research journey.

I express my deepest gratitude to wonderful parents, Late Mr Peter and Mrs Rosemary Osaji, for their unwavering support, encouragement, and love. Additionally, I would like to thank my supervisor, Prof F.U. Okafor for his expert guidance, mentorship, and valuable insights in my research study.

I also extend my gratitude to my Protem Dean Prof F.U Okafor, and my course adviser Mrs E. N. Oyana as well as all my lecturers, Prof (Mrs) R.E Esewe, Prof. (Mrs) J. A. Afemikhe, Prof. (Mrs) C.E Omorogbe, Dr (Mrs) C.A. Enuku, Rev. Sr. Chukwura, Dr T.A Ehwarieme, Mrs M.A. Iniomor, Mrs C.C Edo-Osagie, Mrs. Lawal, Mrs Ekhuobase, Mrs F. Esebanme, Mr Aragua and Mrs Osadolor as well as non-academic staff and technologists for their valuable knowledge, immense contribution, dedication, support, and encouragement through my course of study in the department.

Finally, I would like to thank everyone who contributed to the success of this study in one way or the other. This study would not have been possible without the contributions of numerous individuals who have supported me throughout this research journey. I extend my sincere appreciation to everyone who has played a role in shaping this study, from the participants who shared their experiences to the healthcare professionals who provided valuable insights. I am grateful for the guidance of my supervisor, also for the unwavering support of my family especially, Engr John CEE Onwualu who more than just a mentor; he's like a father to me always looking out for my best interests, Mr. Martins Onwudiachi, Engr Sochukwu EEE Egbune ,Mr. Felix Inneh, Mrs. Anwuli Inneh ,Mrs. Franka Onwualu , Mrs. Nwaka Uweru for their continuous both financially and morally, prayers, and encouragement have kept me outstanding and fostered success throughout this journey.

My sister, Ogochukwu Osaji who has been my day one biggest supporter and my lovely friends Miss Anthonia, Miss Gift, Miss Success, Miss Destiny and so many others who cannot be mentioned now, and the exceptional expertise of my lecturers. Thank you all for your time, effort, and encouragement. Your contributions have been invaluable, and I am honored to have had the opportunity to work with each and every one of you

# DEDICATION

To God Almighty, for His divine wisdom, guidance, grace and strength that has brought me to this milestone

To my beloved late Mr Peter Osaji, your love, sacrifices, and legacy continue to inspire me. Though you may not be here to witness this achievement, your memory lives on in my heart, and I hope to make you proud.

May God bless all those who have contributed to my success

# ABSTRACT

This study assessed the awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital (UBTH), Benin City, Edo State. Genetic counselling plays a vital role in identifying individuals at risk of hereditary breast cancer and in promoting preventive and early detection strategies. However, limited awareness and accessibility hinder its utilization in many low-resource settings, including Nigeria. The study adopted a descriptive cross-sectional design. A purposive sampling technique was used to select 169 participants who were relatives of cancer patients attending the University of Benin Teaching Hospital. A structured questionnaire was used for data collection, and 163 properly completed questionnaires were analyzed, representing a 96.5% response rate. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0 and presented in frequencies, percentages, mean scores, and chi-square tests. Findings revealed that the majority of respondents (64%) had a poor level of awareness of genetic counselling for breast cancer, while 61% exhibited negative perceptions toward it. The level of utilization was also low, with 77% of participants reporting that they had never accessed or engaged in genetic counselling services. Major barriers identified included high cost (82.8%), lack of awareness (81.6%), limited availability of trained professionals, cultural and religious beliefs, and poor institutional support. Hypothesis testing showed a significant relationship between awareness and perception ($p = 0.012$) and between perception and utilization ($p = 0.01$). The study concluded that awareness, perception, and utilization of genetic counselling for breast cancer among relatives of cancer patients remain low due to informational, financial, and systemic barriers. It was recommended that government and health institutions intensify public education, subsidize counselling costs, train healthcare providers especially nurses in genetic counselling, and integrate genetic services into routine cancer care to improve accessibility and uptake.

**Keywords:** Awareness, genetic counselling, breast cancer, Patients relative

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# CHAPTER ONE

# INTRODUCTION

## 1.1 Background to the study

Breast cancer is the most common malignancy affecting women worldwide and remains a leading cause of cancer-related deaths (Acevedo et al., 2023). Globally, one in eight women will be diagnosed with breast cancer in her lifetime, and the burden is increasing in both developed and developing countries. In sub-Saharan Africa, breast cancer incidence is on the rise, and the mortality-to-incidence ratio is higher compared to high-income countries due to late presentation, poor access to diagnostic services, and limited treatment facilities (Adejumo et al., 2023). In Nigeria, breast cancer accounts for approximately 23–30% of all cancers among women, with survival outcomes remaining poor because of delayed diagnosis, lack of preventive strategies, and limited awareness of genetic risk factors (Kamaraju et al., 2024).

In recent years, genetic counselling and testing have emerged as vital strategies for identifying women at increased risk of hereditary breast cancer. Approximately 5–10% of breast cancers are attributable to inherited germline mutations, most commonly in the BRCA1 and BRCA2 genes (Beard et al., 2021). Identifying these mutations is important not only for guiding personalized treatment decisions but also for enabling relatives of affected individuals to undergo predictive testing and adopt preventive measures. Genetic counselling provides information, risk assessment, and psychosocial support to patients and their families, ensuring they can make informed decisions about genetic testing and subsequent risk management options (Conley et al., 2021). Despite its proven benefits, the uptake of genetic counselling and testing remains low in many low- and middle-income countries due to financial, social, and cultural barriers (Cicin et al., 2024).

Studies have demonstrated that awareness and perception of genetic counselling significantly influence utilization rates. In a survey conducted in Iran, for example, Meshkani et al. (2025) found that 89.5% of women expressed willingness to undergo genetic testing for breast cancer if it were provided at no cost, highlighting the impact of financial constraints on decision-making. Similarly, Adejumo et al. (2023) in Nigeria reported that while 86.6% of patients and first-degree relatives expressed willingness to undergo cancer genetic testing, only 71.1% were willing to pay for it, with most indicating a maximum out-of-pocket cost below $100. These findings point to the role of socioeconomic status in determining the uptake of genetic services.

In addition to financial factors, psychosocial and informational barriers also play a significant role. Hanson et al. (2023) noted that patients often cite emotional concerns, fear of discrimination, and family-related anxieties as reasons for declining genetic testing, even when clinically indicated. Depression and psychological distress further complicate decision-making, underscoring the need for integrated mental health support alongside genetic services. Similarly, Afaya et al. (2024), in their review of cascade testing in hereditary breast and ovarian cancer, identified family dynamics, communication challenges, and negative emotions as significant barriers to the uptake of genetic testing among at-risk relatives. These findings suggest that awareness alone may not be sufficient; instead, strategies to address psychosocial barriers and enhance family communication are critical for improving utilization.

Evidence from Latin America and Asia further illustrates the disparities in access and utilization of genetic counselling. In Chile, only 15% of breast cancer patients who met international criteria for germline testing were tested, with significantly lower access in public hospitals compared to private centers (Acevedo et al., 2023). In Singapore, Sun, Li, and Ngeow (2020) found that while women recognized the benefits of testing for themselves and their families, high costs and inadequate information were major deterrents. Likewise, in the United States, Meadows and Padamsee (2021) showed that underinsurance, medical debt, and perceptions of bias from healthcare providers significantly limited women's ability to utilize genetic counselling and risk-management strategies. These studies collectively underscore the global challenges associated with making genetic counselling and testing widely accessible, especially in low-resource settings.

Technological innovations, such as digital tools, are being explored to improve access. Wollney et al. (2025) investigated the implementation of a chatbot to promote hereditary breast and ovarian cancer screening in the United States and found that factors such as perceived risk, clinician interaction, and trust in technology influenced women's willingness to adopt screening tools. While such interventions hold promise, they require adaptation to cultural and infrastructural realities in African contexts, where digital literacy and healthcare access may differ significantly.

In Nigeria, awareness of genetic counselling remains low, even among populations at elevated risk. Healthcare providers often receive minimal training in genetics, which limits their ability to effectively counsel patients or interpret test results (Kamaraju et al., 2024). Furthermore, social and cultural beliefs about cancer, stigma, and reliance on alternative forms of healing may further hinder uptake, as documented in Tanzania by Dominic, Iseselo, and Athanas (2024), who observed that some patients preferred religious healing over hospital-based treatment. These contextual challenges highlight the importance of localized studies to assess awareness, perceptions, and barriers in specific populations.

The University of Benin Teaching Hospital (UBTH), a major referral center in Nigeria, treats a large number of cancer patients annually, making it a strategic setting to evaluate awareness of genetic counselling for breast cancer. Relatives of cancer patients represent a high-risk group who could benefit from genetic risk assessment, yet their knowledge, perceptions, and barriers to utilizing genetic services remain underexplored. Understanding these factors is essential for designing effective interventions that improve early detection, risk reduction, and ultimately survival outcomes.

Therefore, this study seeks to assess the level of awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer at UBTH, and to identify the barriers that hinder its use. By situating the findings within global evidence, the study aims to provide insights that can inform policies and interventions to strengthen cancer risk management in Nigeria.

## 1.2 Statement of the Problem

Breast cancer remains the most frequently diagnosed malignancy and the leading cause of cancer-related deaths among women worldwide (Acevedo et al., 2023). Globally, genetic counselling and testing for breast cancer have been shown to play a critical role in identifying individuals at elevated hereditary risk, particularly those with BRCA1 and BRCA2 mutations, thereby enabling early detection, targeted therapies, and preventive interventions (Beard et al., 2021; Cicin et al., 2024). Despite this, access to and uptake of genetic services remain limited, especially in low- and middle-income countries, due to high costs, inadequate knowledge, and systemic inequities in healthcare (Sun et al., 2020; Meadows & Padamsee, 2021). Even in high-income settings, structural barriers such as underinsurance, health literacy gaps, and racial inequities hinder optimal utilization (Kamaraju et al., 2024).

In Africa, breast cancer incidence and mortality continue to rise, with survival rates lagging behind those of high-income countries due to late presentation, poor screening uptake, and limited genetic services (Adejumo et al., 2023). Studies indicate that although awareness of hereditary cancer syndromes is growing, participation in genetic counselling and testing remains minimal. Afaya et al. (2024) noted that family dynamics, emotional barriers, and poor communication significantly hinder cascade testing uptake among at-risk relatives in African contexts. Similarly, Dominic et al., (2024) observed that cultural beliefs and stigma surrounding cancer contribute to delayed diagnosis and avoidance of biomedical interventions in Tanzania. These findings highlight a double burden in Africa: rising cancer incidence coupled with poor integration of preventive genetic services.

In Nigeria, breast cancer constitutes nearly a third of all cancers among women, and mortality rates remain high due to late detection and poor awareness of genetic risk (Adejumo et al., 2023). Research suggests that while willingness to undergo genetic testing is relatively high, socioeconomic constraints and lack of awareness limit uptake. For instance, Adejumo et al. (2023) found that although 86.6% of patients and relatives were willing to undergo testing, only 71.1% were prepared to pay, with most capping their expenditure below $100. Similarly, low knowledge of genetic testing and counselling has been reported among both patients and healthcare providers, with financial and psychological barriers further compounding the problem (Meshkani et al., 2025; Hanson et al., 2023). This gap between intention and actual utilization underscores the urgent need for context-specific strategies to promote awareness and accessibility.

Against this backdrop, the University of Benin Teaching Hospital (UBTH), being a major referral center, provides a unique opportunity to assess awareness and barriers to genetic counselling among relatives of cancer patients. Relatives are a particularly important group since they are at elevated risk of hereditary cancers and could benefit substantially from predictive counselling and testing. However, there is limited empirical evidence on their awareness, perceptions, and willingness to utilize such services in Nigeria. This knowledge gap is significant, as without understanding these barriers, national cancer control programs may continue to overlook a critical avenue for early detection and prevention. Therefore, this study seeks to address this gap by examining awareness of genetic counselling for breast cancer among relatives of cancer patients at UBTH, thereby providing evidence to guide interventions aimed at improving cancer prevention and survival outcomes in Nigeria.

### 1.3 Objective of the study

The general objective of the study is to assess the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.

The specific objectives of the study are:

1. To assess the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.
2. To examine the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.
3. To assess the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.
4. To identify the barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.

### 1.4 Research Questions

1. What is the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

2. What is the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?
3. What is the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?
4. What are the barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

## 1.5 Hypothesis

1. There is no significant relationship between the level of awareness and the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital
2. There is no significant relationship between the perception and the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital

## 1.6 Significance of the Study

### To the Nursing Profession

This study holds considerable significance for the nursing profession as it provides evidence that can strengthen the role of nurses in cancer prevention, health promotion, and patient education. Nurses are often the first point of contact for patients and their families, and as such, they play a crucial role in raising awareness about genetic counselling and testing. Findings from this research will enable nurses to better understand the level of knowledge, perceptions, and barriers faced by relatives of cancer patients. This understanding will empower nurses to tailor health education, enhance communication strategies, and provide culturally sensitive counselling that addresses fears, misconceptions, and financial concerns. Furthermore, the outcomes of this study can guide curriculum development in nursing education, integrating genetic counselling as a core component of oncology nursing practice, thereby strengthening nurses' capacity to contribute to early detection and preventive strategies in cancer care.

### To Healthcare Providers

For healthcare providers, this study is important as it sheds light on the practical and systemic barriers that hinder the utilization of genetic counselling services among at-risk populations. Physicians, genetic counsellors, and allied health professionals will gain insights into the perceptions and concerns of patients' relatives, which will inform more patient-centered approaches to care. The results will also emphasize the importance of multidisciplinary collaboration in cancer prevention and management, as effective genetic counselling requires cooperation between oncologists, nurses, counsellors, and policymakers. Moreover, by identifying the specific barriers financial, psychosocial, and informational healthcare providers can advocate for policies and institutional frameworks that improve accessibility and affordability of genetic services. This will enhance the effectiveness of cancer control programs and ensure equity in access to preventive interventions.

### To the Society

At the societal level, the findings of this study are vital for public health planning and cancer control initiatives. Awareness and utilization of genetic counselling have implications not only for individuals at risk but also for families and communities. By highlighting the barriers to uptake, this study provides evidence that can be used to design community-based interventions and awareness campaigns to dispel myths, reduce stigma, and promote informed decision-making regarding genetic services. Improved awareness and access will lead to earlier detection of breast cancer, reduced disease burden, and better survival rates.

Additionally, when individuals are empowered to take preventive actions, society benefits from reduced healthcare costs, improved quality of life, and enhanced productivity. This research therefore contributes not only to scientific knowledge but also to the realization of national and global cancer prevention goals.

## 1.7 Scope of the Study

This study is limited to assessing the level of awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer receiving care at the University of Benin Teaching Hospital (UBTH), Benin City, Nigeria. The study focuses specifically on first-degree and second-degree relatives, as they are considered at higher risk of hereditary breast cancer. It further examines the barriers that hinder utilization of genetic counselling services, including financial, psychosocial, cultural, and institutional factors. The study does not extend to genetic counselling practices outside UBTH, nor does it include patients with cancers unrelated to hereditary breast cancer syndromes. The findings are therefore contextualized within the hospital setting and cannot be generalized to the entire Nigerian population, though they may provide insights relevant to similar healthcare environments.

## 1.8 Operational Definition of Terms

**Awareness** – In this study, awareness refers to the extent of knowledge and understanding that relatives of cancer patients at the University of Benin Teaching Hospital (UBTH) have about the existence, purpose, and benefits of genetic counselling for breast cancer.

**Genetic Counselling** – A process by which trained healthcare professionals provide information, education, and support to individuals at risk of hereditary breast cancer, enabling them to understand their risk and make informed decisions regarding genetic testing, prevention, and management.

**Breast Cancer** – A malignant tumour originating in the breast tissue, which may be sporadic or hereditary, and is associated with genetic mutations such as BRCA1 and BRCA2 that can be transmitted within families.

**Relatives of Patients with Cancer** – This refers to first-degree relatives (parents, siblings, and children) and second-degree relatives (grandparents, aunts, uncles, nieces, and nephews) of patients diagnosed with cancer and receiving treatment at UBTH.

# CHAPTER TWO

# LITERATURE REVIEW

This chapter focuses on the review of related literature under the following headings; conceptual review, theoretical review and empirical review. Necessary literature would be gotten from published and unpublished works, articles and journals in this study.

## 2.1 Conceptual Review

### 2.1.1 Concept of Breast Cancer

Breast cancer is a malignant condition that originates in the breast tissue, primarily affecting the epithelial cells of the ducts or lobules. It occurs when abnormal cells proliferate uncontrollably and may invade surrounding tissues or metastasize to distant sites. The disease is broadly categorized into two major histological types: invasive and non-invasive breast cancers. Non-invasive breast cancers, such as ductal carcinoma in situ (DCIS), are confined to the ducts, whereas invasive cancers, including invasive ductal carcinoma (IDC) and invasive lobular carcinoma (ILC), penetrate surrounding tissues and carry higher risks of metastasis (Michaels et al., 2023; Sarhangi et al., 2022). Advances in molecular biology have further classified breast cancer into subtypes such as luminal A, luminal B, HER2-enriched, and triple-negative, each with distinct prognoses and therapeutic implications (Cortesi et al., 2021; Russo & Giri, 2022).

Globally, breast cancer remains the most common cancer among women, contributing significantly to morbidity and mortality rates. According to epidemiological data, breast cancer accounts for nearly one in four cancer diagnoses among women worldwide (Acevedo et al., 2023; Michaels et al., 2023). High-income countries have recorded substantial progress in early detection and treatment, resulting in improved survival rates. However, disparities persist in low- and middle-income countries (LMICs), where late-stage diagnosis and limited access to treatment exacerbate outcomes (Anyigba et al., 2021; Vanderpuye et al., 2021). In Sub-Saharan Africa, including Nigeria, breast cancer is often diagnosed at advanced stages, leading to high mortality rates despite lower incidence compared to Western countries (Ezeome et al., 2022; Osuchukwu, 2022). The underutilization of screening and genetic testing services in these regions contributes significantly to the growing burden (Mapoko et al., 2023).

### Genetic Basis of Breast Cancer (BRCA1, BRCA2, and Other Mutations)

The role of genetic predisposition in breast cancer has been well established, with hereditary mutations in the BRCA1 and BRCA2 genes being the most prominent contributors to hereditary breast and ovarian cancer syndromes. Women with these mutations face a markedly increased lifetime risk of developing breast cancer, estimated between 45–70%, compared to 12% in the general population (Dubsky et al., 2024; Onyia et al., 2025). Beyond BRCA1/2, other moderate- to high-penetrance genes, such as PALB2, CHEK2, and ATM, have been implicated in hereditary breast cancer (Dean et al., 2021; Hayat et al., 2021). Research in African populations has identified unique genetic variants, suggesting population-specific risks that remain underexplored due to limited genomic studies (Amaeshi et al., 2025; Iwai et al., 2023). The identification of these genetic mutations has shaped precision oncology approaches, emphasizing the importance of genetic counselling and testing in breast cancer management (Pensabene et al., 2024).

### Risk Factors (Modifiable vs. Non-Modifiable)

Breast cancer development results from the interplay of both modifiable and non-modifiable risk factors. Non-modifiable factors include advancing age, female sex, family history of breast cancer, early menarche, late menopause, and inherited genetic mutations such as BRCA1/2 (Bedrosian et al., 2024; Effiong et al., 2023). On the other hand, modifiable risk factors, such as obesity, alcohol consumption, smoking, physical inactivity, and prolonged use of hormonal contraceptives or hormone replacement therapy, have been linked to increased risk (Michaels et al., 2023; Rodrigues et al., 2022). Environmental and sociocultural influences, particularly in LMICs, may further contribute to risk through limited awareness, late presentation, and restricted access to preventive healthcare services (Osuchukwu, 2022; Dominic et al., 2024).

### Implications for At-Risk Relatives

For relatives of breast cancer patients, especially first-degree relatives, the risk of developing breast cancer is significantly elevated due to shared genetic and environmental factors. Studies have shown that having a family history of breast cancer doubles the risk, and this risk escalates when multiple family members are affected or if the cancer occurs at a younger age (Seven et al., 2022; Cragun et al., 2021). Genetic counseling and testing are therefore crucial tools for identifying at-risk individuals and guiding preventive strategies such as increased surveillance, prophylactic surgeries, and lifestyle modifications (Baroutsou et al., 2021; Levine et al., 2024). Furthermore, family communication of genetic risk has been shown to influence cascade testing uptake, where tested individuals share results with relatives, thereby extending preventive opportunities (Dean et al., 2021; Afaya et al., 2024). In contexts like Nigeria, where awareness and access remain low, raising awareness among relatives of breast cancer patients is a critical step toward improving early detection and reducing mortality (Wuraola et al., 2025; Alabi & Ilesanmi, 2023).

### 2.1.2 Concept of Genetic Counselling

Genetic counselling is a communication process designed to help individuals and families understand and adapt to the medical, psychological, and familial implications of genetic contributions to disease (Berliner et al., 2021). It involves the interpretation of family and medical histories to assess the probability of disease occurrence or recurrence, education about inheritance, testing, management, prevention, and resources, as well as counselling to promote informed choices (Schneider et al., 2023). Within oncology, genetic counselling has become an integral component of precision medicine, especially for breast and ovarian cancers that have hereditary predispositions (Dubsky et al., 2024; Pensabene et al., 2024).

## Purpose and Objectives

The primary objectives of genetic counselling include identifying individuals at risk, guiding prevention strategies, enabling early detection, and supporting informed decision-making (Reid et al., 2022). For breast cancer, counselling facilitates the identification of carriers of hereditary mutations such as BRCA1, BRCA2, and PALB2, allowing for timely interventions (Bedrosian et al., 2024). Another crucial purpose is empowering patients to make informed reproductive and health decisions, thereby reducing anxiety and uncertainty surrounding hereditary risks (Hanson et al., 2023). Preventive objectives also extend to relatives, since cascade testing allows risk information to be shared within families for collective health planning (Baroutsou et al., 2021; Levine et al., 2024).

## Process of Genetic Counselling

The genetic counselling process typically involves three stages: pre-test counselling, genetic testing, and post-test counselling.

Pre-test counselling entails risk assessment, education on inheritance patterns, test benefits and limitations, as well as addressing patients' psychological readiness (Bokkers et al., 2023). Studies suggest that pre-test discussions enhance patient comprehension and readiness for testing, particularly among individuals with low health literacy (van der Giessen et al., 2021).

Genetic testing follows, where laboratory analyses are performed to detect pathogenic variants in cancer susceptibility genes. Personalized approaches, such as multi-gene panel testing, are increasingly recommended for individuals with strong family histories or high clinical suspicion (Dubsky et al., 2024).

Post-test counselling focuses on interpreting results, guiding surveillance or preventive interventions, and facilitating communication with family members (Cragun et al., 2021; Dean et al., 2021). Post-test support is particularly crucial when pathogenic mutations are identified, as results have profound implications for treatment, surveillance, and family planning.

Innovative delivery methods, such as AI chatbots and tele-genetics, are being tested to improve accessibility, especially in underserved populations (Al-Hilli et al., 2023; Wollney et al., 2025).

## Role in Hereditary Breast and Ovarian Cancer Syndromes

Hereditary breast and ovarian cancer (HBOC) syndromes, largely linked to BRCA1 and BRCA2 mutations, represent some of the most well-studied genetic predispositions. Genetic counselling plays a central role in identifying carriers and guiding preventive and therapeutic strategies (Pensabene et al., 2024; Dubsky et al., 2024). For example, counselling may lead to the adoption of risk-reducing surgeries such as prophylactic mastectomy or salpingo-oophorectomy, enhanced screening through mammography and MRI, or targeted therapies like PARP inhibitors (Cortesi et al., 2021). Furthermore, counselling enables cascade testing of relatives, thereby extending risk-reduction benefits beyond the index patient (Afaya et al., 2024; Seven et al., 2022). In Sub-Saharan Africa, where awareness is low and uptake of genetic services is minimal, integrating counselling into cancer care is critical for bridging gaps in early detection and survivorship (Adejumo et al., 2021; Amaeshi et al., 2025).

## Benefits for Patients and Relatives

The benefits of genetic counselling are multifaceted, encompassing psychological, preventive, and therapeutic outcomes. Psychologically, counselling reduces uncertainty, improves coping with hereditary cancer risks, and facilitates family communication about genetic results (Shin et al., 2021; Dibble et al., 2022). Preventively, it promotes adherence to screening guidelines and risk-reduction strategies, thereby enabling early detection and better prognoses (Brooks et al., 2021; Reid et al., 2022). Therapeutically, genetic test results may influence treatment decisions; for example, BRCA1/2 carriers may benefit from PARP inhibitors, making genetic counselling a key component of personalized oncology (Sarhangi et al., 2022; Singh et al., 2023).

For relatives, genetic counselling creates opportunities for cascade testing, which extends preventive interventions to family members who might otherwise remain unaware of their risk (Levine et al., 2024; Dean et al., 2021). Studies show that when probands share results with relatives, the likelihood of uptake of genetic testing among family members increases significantly, thereby contributing to community-level cancer prevention (Seven et al., 2022; Baroutsou et al., 2021).

### 2.1.3 Awareness of Genetic Counselling

In health behaviour research, awareness is defined as the degree to which individuals recognize the existence, availability, and potential benefits of a health intervention or service (Anderson et al., 2021). Within the context of genetic counselling, awareness refers to knowledge and understanding of the availability, process, and implications of counselling and genetic testing services, especially for hereditary cancers such as breast and ovarian cancer (Shin et al., 2021). Awareness is an essential prerequisite for health-seeking behaviour, as it shapes attitudes, intention, and eventual utilization of preventive services (Meshkani et al., 2025).

## Importance of Awareness for Uptake of Genetic Services

Awareness plays a pivotal role in determining whether individuals seek and utilize genetic services. Studies show that women who are aware of genetic counselling and testing are more likely to participate in these services, particularly when they perceive a family history of cancer or receive physician recommendations (Morand et al., 2022). Awareness facilitates informed decision-making, enabling at-risk individuals to understand the benefits of genetic testing for risk stratification, prevention, and early detection (Meadows & Padamsee, 2021). On the other hand, limited awareness remains one of the strongest barriers to participation in genetic counselling, even in high-resource settings (Cicin et al., 2024). For example, in Iran, despite low baseline knowledge of hereditary breast cancer, about 89.5% of women expressed willingness to undergo genetic testing if it was made available and affordable, highlighting the centrality of awareness to uptake (Meshkani et al., 2025).

## Determinants of Awareness

Multiple factors influence awareness of genetic counselling, and these determinants often intersect with social determinants of health. Educational level has consistently been associated with higher awareness and understanding of genetic risk and testing options (Brooks et al., 2021). Access to information, particularly through health professionals, media, and community outreach, also shapes awareness. In many contexts, physician referral is a primary source of information, yet gaps in provider training mean that many patients remain uninformed about their eligibility for genetic services (Kamaraju et al., 2024). Cultural beliefs significantly affect awareness, as some populations perceive genetic testing as a source of stigma or fatalism, limiting open discussion and uptake (Cicin et al., 2024). Additionally, socioeconomic status plays a crucial role; individuals from lower-income groups often report reduced awareness due to structural barriers such as limited health literacy, poor access to health information, and competing financial priorities (Meadows & Padamsee, 2021). In Sub-Saharan Africa, these determinants are amplified by weak health systems, absence of national genetic service frameworks, and cultural misconceptions about cancer and inheritance (Afaya et al., 2024; Amaeshi et al., 2025).

### Consequences of Low Awareness

Low awareness of genetic counselling has significant public health consequences. One of the most immediate outcomes is delayed testing, as at-risk individuals fail to recognize the importance of early genetic evaluation (Sun et al., 2020). This delay often leads to late-stage diagnosis, which contributes to poorer survival outcomes and higher mortality rates, particularly for aggressive subtypes such as triple-negative breast cancer that disproportionately affect African and African American populations (Kamaraju et al., 2024). Furthermore, lack of awareness undermines informed decision-making, leaving patients and families unprepared to engage in preventive strategies such as enhanced screening or prophylactic surgery (Morand et al., 2022). From a health systems perspective, low awareness contributes to the underutilization of available genetic services, limiting the potential for cost-effective prevention and personalized care (Cicin et al., 2024). Ultimately, inadequate awareness perpetuates health inequities, particularly among minority and underserved populations who are already disproportionately burdened by cancer-related mortality (Meadows & Padamsee, 2021; Afaya et al., 2024).

### 2.1.4 Factors Influencing Awareness and Utilization

The awareness and utilization of genetic counselling for breast cancer are shaped by multiple interacting factors at the individual, family, healthcare system, and sociocultural levels.

Understanding these determinants is critical in identifying barriers, facilitators, and opportunities for improving access to genetic services.

### Individual-Level Factors

Individual factors such as knowledge, attitudes, beliefs, and psychological readiness strongly influence awareness and utilization of genetic counselling. Knowledge of hereditary breast cancer and available genetic services is often low in many populations, resulting in underutilization of counselling and testing even among high-risk groups (Sun et al., 2020). Positive attitudes toward genetic testing, such as perceiving it as useful for prevention and treatment, encourage uptake, while negative beliefs such as fear of genetic discrimination or fatalistic attitudes discourage utilization (Levine et al., 2024). Psychological readiness also plays an important role. Some individuals delay counselling or testing due to fear of receiving a positive result, worry about the implications for family members, or concerns about coping with the outcome (Smith-Uffen et al., 2021). For example, in a systematic review, psychological harm and lack of perceived utility were identified as key barriers despite high initial interest in genetic testing (Smith-Uffen et al., 2021). This indicates that individual decision-making is influenced not only by awareness but also by emotional and cognitive preparedness.

### Family-Level Factors

Family dynamics and history are central to decisions about genetic counselling and testing. A strong family history of breast or ovarian cancer is one of the most powerful motivators for seeking genetic services, as individuals perceive a heightened personal risk (Sun et al., 2020). Communication within families about cancer history and genetic risk can either promote or inhibit awareness. Families that openly share cancer experiences are more likely to encourage members to pursue genetic counselling, while secrecy or denial may prevent at-risk relatives from seeking help (Morand et al., 2022). Support from family members also facilitates decision-making, particularly in collectivist cultures where health decisions are made jointly (Sun et al., 2020). Conversely, resistance from family members such as discouragement due to stigma, fear, or misconceptions may deter individuals from utilizing counselling services (Dominic et al., 2024). Family-level influence is therefore both a facilitator and a barrier depending on the context of communication and support.

### Healthcare System Factors

Healthcare system-related issues such as availability of counselling services, accessibility, affordability, and policy support significantly influence utilization. In many low- and middle-income countries (LMICs), including Sub-Saharan Africa, genetic counselling services are scarce and concentrated in urban centers, limiting access for rural populations (Afaya et al., 2024). Even where services are available, financial barriers such as lack of insurance coverage or high out-of-pocket costs prevent many individuals from accessing counselling and testing (Meadows & Padamsee, 2021). Similarly, underinsurance and competing financial demands, such as medical debt or child-rearing responsibilities, further limit uptake (Meadows & Padamsee, 2021). Provider-related factors also contribute to underutilization, as many physicians report limited training in genetic risk assessment and counselling, especially in African American and underserved populations (Kamaraju et al., 2024). At the policy level, weak integration of genetic counselling into national cancer control plans results in fragmented service delivery and inequitable access (Cicin et al., 2024). These systemic challenges highlight the need for policies that expand insurance coverage, train healthcare providers, and decentralize services to improve utilization.

### Sociocultural Factors

Sociocultural influences, including stigma, myths, cultural norms, and religious beliefs, play a significant role in awareness and utilization of genetic counselling. In some settings, cancer is associated with stigma and shame, which discourages open discussion and uptake of preventive services (Cicin et al., 2024). Myths and misconceptions, such as viewing cancer as a spiritual curse or punishment, further reduce willingness to pursue genetic testing and counselling (Afaya et al., 2024). Cultural norms regarding decision-making also affect utilization. For example, in patriarchal societies, women may require approval from male relatives before accessing genetic services, thereby limiting their autonomy (Dominic et al., 2024). Religion also shapes perceptions; while some individuals turn to faith and religious healing as alternatives to hospital-based care, others see genetic testing as complementary to faith-based coping strategies (Dominic et al., 2024). These sociocultural dynamics underscore the importance of culturally sensitive education and community engagement strategies to reduce stigma and misconceptions and to improve utilization of genetic counselling.

### 2.1.5 Barriers to Genetic Counselling

Despite the growing recognition of the value of genetic counselling in cancer prevention and management, numerous barriers continue to limit its accessibility and utilization across various populations. These barriers operate at multiple levels individual, structural, and systemic and contribute to health inequities, especially in low- and middle-income countries (LMICs). The most commonly identified barriers include financial constraints, limited access to services, fear of discrimination and psychological distress, shortage of trained professionals, and poor integration of genetic counselling into routine oncology care.

#### Financial Constraints and Cost of Testing

Financial barriers remain among the most persistent challenges to accessing genetic counselling and testing. The high cost of genetic testing and related services often deters individuals, particularly those without adequate health insurance or with limited income (Meadows & Padamsee, 2021). In a qualitative study of 50 high-risk women in the United States, Meadows and Padamsee (2021) found that lack of insurance, underinsurance, and competing financial demands such as medical debt and child-rearing responsibilities significantly restricted women’s ability to access genetic counselling, testing, and other preventive interventions. Similarly, Cicin et al. (2024) observed that in Türkiye, the cost of testing was a major determinant of whether patients could benefit from BRCA1/2 gene testing, despite its proven clinical value in improving treatment outcomes.

Financial insecurity is particularly acute in low-resource settings where government funding for preventive health services is minimal. In Tanzania, for instance, Dominic et al. (2024) noted that financial burden influenced women’s decisions to seek hospital-based cancer care, with many turning to traditional or faith-based healing instead. Such findings highlight that even when individuals are aware of the benefits of genetic counselling, affordability remains a crucial limiting factor. Thus, strategies that provide financial support, expand insurance coverage, and subsidize testing costs are essential to improve access and reduce disparities.

### Limited Access to Genetic Services

Access to genetic counselling services is unevenly distributed globally, with a concentration of resources in high-income countries and urban centers. In many LMICs, such as those in Africa and parts of Asia, genetic services are limited or non-existent (Afaya et al., 2024; Sun et al., 2020). Kamaraju et al. (2024) reported that inequities in preventive cancer care among African Americans were linked not only to socioeconomic challenges but also to a lack of available and accessible genetic testing services. The study emphasized that barriers such as transportation difficulties, limited healthcare infrastructure, and inadequate referral systems contribute to delayed or missed genetic assessments.

Sun et al., (2020) found that in Singapore, where genetic services are available, limited access was still a concern due to high demand and lengthy waiting times. For many individuals in Asia, access is further constrained by lack of awareness about where services are offered and by insufficient integration into mainstream healthcare systems. Similarly, Wollney et al. (2025) highlighted that even with technological innovations such as chatbots designed to promote genetic screening in rural Florida, systemic barriers such as infrastructure gaps and limited digital literacy hindered the full adoption of such interventions.

### Fear of Discrimination and Psychological Distress

Another major barrier to genetic counselling is fear of discrimination, particularly concerning insurance coverage and employment opportunities. Hanson et al. (2023) found that concerns about insurance implications were especially pronounced among younger patients and those with a family history of cancer. Patients expressed anxiety that a positive genetic result could lead to stigmatization or denial of insurance coverage. Kahn et al. (2023) similarly reported that at-risk relatives in cascade testing programs declined participation due to concerns about genetic discrimination and fear of learning unfavourable results.

Psychological distress also deters individuals from seeking genetic counselling and testing. Some patients fear that discovering a hereditary mutation may cause anxiety or depression, especially if they feel unprepared to manage the implications for themselves and their families (Smith-Uffen et al., 2021). Sun et al. (2020) identified emotional unpreparedness as one of the top three discouraging factors among Asian women, alongside cost and lack of information. These findings underscore the need for pre-test psychological support and post-test follow-up counselling to mitigate fear and distress associated with genetic information.

### Lack of Trained Professionals

A significant barrier in both developed and developing nations is the shortage of adequately trained genetic counsellors and oncologists with expertise in genetics. Kamaraju et al. (2024) reported that many physicians, particularly those working with African American populations, lack sufficient interdisciplinary training to interpret genetic results or provide appropriate risk counselling. This knowledge gap limits their ability to offer comprehensive guidance and contributes to the underutilization of genetic services.

In many LMICs, the challenge is even more pronounced due to limited educational programs and insufficient integration of genetics into medical curricula (Cicin et al., 2024). As a result, patients often rely on general practitioners who may not be equipped to provide genetic counselling or referrals. The shortage of human resources, compounded by poor infrastructure, creates long waiting times and reduces the availability of specialized genetic services, particularly in rural or underserved regions (Afaya et al., 2024).

### Poor Integration of Genetic Counselling into Routine Oncology Care

Another critical barrier is the inadequate integration of genetic counselling into standard oncology and primary care practices. In many health systems, genetic counselling remains a specialized, stand-alone service rather than an embedded component of cancer prevention and management pathways (Cicin et al., 2024). This fragmentation leads to missed opportunities for early detection, delayed referrals, and inconsistent follow-up. Levine et al. (2024) emphasized that despite advances in cascade testing pathways, many healthcare systems lack the structural mechanisms to ensure continuity of genetic services from diagnosis to treatment.

Similarly, Meadows and Padamsee (2021) noted that underinsurance and fragmented care coordination often prevent women from receiving appropriate genetic counselling referrals. The absence of standardized referral protocols means that high-risk patients may not be identified promptly, and those who are referred may not receive adequate support to complete testing. Kamaraju et al. (2024) also underscored the need for a multidisciplinary approach that integrates genetic counselling into routine oncology care, particularly for minority and underserved populations.

### 2.1.6 Facilitators of Genetic Counselling

Despite the numerous barriers that hinder the uptake of genetic counselling for breast cancer, several facilitators have been identified that can significantly improve access, utilization, and overall acceptance of these services. Facilitators include strong recommendations from healthcare providers, family support, affordability of testing, educational and sensitization programs, and the adoption of innovative digital tools. These factors, when integrated into healthcare systems, play a crucial role in improving awareness, uptake, and continuity of care in both high- and low-resource settings.

#### Strong Physician or Healthcare Provider Recommendation

Healthcare providers play a pivotal role in influencing patients' decisions to undergo genetic counselling and testing. A strong recommendation from a trusted physician has been consistently shown to be one of the most powerful predictors of uptake. In a multinational study, Sun, Li, and Ngeow (2020) found that medical professional endorsement was among the six major encouraging factors influencing Asian women to pursue genetic testing for hereditary breast and ovarian cancer. Patients reported that physician recommendations helped alleviate fears, clarified the importance of testing, and instilled trust in the medical process.

Similarly, Hanson et al. (2023) observed that patients who received clear communication and recommendations from oncologists were more likely to engage in genetic counselling. However, the study also highlighted that inconsistencies in provider knowledge about genetic testing can reduce this positive effect. In the United States, Beard et al. (2021) demonstrated that the mainstream integration of genetic testing within oncology clinics, led by oncologists and oncology nurses, improved referral rates and early identification of at-risk individuals. These findings suggest that empowering healthcare professionals with knowledge and tools to recommend genetic counselling can significantly improve service utilization.

### Family Support and Encouragement

Family support and communication have also emerged as critical facilitators in the decision to pursue genetic counselling. In many cultures, health decisions particularly those related to hereditary diseases are influenced by family values and collective decision-making. Cragun et al. (2021) found that open family communication of genetic test results among women with hereditary breast cancer mutations encouraged relatives to undergo cascade testing. Likewise, Seven et al. (2022) emphasized that probands who actively shared their genetic information with family members facilitated early detection and prevention efforts within their kin networks.

In Asian contexts, family cohesion was identified as both a motivator and a buffer against psychological distress related to testing (Sun et al., 2020). Similarly, in Africa, Mapoko et al. (2023) reported that the perceived benefits for family members and collective awareness motivated women in Cameroon to engage in genetic screening and counselling programs. Family encouragement, therefore, not only enhances decision-making confidence but also promotes intergenerational health awareness, leading to improved prevention and surveillance practices among relatives.

### Availability of Affordable or Free Testing

Affordability remains a determining factor in the uptake of genetic counselling and testing, especially in low- and middle-income countries (LMICs). Adejumo et al. (2021) demonstrated the feasibility of a subsidized genetic testing program in Nigeria, which resulted in higher willingness among participants to undergo testing compared to those in standard clinical settings. The study revealed that when cost barriers were removed or minimized, interest and participation in genetic testing significantly increased.

Similarly, Acevedo et al. (2023) observed that in Chile, disparities in access to germline genetic testing were primarily linked to cost; when testing was provided at low or no cost through public health programs, utilization rates improved substantially. In Tanzania, Dominic et al. (2024) noted that patients who received financial support or community-based funding were more likely to adhere to hospital-based treatments, including genetic-related services. Hence, policy initiatives that provide free or affordable testing can be instrumental in expanding equitable access to genetic counselling services, particularly in resource-constrained settings.

### Education and Sensitization Programs

Educational interventions and awareness campaigns serve as strong facilitators by improving knowledge, dispelling myths, and empowering individuals to make informed decisions about genetic counselling. Conley et al. (2021) conducted a pilot educational intervention among Latina breast cancer survivors, which significantly increased awareness and uptake of genetic counselling. The intervention, delivered in culturally tailored formats, enhanced participants' understanding of hereditary cancer risks and reduced anxiety about testing.

In sub-Saharan Africa, Effiong, Afolabi, and Chinedu (2023) emphasized that low awareness of breast cancer and genetics among women was directly associated with poor screening practices. Educational programs targeting these populations were shown to improve knowledge and perception of cancer genetics. Similarly, Bokkers et al. (2023) found that training surgical oncologists and nurses in pre-test counselling not only improved patient education but also facilitated timely referrals. Collectively, these findings highlight that sustained education and sensitization efforts both at the community and professional levels are vital to enhancing awareness and acceptance of genetic counselling.

**Use of Digital Tools (e.g., Chatbots and Online Risk Assessment Tools)**

Technological innovations such as chatbots, online platforms, and tele-genetic counselling have emerged as promising facilitators in expanding access to genetic counselling services. Al-Hilli et al. (2023) conducted a randomized controlled trial comparing artificial intelligence (AI) chatbot–based pre-test counselling with traditional in-person sessions among newly diagnosed breast cancer patients. The study found that chatbot counselling was equally effective in enhancing understanding, reducing anxiety, and improving testing uptake.

Similarly, Sato et al. (2021) developed a chatbot-based augmented intelligence genetic counselling system for hereditary breast and ovarian cancer, which demonstrated feasibility and user satisfaction in preliminary trials. Wollney et al. (2025) also noted that chatbot-driven awareness campaigns in women's health clinics increased screening adoption by addressing barriers such as time constraints and geographical distance. Moreover, van der Giessen et al. (2021) highlighted that digital communication tools could bridge the gap for patients with limited health literacy or migrant backgrounds, ensuring inclusive access to genetic information.

These digital innovations not only expand reach but also provide flexible, cost-effective, and patient-centered approaches to genetic counselling. They are particularly useful in regions with shortages of trained professionals, making them a viable complement to traditional counselling models.

### 2.1.7 Relevance of Genetic Counselling to Nursing and Public Health

Genetic counselling for breast cancer represents a critical intersection between precision medicine, nursing practice, and public health. As genetic science continues to evolve, the nursing profession has increasingly assumed a central role in promoting awareness, facilitating access, and integrating genetic services into holistic patient care. Nurses, often serving as the first point of contact in healthcare systems, are uniquely positioned to provide education, advocacy, psychosocial support, and care coordination to individuals and families at risk of hereditary breast cancer. Moreover, the integration of genetic counselling into both preventive and curative healthcare frameworks has the potential to reduce breast cancer morbidity and mortality through early detection, risk mitigation, and targeted interventions.

### Nurses’ Role in Health Education, Advocacy, and Support for Genetic Services

Nurses play an essential role in translating complex genetic information into understandable, actionable guidance for patients and their families. According to Bokkers et al. (2023), nurses and surgical oncologists in breast cancer care are increasingly being trained to provide pre-test genetic counselling as part of their routine duties. The study revealed that these healthcare professionals were not only willing but also adequately capable of facilitating pre-test education, obtaining informed consent, and ensuring psychosocial support for patients undergoing genetic testing. Their involvement enhances the continuum of care and ensures that patients receive holistic support before, during, and after genetic testing.

Similarly, Cragun et al. (2021) emphasized the importance of nursing support in family communication following genetic testing. Their study demonstrated that women with inherited breast cancer mutations often relied on nurses and genetic counsellors to help them disclose genetic risk information to relatives. Such family-focused interventions strengthen public health outcomes by facilitating cascade testing and early intervention among at-risk family members.

From a broader perspective, nursing roles extend beyond individual patient care to include advocacy for equitable access to genetic services. Effiong, Afolabi, and Chinedu (2023) noted that nurses in Nigeria were instrumental in promoting breast cancer awareness and screening among women with limited education and low health literacy. Their engagement in community health education programs helped dispel myths and misconceptions about genetic diseases and fostered positive health-seeking behaviours. Thus, nurses serve as powerful agents of change in bridging the knowledge gap between medical science and public understanding of genetic risk.

### Integration into Preventive and Curative Care

The integration of genetic counselling into both preventive and curative care aligns with the nursing philosophy of holistic and patient-centered care. According to Al-Hilli et al. (2023), incorporating pre-test genetic counselling as a standard component of breast cancer diagnosis improved patient comprehension, reduced anxiety, and facilitated informed decision-making about treatment options. In the study, the use of artificial intelligence (AI) chatbots for pre-test counselling was as effective as traditional in-person methods, underscoring the potential for technology-assisted nursing interventions in expanding access to genetic services.

Adejumo et al. (2021) also highlighted the importance of integrating genetic risk assessment programs into Nigeria’s healthcare system. Their findings indicated that when genetic counselling and testing were offered alongside routine cancer care, there was improved uptake and continuity of care among patients. This integration allows nurses to coordinate preventive measures such as regular screening and lifestyle modification alongside therapeutic interventions, ultimately enhancing patient outcomes.

In addition, Conley et al. (2021) demonstrated the impact of educational interventions led by healthcare providers, including nurses, in promoting genetic testing among Latina breast cancer survivors. Participants who received culturally tailored education exhibited increased awareness, reduced anxiety, and higher testing rates. This evidence reinforces the value of nursing participation in delivering genetic literacy and facilitating informed, patient-centered care. Integrating genetic counselling into curative care further ensures that individuals with confirmed hereditary mutations receive targeted therapy, such as BRCA-related treatments, thus aligning nursing care with evidence-based oncology practice.

## Impact on Reducing Morbidity and Mortality from Breast Cancer

One of the ultimate goals of integrating genetic counselling into nursing and public health is the reduction of breast cancer–related morbidity and mortality through early detection, prevention, and personalized care. Cicin et al. (2024) emphasized that personalized genetic testing for BRCA1/2 mutations plays a vital role in reducing disease burden by enabling early interventions and tailored treatment strategies. Nurses, as key members of the multidisciplinary team, contribute to this goal by promoting adherence to screening schedules, facilitating referrals for high-risk individuals, and supporting lifestyle modifications that mitigate risk.

Furthermore, Sun, Li, and Ngeow (2020) observed that in Asian populations, individuals who received pre-test genetic counselling that included family discussions and risk awareness were more likely to pursue preventive actions such as prophylactic surgery or enhanced screening. These actions, when guided by nursing and public health professionals, translate into significant reductions in cancer incidence and improved survival outcomes.

From a public health standpoint, Mapoko et al. (2023) demonstrated that when cancer genetic counselling was introduced in Cameroon, participants reported increased understanding of hereditary risk and a greater willingness to engage in early detection strategies. The study underscored that integrating genetic counselling into public health systems could transform cancer control in Africa by shifting focus from late-stage treatment to proactive prevention.

Additionally, the findings of Meadows and Padamsee (2021) revealed that economic and systemic constraints often limit women's access to genetic counselling in the U.S., leading to underutilization of preventive care and delayed interventions. This further highlights the importance of nursing advocacy for equitable access to genetic services as a means to close healthcare gaps and reduce disparities that contribute to cancer mortality. Nurses, by championing policies that promote affordability and accessibility, play a vital role in ensuring that all women regardless of socioeconomic status can benefit from the lifesaving potential of genetic counselling.

### 2.2.1 Theoretical Framework

#### Health Belief Model (HBM)

The Health Belief Model (HBM) is one of the most widely applied theoretical frameworks in public health for understanding and predicting health behaviours. It was originally developed in the 1950s by social psychologists Hochbaum, Rosenstock, and Kegels of the U.S. Public Health Service to explain why individuals fail to participate in preventive health programs such as disease screening and immunization (Rosenstock, 1974). The model proposes that an individual's health behaviour is primarily influenced by personal beliefs or perceptions about a disease and the strategies available to decrease its occurrence (Becker, 1974; Rosenstock, Strecher, & Becker, 1988).

In the context of genetic counselling for breast cancer, the HBM provides a useful framework for understanding how awareness, perception, and motivation influence whether at-risk individuals such as relatives of patients with breast cancer will seek preventive services. Decisions to utilize genetic counselling are shaped by perceived vulnerability, the perceived benefits of counselling, and potential barriers such as cost, stigma, and accessibility (Sun, Li, & Ngeow, 2020; Meadows & Padamsee, 2021).

### Components of the Health Belief Model

The HBM consists of six major constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. Each construct plays a vital role in determining whether an individual adopts a preventive health behavior (Rosenstock et al., 1988).

### 1. Perceived Susceptibility

This refers to an individual's belief about their likelihood of developing a disease or condition. When individuals perceive themselves as being at higher risk, they are more likely to engage in preventive behaviour (Rosenstock, 1974). In the context of breast cancer, relatives of patients who understand their genetic risk (e.g., BRCA1/BRCA2 mutations) may be more inclined to seek genetic counselling. Women with a strong family history of breast cancer often have greater perceived susceptibility and are thus more open to genetic testing. Conversely, low awareness or denial of risk can lead to avoidance of counselling and testing.

### 2. Perceived Severity

This construct represents an individual's belief about the seriousness or consequences of a health problem. It encompasses medical outcomes such as disability or death, as well as social consequences like family disruption or financial burden (Rosenstock et al., 1988). For instance, individuals who perceive breast cancer as a severe and life-threatening disease are more motivated to adopt preventive strategies such as genetic counselling. Research indicates that individuals who understand the potential hereditary implications of breast cancer demonstrate higher motivation for testing and risk management.

### 3. Perceived Benefits

Perceived benefits refer to an individual's assessment of the value or efficacy of engaging in a health-promoting behaviour to reduce the threat of illness (Becker, 1974). In relation to genetic counselling, perceived benefits include early detection, risk reduction, and reassurance through professional support. When individuals believe that genetic counselling can provide actionable knowledge or improve survival outcomes, they are more likely to seek and utilize these services. For example, awareness that BRCA mutation identification can guide preventive interventions such as enhanced screening or prophylactic surgery increases uptake.

### 4. Perceived Barriers

Perceived barriers refer to the individual's evaluation of obstacles that may prevent engagement in a health-promoting behaviour (Rosenstock, 1974). These barriers may be psychological, social, financial, or logistical. In low- and middle-income settings, key barriers include the high cost of testing, lack of access to trained counsellors, and fear of discrimination.

### 5. Cues to Action

Cues to action are triggers or stimuli that prompt individuals to engage in a health behaviour. These may include internal cues (such as physical symptoms or anxiety about risk) and external cues (such as media campaigns, physician recommendations, or family encouragement) (Rosenstock et al., 1988). Physician referrals and public health education have been shown to be strong motivators for genetic counselling uptake. Likewise, family support and social influence act as key enablers, especially when relatives encourage at-risk individuals to seek counselling and testing.

### 6. Self-Efficacy

Self-efficacy refers to an individual's confidence in their ability to successfully take the recommended action (Bandura, 1977; Rosenstock et al., 1988). It plays a crucial role in determining whether individuals will follow through with health-promoting behaviours, particularly when the process requires multiple steps, such as scheduling and attending counselling sessions. Educational interventions and supportive communication from healthcare providers can enhance self-efficacy. For example, patients who receive clear information about the process and benefits of genetic testing tend to exhibit greater confidence in their decision-making.

### 2.2.2 Application of the theory to the Study

The Health Belief Model (HBM) provides a strong theoretical foundation for examining awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer. The model posits that an individual's readiness to take health-related action such as seeking genetic counselling is influenced by personal beliefs and perceptions about a disease and the perceived benefits or barriers to taking preventive action (Rosenstock, 1974; Janz & Becker, 1984). Within the context of this study, the constructs of the HBM perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy serve as lenses through which the level of awareness, perception, and utilization of genetic counselling services can be understood.

In relation to the first objective, which seeks to assess the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer, the construct of cues to action is particularly relevant. Cues to action refer to the stimuli or triggers that motivate individuals to adopt a health behaviour. In this study, awareness may be influenced by exposure to health education, physician recommendations, family experiences with cancer, and media campaigns promoting genetic testing and counselling. When individuals are adequately informed about hereditary breast cancer and the availability of genetic counselling, they are more likely to recognize the importance of preventive testing and act upon it. Thus, awareness acts as the first step in shaping attitudes and subsequent utilization of genetic services.

The second objective, which aims to examine the perception of genetic counselling for breast cancer, corresponds to the HBM constructs of perceived susceptibility and perceived severity. Perceived susceptibility involves an individual's belief about their likelihood of developing breast cancer due to genetic predisposition, such as BRCA1 or BRCA2 mutations, while perceived severity reflects beliefs about the seriousness and consequences of the disease. When relatives of patients believe they are at high risk of developing breast cancer and perceive it as a serious, potentially life-threatening illness, they are more likely to view genetic counselling as a valuable and necessary preventive measure. Conversely, if they underestimate their susceptibility or view cancer as a condition beyond control, their motivation to engage in genetic counselling may be reduced.

The third objective, which focuses on assessing the level of utilization of genetic counselling, is closely aligned with the constructs of perceived benefits and self-efficacy. Perceived benefits refer to the individual's belief in the positive outcomes of engaging in a health action in this case, the preventive, psychological, and therapeutic advantages of genetic counselling and testing. These benefits include early detection, risk reduction, and informed decision-making about preventive interventions. Self-efficacy, on the other hand, reflects an individual's confidence in their ability to successfully access and complete the counselling process. Individuals with higher self-efficacy are more likely to navigate hospital procedures, follow up on referrals, and act upon recommendations. Thus, utilization is influenced not only by the perceived benefits of genetic counselling but also by the individual's confidence in overcoming potential challenges.

Finally, the fourth objective, which aims to identify the barriers that hinder utilization of genetic counselling, directly relates to the construct of perceived barriers. These barriers may include financial constraints, limited access to counselling services, cultural and religious beliefs, fear of discrimination, and psychological distress associated with genetic results. According to the HBM, even when individuals perceive themselves to be at risk and recognize the benefits of genetic counselling, they may still refrain from utilizing such services if the perceived barriers outweigh the perceived benefits. For example, fear of positive results or the stigma associated with hereditary cancer can discourage participation, particularly in low- and middle-income settings like Nigeria, where health literacy and access remain uneven.

## 2.3 Empirical Review

### 2.3.1 The level of awareness of genetic counselling for breast cancer

In a study carried out by Adejumo et al., (2021) in Nigeria on university students' knowledge and readiness to practice genomic nursing, a cross-sectional design was employed. The researchers purposively selected three universities and recruited 136 nursing students using a convenience sampling technique. Data were collected using a modified Genetic Nursing Concept Inventory questionnaire and analyzed with SPSS version 23. Descriptive statistics, Chi-square test, and multivariate analysis were used. The results revealed that a very high proportion of the participants had poor knowledge (89%) of genomic nursing, while 66% lacked readiness to practice it. Further analysis showed that students' knowledge significantly influenced their readiness to practice genomic nursing ($\chi^2 = 21.033$, df = 1, $p = 0.001$). Type of institution was found to be the most consistent predictor of both knowledge ($\chi^2 = 48.586$, df = 2, p = 0.001) and readiness (OR = 14.817, p = 0.326, C.I. = 3.190 – 319.57). Nursing students from federal institutions demonstrated higher knowledge and readiness compared to those in state or private universities. Moreover, participants identified poor funding, lack of trained personnel, and social/environmental factors as major barriers to practicing genomic nursing. The study concluded that nursing students in Nigeria generally have low knowledge and poor readiness to practice genomic nursing.

Similarly, Effiong et al., (2023) conducted a study in Ota, Southwest Nigeria, to investigate the influence of age and education on breast cancer awareness and knowledge. The study employed a cross-sectional survey design and recruited 1,135 participants, including 917 (80.79%) students and 218 (19.21%) staff, drawn from six educational institutions using a stratified random sampling technique. The participants were aged 13–60 years and were grouped into adolescents (13–19 years), young adults (21–40 years), and middle-aged adults (41–60 years). Data were collected through structured questionnaires and analyzed using Epi-info software and SPSS version 20. Findings showed that awareness of breast cancer (BC) was very high at 94.8%, while awareness of breast self-examination (BSE) stood at 65.1%. However, actual knowledge scores were low, with an average of 4.06 (40.57%). Knowledge was highest among young adults (4.31; 43.07%) and lowest among adolescents (3.88; 38.78%). The same pattern was observed in BSE practice across age groups. Only 7 participants (0.62%) had a history of BC. Regarding education, postgraduate students recorded the highest knowledge score (4.49; 44.89%), while secondary school students had the lowest (3.82; 38.12%). The main sources of BC and BSE information were television, health workers, and the internet. The authors concluded that although awareness of breast cancer was relatively high, knowledge and practice of BSE remained poor, particularly among adolescents and less-educated groups. They recommended structured health education programs and school-based screening initiatives to bridge the knowledge gap.

In a study conducted by Powell et al., (2024) across nine countries, the researchers examined patients' awareness, perceptions, and unmet needs in genetic testing and counselling for breast cancer. The study was carried out using a multinational patient survey that was designed by patient authors. The survey was individualized, with question pathways depending on prior responses, and data were analyzed using Chi-square tests to determine significance. The final analysis included 1,176 respondents, though only a subset answered all questions. Results revealed that 63% of respondents had undergone genetic testing. Among those tested, 70% reported they were offered testing, while only 40% of untested respondents had ever been offered testing but eventually did not proceed. Importantly, 44% of the tested population received genetic counselling, compared to only 7% of the untested group, a statistically significant difference ($p < 0.00001$). In terms of awareness, 71% of participants rated their awareness between "very low" and "moderate" before diagnosis, showing limited baseline knowledge. Interestingly, the majority of patients (71%) believed that all breast cancer patients should be tested before treatment, although regional differences were noted. For example, only 25% of Asian patients endorsed universal testing compared to ≥50% of respondents in other regions ($p < 0.00001$). Willingness to extend testing to family members was higher among those tested (44% very willing) compared to untested respondents (11%). Regional variations were also observed, with Australians (77%) and Russians (56%) expressing the highest willingness ($p < 0.00001$). The study concluded that critical gaps exist in awareness, access, and perceived value of genetic testing and counselling, with significant regional disparities. The authors emphasized that most breast cancer patients are not offered counselling, which directly contributes to the low uptake of testing

In another study conducted in Nigeria, Wuraola et al., (2025) explored healthcare providers' knowledge and perceptions of genetic testing for breast cancer patients. The study was motivated by the increasing relevance of genetics in breast cancer management in sub-Saharan Africa, especially given the National Comprehensive Cancer Network (NCCN) guidelines that specify patient subgroups requiring genetic testing. The researchers carried out a survey in June 2022 targeting 549 Nigerian healthcare providers (HCPs). A 35-item questionnaire was administered via Google Forms and distributed on WhatsApp platforms. Of the 549 contacted, 121 HCPs responded (22% response rate). Respondents comprised 54 (44.6%) general surgeons, 4 (3.3%) breast surgical oncologists, 29 (24.0%) clinical and radiation oncologists, 31 (25.6%) oncology nurses, and 3 (2.5%) breast radiologists. Data were analyzed using R version 4.4.1. Findings revealed that while respondents were generally knowledgeable about hereditary breast cancer genetics, implementation was very limited. Only 32.2% of HCPs had ever requested genetic testing for their patients, and all such tests were performed through private laboratories. In terms of training, only 9.9% had received any formal education in clinical genetics, and 13.2% reported having access to a genetic counsellor in their hospital. Despite these gaps, there was considerable interest in receiving genetics training in the future, with many respondents open to both in-person and online teaching modalities. The study concluded that while Nigerian HCPs show promising levels of knowledge and interest, structural and training barriers hinder the integration of genetic counselling into routine breast cancer care.

**Ye et al. (2025)** conducted a multicentre cross-sectional study in Shanghai, China, to assess knowledge, attitude, and practice toward genetic testing among breast cancer patients. Among 592 respondents, only 24.5% had undergone genetic testing, while 20.6% had never heard of it. The study revealed poor knowledge (22.9%), despite positive attitudes (83.6%) and fair practice levels (73.9%). Higher knowledge and positive attitudes significantly predicted testing uptake ($p < 0.05$). Structural equation modelling showed that knowledge positively influenced attitude ($\beta = 0.343$, $p < 0.001$), and attitude strongly influenced practice ($\beta = 0.942$,

$p < 0.001$), confirming that improved awareness promotes better perception and utilization. The authors concluded that limited knowledge remains the major barrier to optimal use of genetic testing, despite favorable attitudes among patients.This demonstrated a sequential pathway whereby improving patient knowledge could shape attitudes, which in turn drives better practice regarding genetic testing. The study concluded that while Chinese breast cancer patients demonstrated positive attitudes (83.6%) and relatively fair practices (73.9%) toward genetic testing, their knowledge level remained poor (22.9%). The authors highlighted the urgent need for increased education and genetic counselling interventions to improve awareness and informed decision-making among patients.

### 2.3.2 Perception of Genetic Counselling for Breast Cancer

Dibble et al. (2022) explored perceptions and care recommendations among 34 U.S. women carrying BRCA1/2 mutations using qualitative interviews. Six major themes emerged: emotional reactions to results and counselling, family support, experiences with the healthcare system, preventive decisions, sources influencing risk perception, and future recommendations. Two key subthemes *"Pre-vivor"* (women aware of their genetic risk before cancer) and *"Testing intuition"* (personal drive to seek testing)—captured unique emotional dimensions of testing. Participants reported anxiety, uncertainty, and relief after receiving results, emphasizing the emotional and psychological burden of genetic counselling. The study identified gaps in counselling delivery and recommended improved provider sensitivity, educational resources, and emotional support for women undergoing genetic testing. The study concluded that there are clear gaps in the delivery of genetic counselling for BRCA1/2 mutation carriers. Participants recommended improvements such as sensitivity training for healthcare professionals, better educational resources, and enhanced emotional and financial support systems. The authors noted that while these findings provide valuable insight, larger studies are required to improve the generalizability across diverse populations.

In a related study carried out by Olanrewaju and Olayiwola (Nigeria) in Ibadan, Oyo State, the researchers investigated the influence of SMS-based psycho-education on attitudes to genetic counselling and cancer-risk perception among relatives of persons living with cancer. The study used a pre-test-post-test control group design. In the first phase, 101 participants were purposively selected, but only 44 (22 males and 22 females) qualified for the second phase and were randomly assigned into experimental and control groups. Data collection instruments included the Attitude to Genetic Counselling Scale (Cronbach's $\alpha = 0.77$ in this study) and the Cancer Risk Perception Scale (Cronbach's $\alpha = 0.82$). Results showed that exposure to SMS-based psycho-education significantly improved participants' attitudes toward genetic counselling ($t(43) = 47.84$; $p < .05$). However, cancer risk perception did not show a significant change ($F(1,15) = 0.96$; $p > .05$). Demographic variables such as educational qualification, marital status, age, sex, and frequency of hospital visits showed no significant main effects on cancer risk perception (all $p > .05$). Interestingly, sex and educational qualification had a significant interactive effect on attitude toward genetic counselling ($F(2,15) = 4.71$; $p < .05$), suggesting that psycho-education interventions may work differently across subgroups. The study concluded that SMS-based psycho-education is an effective intervention in boosting positive attitudes toward genetic counselling among relatives of cancer patients, although its effect on risk perception was less pronounced. The authors recommended that SMS-based interventions should be incorporated into treatment and support plans for patients' relatives and further tested on additional variables in future research.

In a study conducted by Shin et al., (2021) at the Samsung Medical Center in South Korea, the psychological effects and risk perception of patients undergoing genetic counselling were evaluated. The study adopted a survey design with 72 participants who attended a genetic counselling clinic. Data were collected in two phases: the first survey before the initial counselling session and the second survey after the follow-up session. Out of the 72 participants, 43 completed both surveys, making them eligible for paired analysis. The results revealed distinct psychological responses depending on the participants' background and diagnosis. The initial survey showed that participants with religious affiliation reported higher feelings of guilt, while those who had a personal cancer diagnosis experienced higher levels of depression and anxiety. Similarly, individuals who self-referred to the counselling clinic demonstrated increased anxiety compared to other subgroups. After the second counselling session, the findings demonstrated an overall reduction in depression scores ($P = 0.013$). However, the effects on risk perception and anxiety varied depending on genetic test results: participants diagnosed with benign variants or variants of uncertain significance (BV/VUS, $n = 28$; 25 benign, 3 uncertain) showed a decrease in both anxiety and risk perception, while those diagnosed with a pathogenic variant (PV, $n = 15$) reported an increase in anxiety and heightened perception of risk. These subgroup differences were statistically significant ($P < 0.001$ for risk perception; $P = 0.03$ for anxiety). The study concluded that genetic counselling was effective in reducing depression among counselees.

A more recent study was conducted by Earla et al., (2025) in the United States, examining perceptions of patients and healthcare providers on BRCA testing in early-stage breast cancer (eBC). The study employed a qualitative design using semi-structured telephone interviews. Participants included female patients diagnosed with eBC ($n = 12$; 7 tested, 5 untested since 2017) and healthcare providers, specifically 12 medical oncologists and 8 genetic counsellors. Recruitment was carried out via panel databases between January and February 2023, and data were analysed using both deductive and inductive content analysis. The findings revealed that both patients and healthcare providers viewed complete access to information about breast cancer and treatment options as a major driver of patients' willingness to undergo genetic testing. Many patients reported that physician recommendations strongly influenced their decision to test, while others cited the value of sharing results with family as a motivator. Conversely, reluctance to undergo BRCA testing stemmed from perceived lack of benefit to family members, fear of losing insurance coverage, and increased anxiety associated with testing. From the providers' perspective, barriers included patient distrust of the medical system and the limited availability of genetic counsellors, which often delayed access to testing services. Additionally, patients expressed strong interest in targeted therapies with proven efficacy in reducing recurrence, emphasizing that treatment choices were closely linked to their desire for normalcy and remission. Providers also acknowledged that engaging patients in shared decision-making helped align testing and treatment with patient values. The study concluded that while patients are generally receptive to BRCA testing when it is framed as empowering and informative, systemic barriers such as access to counselling and fears about insurance hinder utilization.

In a study conducted by Meshkani et al., (2025) in Iran, the researchers investigated women's intention to participate in predictive breast cancer genetic testing. The study was motivated by the rising incidence and mortality of breast cancer in the country and the need to understand the factors influencing participation in BRCA1 and BRCA2 genetic testing. The study employed a cross-sectional survey design carried out online between July and August 2021, targeting Iranian women aged 30 years and above. A total of 1,041 participants were recruited, and data were collected using a validated questionnaire that assessed demographic characteristics, psychological factors, personal and family cancer history, knowledge of breast cancer genetics, attitudes toward genetic testing, and testing intentions. For analysis, the researchers used Chi-square tests, Fisher's Exact Test, and logistic regression to determine significant predictors of testing intentions. The findings revealed that the majority of participants (89.5%) expressed willingness to undergo genetic testing if it were offered free of charge, suggesting that cost was a major barrier. Knowledge and attitude were key predictors of testing intention: women with higher knowledge of breast cancer genetics were more likely to intend participation (OR = 1.59, p = 0.038), as were those with positive attitudes toward testing (OR = 1.59, p = 0.042). Marital status and previous breast cancer screening were also significant; married women and those with a history of breast cancer screening were more likely to have undergone testing (p = 0.03 and p = 0.02, respectively). Interestingly, family history of cancer and perceived personal risk did not show a statistically significant association with the intention to test. The study concluded that despite relatively limited knowledge about genetic testing, Iranian women showed a high level of interest (nearly 90%) in participating, especially if financial barriers were removed.

### 2.3.3 Utilization of Genetic Counselling for Breast Cancer

In a study carried out by Adejumo et al., (2023) in southwest Nigeria, the researchers examined cancer patients' willingness to undergo and pay for germline cancer genetic testing (CGT) as part of efforts to strengthen sustainable cancer risk management. The study employed a cross-sectional design conducted between July 2018 and February 2020 across three teaching hospitals: University College Hospital, Ibadan (56.2%), Lagos State University Teaching Hospital (26.3%), and Lagos University Teaching Hospital (17.5%). A total of 362 cancer patients and 10 first-degree relatives participated. Data were collected through a semi-structured interviewer-administered questionnaire following genetic counselling sessions. Analysis was performed using SPSS version 22, with $\chi^2$ tests for univariate comparisons and logistic regression for multivariate analysis. The results showed that the majority of participants were female (98.4%) with a mean age of 48.8 ± 11.79 years. Overall, 322 respondents (86.6%) expressed willingness to undergo CGT, while 231 (71.1%) were willing to pay for the service. Among those willing to pay, more than half (53.6%) were prepared to contribute between ₦10,000 and ₦30,000 (less than 100 USD). Sociodemographic characteristics such as age and gender were not significantly associated with willingness to undergo testing ($p > 0.05$). However, education level and ethnicity were significantly associated with willingness to pay ($p \leq 0.05$), indicating that social determinants influenced affordability and prioritization of genetic testing. The study concluded that patients and relatives were strongly motivated to consider genetic testing, with over 70% demonstrating readiness to pay, albeit at lower price ranges.

In another study, Beard (2021) explored the early implementation of mainstream genetic testing for breast cancer patients in Australia. The study was situated at the Parkville Familial Cancer Centre (PFCC), which historically coordinated testing for hereditary breast cancers such as BRCA1 and BRCA2. The researchers highlighted the increasing demand for genetic testing driven by lower testing costs, greater public awareness, and the clinical implications of identifying pathogenic variants. The mainstream testing program was rolled out in September 2017 across 10 hospital sites linked to the PFCC. Under this model, specialist doctors treating eligible breast cancer patients could directly order genetic testing during oncology or surgical appointments, integrating it into routine clinical care. The PFCC remained responsible for test interpretation, cascade family testing, and segregation testing, while treatment implications were managed by the attending specialist doctor. Although the study did not employ a traditional quantitative survey design, its observational findings indicated successful uptake of the mainstream testing model, improved detection of pathogenic variants, and reduced waiting times compared to the prior referral-based system. Importantly, the initiative eased the burden on the PFCC, allowing reallocation of resources to more complex genetic counseling needs. The study underscored that the new model had streamlined testing access for patients, though it also called for further research into patient and clinician experiences to ensure that care delivery, counselling quality, and treatment decisions remained patient-centered.

In a study carried out by Conley et al., (2021) in Tampa, Florida (USA) and Ponce, Puerto Rico, the researchers investigated the effect of a culturally targeted educational intervention on increasing genetic counselling (GC) and genetic testing (GT) uptake among Latina breast cancer survivors. The study was motivated by evidence showing that Latinas are less likely to undergo GC and GT compared to non-Hispanic White women. The study employed a pilot randomized controlled trial (RCT) design with 52 Latina breast cancer survivors. Participants were randomly assigned to either a control group that received a fact sheet on breast cancer survivorship, or an intervention group that received a culturally adapted educational booklet on GC and GT. Those in the intervention group were further offered no-cost telephone-based genetic counselling followed by free genetic testing through mail-in saliva kits. Data were collected at baseline and at 1- and 3-month follow-ups, focusing on knowledge of hereditary breast and ovarian cancer (HBOC), emotional distress, and actual uptake of GC and GT. Analysis was conducted using logistic regression for uptake outcomes and repeated measures ANOVA for changes in knowledge and distress. The results showed that intervention participants were 13.92 times more likely to complete GC (OR = 13.92, 95% CI = 3.06–63.25, $p < 0.01$) and 12.93 times more likely to complete GT (OR = 12.93, 95% CI = 2.82–59.20, $p < 0.01$) compared to controls. Site differences were minimal, though women from Ponce were significantly more likely to complete GT (OR = 4.53, 95% CI = 1.04–19.72, $p = 0.04$). Knowledge of HBOC significantly improved over time across both groups ($F(2,88) = 12.24$, $p < 0.01$, $\eta p^2 = 0.22$), but a stronger and more sustained increase was found among intervention participants ($F(2,88) = 3.66$, $p = 0.03$, $\eta p^2 = 0.08$). No significant changes were observed in emotional distress across study arms ($p > 0.15$). The study concluded that a culturally targeted educational intervention combined with the removal of cost barriers could substantially increase Latina breast cancer survivors' participation in GC and GT. With over 70% of intervention participants completing counseling and testing, the findings underscore the importance of tailoring interventions to cultural needs and addressing systemic access barriers.

In another study, Acevedo et al., (2023) examined disparities in access to germline genetic testing among breast cancer patients in Chile, where national guidelines do not provide clear strategies for integrating genetic testing into cancer care. The study utilized a retrospective cohort design, analysing invasive breast cancer cases treated at a Public Hospital (PH) and an Academic Private Center (AC) in Santiago, Chile, between 2012 and 2021. Out of 5,438 breast cancer patients, data from 3,955 patients were sufficient for classification using the National Comprehensive Cancer Network (NCCN) guidelines. Among these, 1,911 (48.3%) fulfilled criteria for germline genetic testing, yet only 300 patients (15.7%) were tested. Of those tested, 268 underwent multigene panel testing, with 65 pathogenic variants identified. BRCA1/2 mutations accounted for 17.7% of these cases. Access disparities were marked by treatment setting: patients in the academic private center were nearly twice as likely to receive testing compared to those in the public hospital (19.6% vs. 10.3%, $p = 0.0001$). Additional factors associated with higher testing uptake included diagnosis after 2018, being ≤45 years at diagnosis, having a family history of breast or ovarian cancer, presenting with non-metastatic disease, and having triple-negative breast cancer. The study concluded that despite nearly half of patients meeting international testing criteria, only 15% received germline testing, with even lower rates in the public healthcare system.

### 2.3.4 The barriers that hinder the utilization of genetic counselling for breast cancer

In a study carried out by Afaya et al., (2024), a scoping review was conducted to investigate psychosocial barriers and facilitators of cascade genetic testing among families with hereditary breast and ovarian cancer (HBOC). The study was conducted across multiple international contexts, reviewing research published between 2012 and 2022. The researchers systematically searched major databases with key terms such as “hereditary breast and ovarian cancer” and “cascade genetic testing”. From an initial pool of 480 articles, duplicates and irrelevant studies were removed, leaving 20 studies that met the inclusion criteria. Each study was independently reviewed by two researchers to ensure validity. The quality of the studies was assessed using CASP, RoBANS 2.0, RoB 2.0, and MMAT, and data were synthesized using a convergent method to integrate both quantitative and qualitative findings. The results highlighted three broad categories and 12 subcategories of psychosocial barriers and facilitators influencing cascade testing. The facilitators included: belief in health protection and prevention, family closeness, decisional empowerment, family support, sense of responsibility, self-efficacy, and supportive health professionals. The barriers included: negative family reactions and poor family dynamics, which discouraged disclosure and testing. Finally, the study identified bidirectional factors that could act either as barriers or facilitators depending on context: information adequacy, perception of genetic/cancer consequences, and emotional responses.

Similarly, Dron et al., (2023) conducted a systematic review in the United States to explore Latinx attitudes, barriers, and experiences with genetic counseling and testing (GC/GT). The review synthesized evidence from 81 empirical peer-reviewed studies published between January 1990 and July 2019. The included studies largely focused on Latinas in prenatal contexts or those at risk for hereditary breast and ovarian cancer (HBOC). Data were analyzed thematically to identify common experiences, barriers, and unmet needs regarding GC/GT. The findings revealed several barriers. Cost of services, lack of referrals, and limited communication between providers and patients were the most frequently reported obstacles. Language was a major determinant: patients with limited English proficiency (LEP) faced significant challenges in accessing and understanding genetic counseling services. Additionally, implicit provider biases against Latinx patients contributed to poor healthcare experiences and restricted access to testing. Despite these barriers, the review found that many Latinx patients expressed a strong interest in genetic counseling and testing, especially for cancer prevention. However, low awareness and inadequate information provision left their needs unmet. Patients also highlighted the importance of shared decision-making, with preferences for educational tools tailored to cultural and language needs, particularly for those with low numeracy or LEP.

In a study carried out by Hanson et al., (2023) at a large academic medical center in the United States, the researchers examined psychosocial barriers and motivators to cancer genetic testing among cancer patients. The study aimed to identify patient-level factors that influence the uptake of genetic testing, given that only a small proportion of eligible individuals currently pursue testing. The study employed a survey method, which was emailed to patients with a prior diagnosis of cancer. The survey included both newly developed and existing measures to assess barriers, motivators, and emotional responses related to genetic testing. Only patients who self-reported having received genetic testing were included in the analysis, giving a final sample size of 376 participants. Data were analyzed to compare reported barriers and motivators across demographic groups. The results revealed significant psychosocial influences. Females reported more concerns related to emotions, insurance, and family impact, but also indicated greater awareness of potential health benefits compared to males. Younger patients expressed significantly more emotional and family concerns than older respondents, while those who were recently diagnosed reported fewer concerns about insurance or emotional burden. Participants with BRCA-related cancers scored higher on the social and interpersonal concerns scale than patients with other cancer types. Importantly, individuals with elevated depression scores consistently reported higher levels of emotional, social, interpersonal, and family concerns compared to those without depression. The study concluded that self-reported depression was the most consistent predictor of perceived barriers to genetic testing.

Similarly, a study by Kahn et al., (2023) investigated barriers to cascade genetic testing among at-risk relatives (ARRs) of patients with hereditary breast and ovarian cancer (HBOC) syndrome. The study was conducted as a follow-up investigation to a previously implemented facilitated cascade testing pathway in which genetics teams offered telephone counseling and mailed saliva kits to ARRs. In the study, 114 ARRs were identified through probands, of which 97 were successfully contacted by telephone. Out of those contacted, 83 relatives (86%) expressed interest in undergoing genetic testing, while 14 (14%) declined testing. Among the 83 interested relatives, 69 (71%) completed the test, while 14 (29%) did not complete testing despite initial willingness. Reasons cited for non-completion included fear of genetic discrimination, anxiety about positive results, and perceptions that the variant was irrelevant to personal health. Additionally, five relatives reported that the telephone follow-up prompted them to reconsider and pursue testing after initially delaying. The findings demonstrate that even when testing is facilitated and logistical barriers minimized, psychological and perception-based barriers remain powerful obstacles to cascade testing. The authors concluded that concerns about discrimination, cost, and fear of positive results are persistent barriers that limit uptake of cascade testing.

In a study carried out by Levine et al., (2024) in the United States, the researchers explored cascade genetic testing for hereditary cancer syndromes, with particular focus on the barriers and facilitators to uptake. The study built on an earlier facilitated cascade testing program, in which genetics teams helped at-risk relatives (ARRs) of probands complete testing through telephone counseling and mailed saliva kits. The follow-up study evaluated completion rates and barriers to cascade testing through six-month follow-up telephone interviews. In total, probands identified 114 ARRs, of whom 97 (85.1%) were successfully contacted by telephone. Out of those contacted, 83 (86%) expressed interest in genetic testing, while 14 (14%) declined testing. Among those who indicated interest, 69 (71%) eventually completed the test. However, 14 relatives (16.9%) did not complete testing despite initially expressing interest. Reasons included fear of genetic discrimination, anxiety about a positive result, and a belief that the identified pathogenic variant was not personally relevant. Interestingly, five relatives (6%) reported that follow-up contact reignited their interest and prompted eventual completion of testing.

In another study, Smith-Uffen et al., (2021) conducted a systematic review to better understand the motivations and barriers influencing cancer patients' decisions to pursue genomic testing. The review targeted both somatic and germline testing and covered empirical literature published between 2001 and 2018. Using five databases, the researchers identified 182 studies, of which 17 met the inclusion criteria, comprising a total of 3,249 participants aged 18 to 94 years. The reviewed studies revealed that interest in genomic testing was consistently high, particularly among patients diagnosed with breast, ovarian, lung, and colorectal cancers. Motivations for testing included the desire to predict cancer risk, inform disease management, benefit family members, and gain a deeper understanding of cancer biology. On the other hand, barriers commonly identified included concerns about cost, privacy and confidentiality, clinical utility of results, and the risk of psychological harm. A notable proportion of included studies (14 out of 17) used hypothetical scenarios rather than actual patient experiences, but the findings nonetheless provided valuable insights. The study concluded that although patients are highly motivated to undergo genomic testing when the results have actionable clinical or familial value, persistent concerns regarding financial cost, psychological burden, and confidentiality limit participation.

In a study carried out by Dominic et al., (2024) in Dar es Salaam, Tanzania, the researchers investigated the facilitators and barriers to treatment decision-making among patients diagnosed with breast cancer. The study employed a descriptive qualitative design, focusing on women receiving care at the Ocean Road Cancer Institute. Using a purposive sampling technique, the authors recruited 14 female breast cancer patients. Data were collected through in-depth, semi-structured interviews that were audio-recorded, and analyzed thematically. The findings highlighted two major themes. Facilitators of treatment decision-making included patients' understanding of treatment information and the support provided by healthcare providers, both of which gave patients confidence in choosing hospital treatment. Conversely, barriers included the high cost of treatment, uncertainty about the efficacy of medical treatment, and a reliance on religious or traditional healing practices. The study emphasized that financial constraints and cultural beliefs were significant deterrents to timely hospital-based decision-making.

In another study conducted in the United States, Wollney et al., (2025) explored the implementation of a chatbot system (Gia®) to promote hereditary breast and ovarian cancer (HBOC) genetic screening and examined the facilitators and barriers influencing its adoption. The research took place across three women's health (OB/GYN) clinics in rural northern Florida. The study recruited 17 women (9 who adopted the chatbot screening and 8 who declined) and used semi-structured, in-depth interviews followed by thematic analysis. The results identified six main factors influencing uptake: (1) perception of cancer risk, (2) communication with clinicians, (3) feasibility of screening, (4) insurance and financial concerns, (5) trust or distrust in technology, and (6) previous experiences with genetic testing. Each factor served as either a facilitator or barrier. For instance, while some participants trusted the chatbot's accuracy, others expressed concerns about data privacy and security. Similarly, strong communication with clinicians promoted adoption, while lack of physician involvement discouraged use. The study concluded that while chatbots can expand access to HBOC risk screening, particularly in rural areas, their effectiveness is influenced by both systems-level barriers (such as cost and insurance) and individual-level concerns (such as risk perception and misconceptions about genetic testing).

In a study conducted by Kamaraju et al., (2024) in the United States, the researchers examined the challenges to genetic testing for germline mutations associated with breast cancer among African Americans (AAs). This review focused on the disparities that exist across the cancer continuum, particularly in preventive screening, diagnosis, treatment, and outcomes among racial minorities. The study synthesized evidence from multiple sources and highlighted that African Americans have a disproportionately higher incidence of triple-negative breast cancer and a high prevalence of BRCA1/2 mutations, both of which significantly increase cancer risk. Despite this, uptake of genetic testing remains low. The researchers attributed this to barriers embedded within the social determinants of health (SDOH), such as transportation difficulties, housing instability, food insecurity, and financial hardship, all of which delay preventive cancer screening and treatment. Additionally, low health literacy, limited awareness of genetic testing, and minimal physician training in genetic risk assessment further exacerbate these disparities. The study concluded that the underutilization of genetic testing among African Americans is multifactorial, with both systemic and individual-level barriers at play. The authors recommended multi-panel germline testing, patient education on hereditary cancer risks, and interdisciplinary training for physicians to ensure improved access to and utilization of genetic testing resources among underserved minority populations.

Similarly, Morand et al., (2022) carried out a study in the United States exploring the factors influencing adolescent and young adult (AYA) cancer patients' decisions to pursue genetic counseling and testing. The researchers used a qualitative design and conducted semi-structured interviews with 30 AYA patients, all of whom had previously been referred for cancer predisposition genetic counseling. The interviews were conducted via audio-only Zoom calls, and a thematic analysis was employed to interpret the findings. Of the 30 participants, 21 AYAs reported having undergone genetic counseling, while 9 had not.

Motivational factors that encouraged participation included awareness of the availability of genetic counseling services, concern about hereditary risk for family members, implications for family planning, affordability of genetic testing, and reassurance about potential cancer risks. Conversely, barriers included scheduling conflicts, competing priorities, fear or worry about results, and financial concerns. Importantly, even among those who had not accessed genetic counseling, most expressed willingness to reconsider in the future. The study concluded that AYA cancer patients exhibit similar motivational drivers to other patient groups, but their younger age at diagnosis uniquely influences their decision-making process, especially regarding family planning and long-term risk management. The authors emphasized that genetic counseling should remain an ongoing conversation, as barriers such as cost or timing may not permanently prevent uptake, but rather delay it.

In a study carried out by Meadows and Padamsee (2021) in the United States, the researchers explored the impact of financial constraints on the use of genetic counseling, testing, and subsequent breast cancer risk-management decisions among women at elevated risk. A qualitative research design was employed, with semi-structured interviews conducted among 50 high-risk women. Participants were recruited purposively, ensuring representation of diverse financial and healthcare backgrounds. Data were analyzed inductively to capture the nuanced ways in which financial barriers influenced decision-making. The results revealed that women's decisions regarding breast cancer risk management were strongly affected by three main categories of financial constraints: lack of insurance, underinsurance, and competing financial demands (such as medical debt, raising children, or managing other health conditions). These constraints directly hindered access to genetic counseling, genetic testing, enhanced screening, and prophylactic surgeries. Women also reported significant mistrust toward healthcare providers and insurance companies, citing bias, lack of price transparency, and fears of genetic discrimination. A notable proportion of women expressed that even when tests or procedures were medically recommended, they refrained from pursuing them due to cost concerns, illustrating how financial insecurity perpetuates underutilization of preventive services.

Similarly, Cicin et al., (2024) conducted a review in Türkiye focusing on the challenges of genetic testing and counselling in personalized breast cancer care. While not an empirical survey, the study synthesized evidence on the clinical utility of germline BRCA testing and its role in guiding targeted therapy and secondary prevention. The authors highlighted that, despite its proven benefits, awareness and access to BRCA1/2 testing remain low in many developing countries, including Türkiye. Key barriers identified included fear of stigmatization, restrictive legislation, high costs, lack of awareness, confusion about the purpose of testing, and limited institutional access. These obstacles not only prevent patients from accessing lifesaving interventions but also increase long-term healthcare costs due to delayed or missed treatment opportunities. For example, patients who might have benefited from tailored therapies often continued with generalized treatment pathways, leading to higher recurrence risks and poorer survival outcomes. The study concluded that integrating genetic counseling and testing into national cancer control plans is critical for reducing breast cancer burden in Türkiye. The authors recommended that health policymakers develop structured pathways that embed genetic testing into comprehensive cancer care, ensuring affordability, accessibility, and patient education.

In a study conducted by Sun et al., (2020) in Singapore, the researchers explored the factors that shape the decisions of at-risk individuals to undergo genetic testing for hereditary breast and ovarian cancer syndromes. While much of the existing literature on this subject has come from Europe and the United States, little was known about the situation in Asia. To address this gap, the authors carried out in-depth interviews with 24 women who had undergone genetic testing, using a grounded theory approach and thematic analysis to interpret the data.

The findings revealed a complex interplay of motivating and discouraging influences on women's decisions. Many participants were encouraged to proceed with testing because they wished to create awareness for themselves and their families and recognized the potential health benefits the results might provide. A strong family history of cancer, coupled with the emotional and practical support of relatives, further strengthened their resolve. Recommendations from medical professionals were highly influential, and having adequate time to reflect on the decision also emerged as an important factor in their willingness to pursue testing. At the same time, barriers played a significant role in shaping the choices of participants. High costs were identified as the most pressing obstacle, preventing some women from either considering or following through with testing. Others expressed fears about not being able to cope emotionally with the results, especially if they turned out to be positive for hereditary risk. A further limitation was the lack of adequate information about the purpose, implications, and process of genetic testing, which created uncertainty and hesitation.

## 2.4 Summary of the Literature Review

The reviewed literature has provided a comprehensive understanding of genetic counselling for breast cancer, emphasizing its conceptual, theoretical, and empirical foundations. Conceptually, breast cancer remains one of the most prevalent malignancies among women globally, with a growing incidence in Africa and Nigeria due to delayed detection, genetic predispositions, and limited access to preventive care (Anyigba et al., 2021; Vanderpuye et al., 2021). The discovery of hereditary mutations such as *BRCA1* and *BRCA2* has underscored the importance of genetic counselling as a preventive and therapeutic strategy. Genetic counselling serves as a process that enables individuals to understand their risk of inherited cancer, make informed decisions, and adopt preventive measures (Berliner et al., 2021; Reid et al., 2022). However, awareness and utilization of genetic counselling remain suboptimal, especially in low- and middle-income settings like Nigeria, where cultural beliefs, socioeconomic factors, and healthcare infrastructure significantly influence health-seeking behaviour (Adejumo et al., 2021; Wuraola et al., 2025).

The conceptual review further revealed that awareness of genetic counselling is critical for uptake and effective prevention of hereditary breast cancer. Factors such as education, access to health information, healthcare provider recommendation, and family experiences influence awareness levels (Afaya et al., 2024; Wollney et al., 2025). Conversely, barriers including financial constraints, fear of discrimination, psychological distress, and inadequate healthcare infrastructure impede utilization (Dominic et al., 2024; Meadows & Padamsee, 2021). On the other hand, facilitators such as strong physician recommendations, family encouragement, and digital innovations like chatbots have shown potential to improve participation (Al-Hilli et al., 2023; Bokkers et al., 2023). For nurses and public health professionals, genetic counselling aligns with preventive care and early detection goals, empowering them to educate, advocate, and support individuals at risk of hereditary cancers (Adejumo et al., 2021; Ogunkorode et al., 2023).

The theoretical framework, based on the Health Belief Model (HBM), provides a behavioural explanation for awareness, perception, and utilization of genetic counselling services. The HBM posits that an individual’s health actions are shaped by their perceived susceptibility to illness, perceived severity of the condition, perceived benefits of taking preventive action, perceived barriers to action, cues to action, and self-efficacy (Rosenstock, 1974; Janz & Becker, 1984). In the context of this study, these constructs explain why some individuals may recognize their hereditary risk but still fail to utilize genetic counselling services due to barriers such as cost, stigma, or low confidence in navigating the healthcare system. Applying the HBM thus provides a framework for understanding how beliefs and perceptions influence decision-making regarding genetic counselling in a Nigerian context.

Empirical studies across different regions have reinforced these theoretical and conceptual insights. Research in the United States, Europe, and Asia shows that awareness and uptake of genetic counselling are relatively high where genetic services are well integrated into oncology care (Dubsky et al., 2024; Beard et al., 2021). In contrast, studies in sub-Saharan Africa, including Nigeria, report low levels of awareness and utilization, primarily due to limited-service availability, poor policy integration, and cultural misconceptions about genetics (Adejumo et al., 2023; Mapoko et al., 2023; Wuraola et al., 2025). Similar findings from Ghana, Tanzania, and Cameroon indicate that socio-economic barriers, lack of professional training, and limited government support remain significant obstacles (Dominic et al., 2024; Kamga et al., 2024). Nonetheless, emerging evidence suggests that increasing educational interventions and digital outreach can enhance knowledge and encourage greater participation in genetic testing and counselling (Wollney et al., 2025; Al-Hilli et al., 2023).

# CHAPTER THREE

# METHODOLOGY

This chapter described the methodology that the researcher adopted in conducting this study. The various components of the research methodology were discussed under their respective headings, including research design, study setting, target population, sample and sampling technique, instruments of data collection, validity and reliability of instruments, method of data collection, method of data analysis, and ethical considerations.

## 3.1 Research Design

This study employed a descriptive cross-sectional survey design to assess the awareness and perception of genetic counselling among relatives of breast cancer patients. This design was deemed suitable as it enabled the observation and collection of data from a defined population at a single point in time. Using a quantitative approach, the study aimed to generate measurable insights into the knowledge, attitudes, and perceived barriers associated with genetic counselling among individuals with a hereditary risk of breast cancer.

## 3.2 Research Setting

The study was conducted at the University of Benin Teaching Hospital (UBTH), located in Benin City, Edo State, Nigeria. UBTH, a prominent tertiary healthcare institution in southern Nigeria, offered a wide range of medical services, including oncology, surgery, diagnostics, and emerging genetic consultations.  As a major referral center, the hospital catered to a broad and diverse patient population from both urban and rural areas within Edo State and neighbouring regions. Due to the large number of breast cancer cases managed annually in its oncology and surgical departments, UBTH provided an appropriate setting for identifying and engaging with first-degree relatives of breast cancer patients for the study.

### 3.3 Target Population

The target population for the research included relatives of patients with breast cancer who are attending the University of Benin Teaching Hospital (UBTH).

#### 3.3.1 Inclusion Criteria

First-degree relatives (mothers, sisters, daughters) or second-degree relatives (aunts, grandmothers, nieces) of patients with breast cancer

- Aged 18 years and above

- Able to provide informed consent

- Relatives of patients diagnosed with breast cancer at UBTH

#### 3.3.2. Exclusion Criteria

- Relatives of patients with other types of cancer (not breast cancer)

- Individuals with a known history of breast cancer themselves

-Unable to provide informed consent due to cognitive or mental health issues

-Under 18 years old

### 3.4 Sample Size Determination

The Yamane formula (1967) was commonly used for calculating sample size from a finite population. The formula is:

$$n = \frac{N}{1 + N\,(e)^2}$$

Where:

n is the sample size,

N is the estimated population size of eligible relatives (estimated at 250 based on hospital data),

e is the margin of error (set at 0.05 for 95% confidence level).

Using the formula:

$$n = \frac{250}{1 + 250\,(0.05)^2} = 153.846 = 154$$

To accommodate possible non-responses or incomplete questionnaires, a 10% buffer (15) will be added, bringing the total sample size to approximately 169 respondents.

### 3.5 Sampling Technique

A purposive sampling technique was used for participant selection. Hospital records were reviewed to identify breast cancer patients who were currently undergoing treatment, after which their first-degree relatives were approached for inclusion in the study. This non-probability sampling method was suitable given the need to reach a specific group of relatives of breast cancer patients who were most relevant for the study objectives. Only those who met the inclusion criteria and provided informed consent were selected.

### 3.6 Instrument for Data Collection

Data were collected using a structured interviewer-administered questionnaire developed specifically for the study. The questionnaire consisted of five sections:

- Section A: Socio-Demographic and Background Information
- Section B: Awareness of Genetic Counselling for Breast Cancer
- Section C: Perception of Genetic Counselling for Breast Cancer
- Section D: Utilization of Genetic Counselling for Breast Cancer
- Section E: Barriers to the Utilization of Genetic Counselling

### 3.7 Validity of the Instrument

To ensure content and face validity, the questionnaire was reviewed by experts in genetic counselling, oncology, and public health. Their feedback guided the modification of items to ensure that all questions were relevant, clearly worded, and appropriate for the target population. Additionally, the questionnaire underwent pre-testing with a small sample (n=20) of relatives from a different hospital setting to identify any ambiguities or inconsistencies in the questions.

### 3.8 Reliability of the Instrument

The reliability of the questionnaire was assessed using the Cronbach's alpha coefficient, which measured the internal consistency of items within each section. A coefficient of 0.70 or higher was considered acceptable, indicating that the instrument yielded consistent and reliable data. Any section falling below the reliability threshold was revised before the full deployment of the tool.

### 3.9 Method of Data Collection

The data collection process was conducted by trained research assistants with experience in public health surveys and patient interaction. After obtaining ethical clearance and permission from UBTH management, potential participants were approached in the outpatient oncology unit and family support areas. Each respondent was briefed on the study, and informed consent was obtained. Questionnaires were administered in either English or Pidgin English (where necessary) to accommodate varying literacy levels, and responses were recorded manually or digitally.

### 3.10 Method of Data Analysis

The data were analysed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the socio-demographic characteristics and levels of awareness and perception. Inferential statistics such as the Chi-square test were employed to determine the association between socio-demographic factors and awareness/perception of genetic counselling. A p-value of $< 0.05$ was considered statistically significant.

### 3.11 Ethical Considerations

Ethical approval was sought and granted by the main research ethics committee board of the hospital management board of the University of Benin Teaching Hospital, Benin City. The application letter, which also served as the letter of introduction from the Department of Nursing Sciences, University of Benin, was duly signed by the Head of Department and stamped before being sent to the ethics office of UBTH. Upon receiving permission from the authorities, copies were made to carry along to the wards while distributing the questionnaires. The code of ethics aimed at protecting the rights of individuals used as subjects of the research included:

**Informed Consent and Voluntary Participation:** A proper process was followed to obtain informed consent from the participants. This process involved allowing the participants to freely give consent after fully understanding the research and ensuring they were competent in the area of study. Participants were adequately informed about the research, understood the information, and had the freedom to decide whether they wanted to participate or decline. Participants' agreement to participate was obtained only after a thorough explanation of the research process. All participants were required to give verbal informed consent. Potential participants were approached individually and given an explanation of the study’s purpose and data collection process. They were provided with appropriate time to read the information sheet and ask any questions. It was clearly explained to potential participants that they had the right to decline to answer the questionnaires.

**Anonymity and Confidentiality:** The anonymity and confidentiality of the participants were preserved by not revealing their names or identities in the data collection, analysis, and reporting of the study findings. Privacy and confidentiality were managed by leaving the nurses with the questionnaires, retrieving them later, and immediately placing them into an envelope after ensuring they were filled out.

**Beneficence / Non-Maleficence**: It was ensured that no offensive, discriminatory, or other unacceptable language was used in the formulation of the questionnaire's questions. The works of other authors used in any part of the research discussion were duly acknowledged with the use of the APA referencing system, in accordance with the school-approved version and style.

# CHAPTER FOUR

# RESULTS

This chapter deals with the representation of data collected regarding the awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. A total of 169 questionnaires were distributed to relatives of patients with cancer in the University of Benin Teaching Hospital during the period of the study. 163 were properly filled and valid for data analysis, giving a response rate of 96.5%.

**Table 4.1: Socio-Demographic Characteristics of respondents. (n = 163)**

*Table 1:Table 4.2 :Socio-demographic characteristics.(n=163)*

| Variable | Frequency (n = 163) | Percent (%) |
|---|---|---|
| **Age (years)** | | |
| 18–24 | 27 | 16.6 |
| 25–34 | 42 | 25.8 |
| 35–44 | 39 | 23.9 |
| 45–54 | 31 | 19.0 |
| 55 and above | 24 | 14.7 |
| **Sex** | | |
| Male | 68 | 41.7 |
| Female | 95 | 58.3 |
| **Marital Status** | | |
| Single | 52 | 31.9 |
| Married | 89 | 54.6 |
| Divorced | 9 | 5.5 |
| Widowed | 13 | 8.0 |
| **Relationship to Cancer Patient** | | |
| Parent | 32 | 19.6 |
| Sibling | 46 | 28.2 |
| Child | 21 | 12.9 |
| Spouse | 38 | 23.3 |
| Other (specify) | 26 | 16.0 |

| | | |
|---|---|---|
| **Educational Level** | | |
| No formal education | 10 | 6.1 |
| Primary | 22 | 13.5 |
| Secondary | 48 | 29.4 |
| Tertiary | 59 | 36.2 |
| Postgraduate | 24 | 14.7 |

**Table 4.1 Cont'd**

| Variable | Frequency (n = 163) | Percent (%) |
|---|---|---|
| **Occupation** | | |
| Student | 19 | 11.7 |
| Trader | 36 | 22.1 |
| Civil servant | 41 | 25.2 |
| Private employee | 27 | 16.6 |
| Unemployed | 29 | 17.8 |
| Other (specify) | 11 | 6.7 |
| **Monthly Income (₦)** | | |
| Less than 50,000 | 47 | 28.8 |
| 50,000–100,000 | 55 | 33.7 |
| 100,001–200,000 | 35 | 21.5 |
| Above 200,000 | 18 | 11.0 |
| Prefer not to say | 8 | 4.9 |
| **Place of Residence** | | |
| Urban | 112 | 68.7 |
| Rural | 51 | 31.3 |
| **Religion** | | |
| Christianity | 118 | 72.4 |
| Islam | 33 | 20.2 |
| Traditional | 7 | 4.3 |
| Other (specify) | 5 | 3.1 |
| **Ethnicity** | | |
| Edo | 71 | 43.6 |
| Yoruba | 29 | 17.8 |
| Igbo | 37 | 22.7 |

| | | |
|---|---|---|
| Hausa | 15 | 9.2 |
| Other (specify) | 11 | 6.7 |

Table 4.1 shows the socio-demographic characteristics of relatives of patients with cancer in the University of Benin Teaching Hospital. The results indicate that respondents were fairly distributed across different age groups, with the highest proportion (25.8%) aged 25–34 years, followed by 23.9% aged 35–44 years, while the least represented group was those aged 55 years and above (14.7%). In terms of sex distribution, females (58.3%) were more represented than males (41.7%). Regarding marital status, more than half of the respondents were married (54.6%), 31.9% were single, while a smaller proportion were divorced (5.5%) or widowed (8.0%). The relationship to the cancer patients varied, with siblings forming the largest group (28.2%), followed by spouses (23.3%), parents (19.6%), and children (12.9%), while 16.0% fell into other categories. Educational attainment showed that the majority of respondents had tertiary education (36.2%), 29.4% had secondary education, 13.5% had primary education, while only 6.1% had no formal education, and 14.7% possessed postgraduate qualifications. In terms of occupation, civil servants made up the highest group (25.2%), followed by traders (22.1%), unemployed individuals (17.8%), private employees (16.6%), and students (11.7%). Monthly income distribution revealed that a significant proportion earned between ₦50,000–₦100,000 (33.7%), while 28.8% earned less than ₦50,000. About 21.5% earned between ₦100,001–₦200,000, and 11.0% earned above ₦200,000, while 4.9% preferred not to disclose their income. Most respondents resided in urban areas (68.7%), while 31.3% were from rural areas. Concerning religion, Christianity was predominant (72.4%), followed by Islam (20.2%), traditional religion (4.3%), and other faiths (3.1%). Ethnically, Edo respondents constituted the majority (43.6%), followed by Igbo (22.7%), Yoruba (17.8%), Hausa (9.2%), and other ethnic groups (6.7%).

## Answering Research Questions

**Research Question 1:** What is the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

**Table 4.2: Level of Awareness of Genetic Counselling for Breast Cancer Among Relatives of Patients with Cancer (n = 163)**

*Table 2:Table 4.2: Level of awareness of Genetic Counselling for Breast Cancer Among Relatives of Patients with Cancer(n=163)*

| Variables | Frequency | Correct (n, %) | Wrong (n, %) | Mean | Remark |
|---|---|---|---|---|---|
| **Genetic counselling for breast cancer mainly helps individuals to:** | | 49 (30.1) | 114 (69.9) | 1.3 | Poor |
| Understand their risk of inheriting or passing on breast cancer genes | 49 (30.1) | | | | |
| Cure breast cancer completely | 64 (39.3) | | | | |
| Avoid all types of cancer | 50 (30.6) | | | | |
| **The genes most commonly linked with hereditary breast cancer are:** | | 55 (33.7) | 108 (66.3) | 1.3 | Poor |
| BRCA1 and BRCA2 | 55 (33.7) | | | | |
| HPV and HIV | 63 (38.7) | | | | |
| DNA and RNA | 45 (27.6) | | | | |
| **Who usually provides genetic counselling**? | | 52 (31.9) | 111 (68.1) | 1.3 | Poor |
| Trained health professionals or genetic counsellors | 52 (31.9) | | | | |
| Herbal practitioners | 61 (37.4) | | | | |
| Family members | 50 (30.7) | | | | |
| **The main purpose of genetic counselling is to:** | | 58 (35.6) | 105 (64.4) | 1.4 | Poor |
| Provide information and guidance about inherited cancer risk | 58 (35.6) | | | | |
| Predict future gender of children | 55 (33.7) | | | | |
| Treat already diagnosed breast cancer | 50 (30.7) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| **Genetic counselling is recommended for:** | | 61 (37.4) | 102 (62.6) | 1.4 | Poor |
| Individuals with personal or family history of breast or ovarian cancer | 61 (37.4) | | | | |
| Only elderly women | 46 (28.2) | | | | |
| Everyone regardless of family history | 56 (34.4) | | | | |

**Table 4.2 Cont’d**

| Variables | Frequency | Correct (n, %) | Wrong (n, %) | Mean | Remark |
|---|---|---|---|---|---|
| **Which of the following is true about genetic testing for breast cancer?** | | 57 (35.0) | 106 (65.0) | 1.4 | Poor |
| It can identify inherited mutations that increase cancer risk | 57 (35.0) | | | | |
| It is used to detect active breast cancer tumours | 54 (33.1) | | | | |
| It replaces normal cancer screening | 52 (31.9) | | | | |
| **The result of a genetic test can help a person to:** | | 60 (36.8) | 103 (63.2) | 1.4 | Poor |
| Take preventive actions or start early screening | 60 (36.8) | | | | |
| Avoid regular medical check-ups | 53 (32.5) | | | | |
| Stop worrying about cancer completely | 50 (30.7) | | | | |
| **Where can genetic counselling services usually be obtained?** | | 62 (38.0) | 101 (62.0) | 1.4 | Poor |
| In hospitals or specialized genetic clinics | 62 (38.0) | | | | |
| In community markets | 48 (29.4) | | | | |
| Only through online advertisements | 53 (32.6) | | | | |
| **Which of the following statements is correct about breast cancer inheritance?** | | 59 (36.2) | 104 (63.8) | 1.4 | Poor |
| It can run in families due to genetic mutations | 59 (36.2) | | | | |

| | | | | | |
|---|---|---|---|---|---|
| It can never be inherited | 54 (33.1) | | | | |
| It is only caused by lifestyle and diet | 50 (30.7) | | | | |
| **Awareness of genetic counselling helps individuals to:** | | 65 (39.9) | 98 (60.1) | 1.4 | Poor |
| Make informed health decisions and reduce cancer risk | 65 (39.9) | | | | |
| Depend solely on self-medication | 47 (28.8) | | | | |
| Avoid visiting hospitals | 51 (31.3) | | | | |
| | | | **Grand Mean** | **1.4** | **Poor** |

**Mean Cut-off = 1.5**

**Table 4.2** shows the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The findings reveal generally low awareness levels across all items, with mean scores below the cut-off point of 1.5. The highest mean value (1.4) was recorded for several items, including the main purpose of genetic counselling, the recommendation for individuals with a family history of breast or ovarian cancer, knowledge of genetic testing for breast cancer, understanding that genetic test results can guide preventive actions, awareness of where to obtain genetic counselling services, recognition that breast cancer can be inherited, and awareness that genetic counselling helps individuals make informed health decisions. The lowest mean value (1.3) was observed in respondents’ understanding of the purpose of genetic counselling, knowledge of the genes linked with hereditary breast cancer, and awareness of who provides genetic counselling services. The overall grand mean of 1.4 indicates a poor level of awareness of genetic counselling for breast cancer among the respondents.

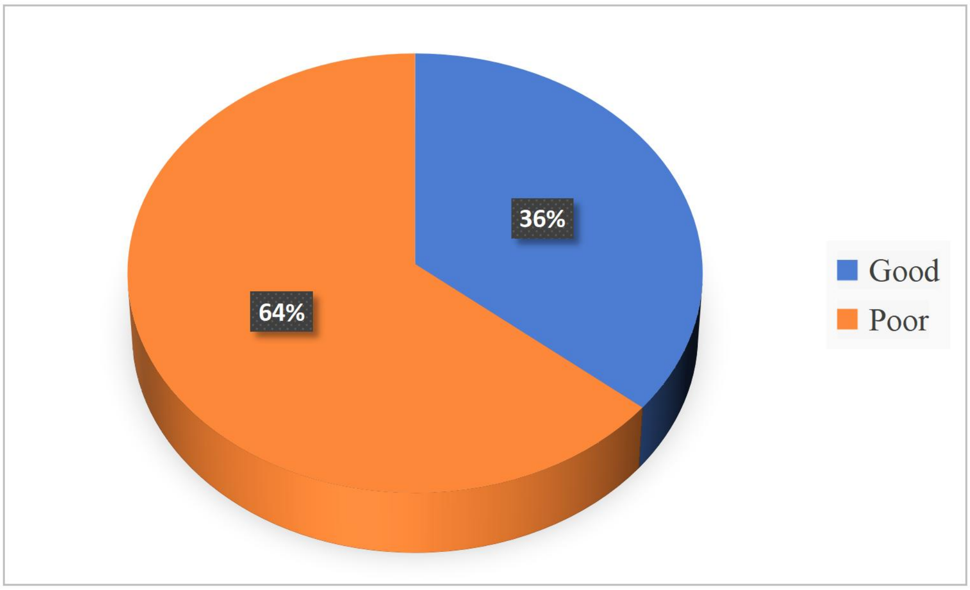

*Figure 1:Figure 4.2:Pie-chart showing the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital*

**Fig 4.1: Pie-chart showing the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital**

**Fig 4.1 shows** the level of awareness of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The figure reveals that a majority of the respondents, 105 (64), had poor awareness of genetic counselling for breast cancer, while only 58 (36) demonstrated good awareness.

**Research Question 2:** What is the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

**Table 4.3: Perception of Genetic Counselling for Breast Cancer Among Relatives of Patients with Cancer.**

*Table 3:Table 4.3:Perception of Genetic Counselling for Breast Cancer Among Relatives of Patients with Cancer.*

| Statements | Strongly Agree | Agree | Disagree | Strongly Disagree | Mean | Remark |
|---|---|---|---|---|---|---|
| Genetic counselling is important for the prevention of breast cancer. | 36 (22.1) | 42 (25.8) | 48 (29.4) | 37 (22.7) | 2.5 | Negative |
| I believe genetic counselling can help identify individuals at risk of breast cancer early. | 38 (23.3) | 40 (24.5) | 49 (30.1) | 36 (22.1) | 2.5 | Negative |
| Genetic counselling creates unnecessary fear and anxiety among people. | 18 (11.0) | 26 (16.0) | 61 (37.4) | 58 (35.6) | 2.0 | Negative |
| Knowing my genetic risk for breast cancer would motivate me to take preventive actions. | 32 (19.6) | 41 (25.2) | 47 (28.8) | 43 (26.4) | 2.4 | Negative |
| Genetic counselling is only necessary for people who already have breast cancer. | 14 (8.6) | 22 (13.5) | 67 (41.1) | 60 (36.8) | 1.9 | Negative |
| I think discussing family history of breast cancer with a health professional is useful. | 29 (17.8) | 38 (23.3) | 50 (30.7) | 46 (28.2) | 2.3 | Negative |
| I am comfortable with the idea of undergoing genetic counselling if recommended. | 31 (19.0) | 36 (22.1) | 50 (30.7) | 46 (28.2) | 2.3 | Negative |
| Genetic counselling can help reduce the number of breast cancer deaths. | 35 (21.5) | 39 (23.9) | 46 (28.2) | 43 (26.4) | 2.4 | Negative |
| Religious or cultural beliefs discourage participation in genetic counselling. | 27 (16.6) | 31 (19.0) | 53 (32.5) | 52 (31.9) | 2.2 | Negative |
| Genetic counselling provides emotional support for individuals and families at risk. | 30 (18.4) | 37 (22.7) | 51 (31.3) | 45 (27.6) | 2.3 | Negative |
| | | | **Grand Mean** | | **2.3** | **Negative** |

**Mean cut-off = 2.5**

**Table 4.3** shows the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The result indicates an overall negative perception, with a grand mean of 2.3, which is below the cut-off point of 2.5.

The highest mean values of 2.5 were recorded for the statements “Genetic counselling is important for the prevention of breast cancer” and “I believe genetic counselling can help identify individuals at risk of breast cancer early.” These were followed by mean scores of 2.4 for “Knowing my genetic risk for breast cancer would motivate me to take preventive actions” and “Genetic counselling can help reduce the number of breast cancer deaths.” Statements such as “I think discussing family history of breast cancer with a health professional is useful,” “I am comfortable with the idea of undergoing genetic counselling if recommended,” and “Genetic counselling provides emotional support for individuals and families at risk” all had mean values of 2.3. “Religious or cultural beliefs discourage participation in genetic counselling” recorded a mean of 2.2, while “Genetic counselling creates unnecessary fear and anxiety among people” had a mean of 2.0, and the lowest mean value of 1.9 was observed for the statement “Genetic counselling is only necessary for people who already have breast cancer.”

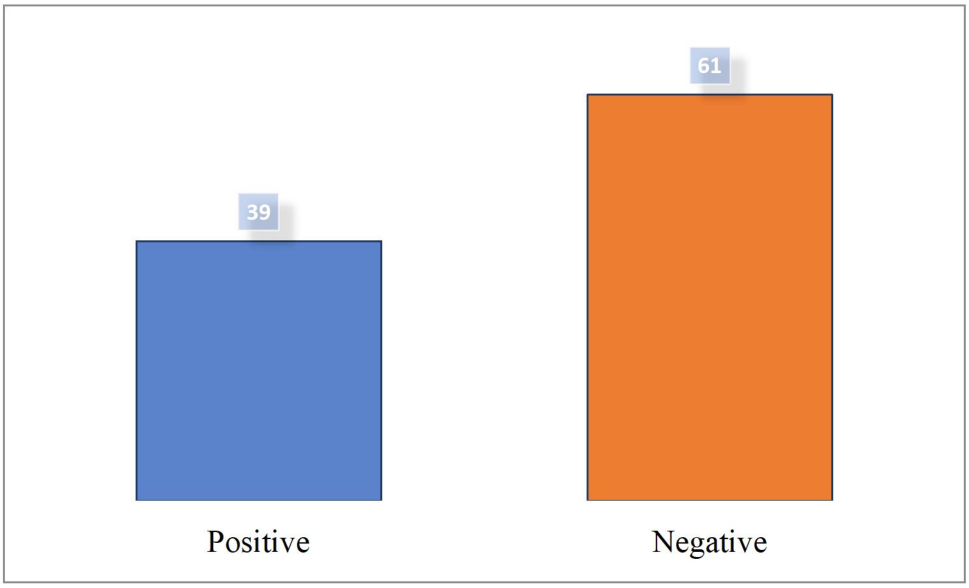

*Figure 2:Figure 4.2: Bar chart showing the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital*

**Figure 4.2: Bar chart showing the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.**

**Fig 4.2 shows** the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The figure indicates that 99 (61) of the respondents had a negative perception of genetic counselling for breast cancer, while only 64 (39) had a positive perception.

**Research question 3:** What is the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

**Table 4.4: The level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. (n = 163)**

*Table 4:Table 4.4: The level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital(n=163)*

| Statements | Always (A) | Sometimes (S) | Rarely (R) | Never (N) | Mean | Remark |
|---|---|---|---|---|---|---|
| How often do you visit the hospital/clinic to seek information about genetic counselling for breast cancer? | 12 (7.4) | 30 (18.4) | 60 (36.8) | 61 (37.4) | 2 | Low |
| How often do you discuss the possibility of genetic counselling with healthcare providers? | 10 (6.1) | 28 (17.2) | 58 (35.6) | 67 (41.1) | 1.9 | Low |
| How often do you encourage family members to undergo genetic counselling for breast cancer? | 15 (9.2) | 35 (21.5) | 55 (33.7) | 58 (35.6) | 2 | Low |
| How often have you attended any session or program related to breast cancer genetic counselling? | 8 (4.9) | 22 (13.5) | 40 (24.5) | 93 (57.1) | 1.7 | Low |
| How often do you seek professional advice when you notice symptoms/changes that may be related to breast cancer? | 20 (12.3) | 40 (24.5) | 60 (36.8) | 43 (26.4) | 2.2 | Low |
| How often do you use available hospital resources to learn about genetic counselling for breast cancer? | 9 (5.5) | 25 (15.3) | 50 (30.7) | 79 (48.5) | 1.8 | Low |
| How often have you been referred for genetic counselling by a healthcare professional? | 7 (4.3) | 20 (12.3) | 50 (30.7) | 86 (52.8) | 1.7 | Low |
| How often do you take steps to follow up on recommendations given during genetic counselling sessions? | 6 (3.7) | 18 (11.0) | 45 (27.6) | 94 (57.7) | 1.6 | Low |
| How often do you share information about genetic counselling with others in your community? | 14 (8.6) | 36 (22.1) | 60 (36.8) | 53 (32.5) | 2.1 | Low |
| How often do you prioritize attending appointments related to genetic counselling and cancer risk assessment? | 11 (6.7) | 30 (18.4) | 50 (30.7) | 72 (44.2) | 1.9 | Low |
| **Grand Mean** | | | | | **1.9** | **Low** |

**Mean Cut-off = 2.5**

**Table 4.4 shows** the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The result indicates generally low utilization, with a grand mean of 1.9, which is below the cut-off point of 2.5. The highest mean value of 2.2 was recorded for the statement "How often do you seek professional advice when you notice symptoms or changes that may be related to breast cancer." This was followed by mean scores of 2.1 for "How often do you share information about genetic counselling with others in your community," and 2.0 for both "How often do you visit the hospital or clinic to seek information about genetic counselling for breast cancer" and "How often do you encourage family members to undergo genetic counselling for breast cancer." Mean values of 1.9 were observed for "How often do you discuss the possibility of genetic counselling with healthcare providers" and "How often do you prioritize attending appointments related to genetic counselling and cancer risk assessment." Lower mean scores of 1.8, 1.7, and 1.6 were recorded for "How often do you use available hospital resources to learn about genetic counselling for breast cancer," "How often have you attended any session or program related to breast cancer genetic counselling," "How often have you been referred for genetic counselling by a healthcare professional," and "How often do you take steps to follow up on recommendations given during genetic counselling sessions," respectively.

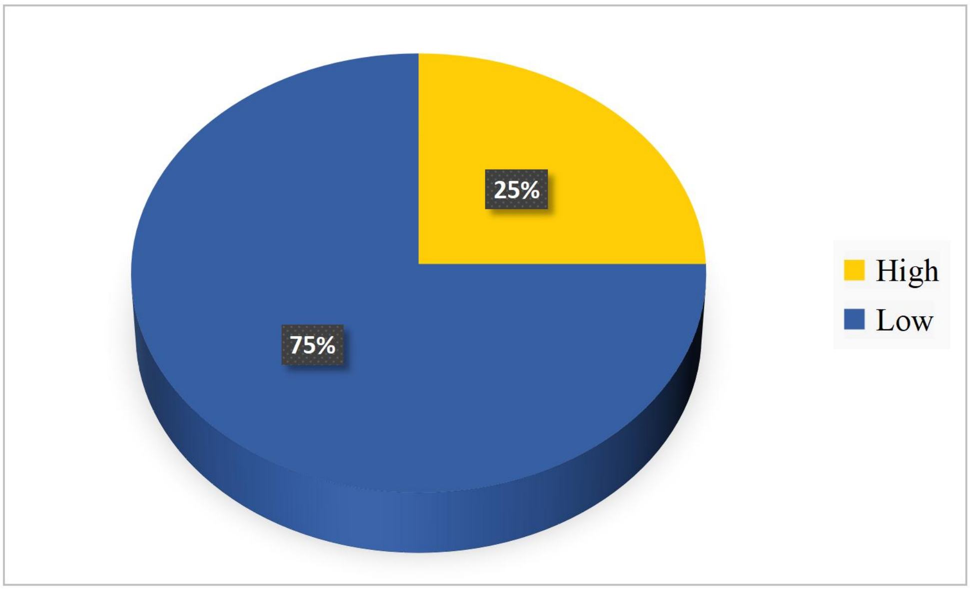

*Figure 3:Figure 4.3:Pie chart showing the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital*

**Fig 4.3: Pie chart showing the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.**

**Fig 4.3 shows** the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The figure reveals that 125 (75) of the respondents had a low level of utilization, while only 40 (25) demonstrated a high level of utilization.

**Research Question 4:** What are the barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital?

**Table 4.5: Barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer. (n = 163)**

*Table 5:Table 4.5: Barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer(n=163).*

| Statements | Strongly Agree | Agree | Disagree | Strongly Disagree | Mean | Remark |
|---|---|---|---|---|---|---|
| The cost of genetic counselling and testing is too expensive for most people. | 80 (49.1) | 55 (33.7) | 18 (11.0) | 10 (6.1) | 3.3 | Barrier |
| Genetic counselling services are not easily available in my community or hospital. | 75 (46.0) | 60 (36.8) | 16 (9.8) | 12 (7.4) | 3.2 | Barrier |
| I am afraid that the results of genetic testing could lead to discrimination or stigma. | 68 (41.7) | 58 (35.6) | 22 (13.5) | 15 (9.2) | 3.1 | Barrier |
| There are not enough trained professionals to provide genetic counselling in Nigeria. | 72 (44.2) | 60 (36.8) | 18 (11.0) | 13 (8.0) | 3.2 | Barrier |
| Lack of awareness about the benefits of genetic counselling discourages people from using the service. | 83 (50.9) | 50 (30.7) | 18 (11.0) | 12 (7.4) | 3.3 | Barrier |
| Cultural and religious beliefs make people reluctant to go for genetic counselling. | 70 (42.9) | 55 (33.7) | 23 (14.1) | 15 (9.2) | 3.1 | Barrier |
| Fear of discovering a high risk of breast cancer prevents people from attending counselling sessions. | 64 (39.3) | 58 (35.6) | 25 (15.3) | 16 (9.8) | 3.0 | Barrier |
| Healthcare providers rarely recommend genetic counselling to patients or their relatives. | 69 (42.3) | 54 (33.1) | 26 (16.0) | 14 (8.6) | 3.1 | Barrier |
| The process of booking and attending counselling sessions is time-consuming. | 60 (36.8) | 59 (36.2) | 27 (16.6) | 17 (10.4) | 3.0 | Barrier |
| There is poor government and institutional support for integrating genetic counselling into cancer care. | 76 (46.6) | 52 (31.9) | 20 (12.3) | 15 (9.2) | 3.2 | Barrier |
| **Grand Mean** | | | | | **3.1** | **Barrier** |

**Mean Cut-off = 2.5**

**Table 4.5 shows** the barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The result reveals that all the listed factors were identified as barriers, with a grand mean of 3.1, which is above the cut-off point of 2.5. The highest mean values of 3.3 were recorded for the statements “The cost of genetic counselling and testing is too expensive for most people” and “Lack of awareness about the benefits of genetic counselling discourages people from using the service.” These were followed by mean scores of 3.2 for “Genetic counselling services are not easily available in my community or hospital,” “There are not enough trained professionals to provide genetic counselling in Nigeria,” and “There is poor government and institutional support for integrating genetic counselling into cancer care.” Mean values of 3.1 were observed for “I am afraid that the results of genetic testing could lead to discrimination or stigma,” “Cultural and religious beliefs make people reluctant to go for genetic counselling,” and “Healthcare providers rarely recommend genetic counselling to patients or their relatives.” The lowest mean values of 3.0 were recorded for “Fear of discovering a high risk of breast cancer prevents people from attending counselling sessions” and “The process of booking and attending counselling sessions is time-consuming.”

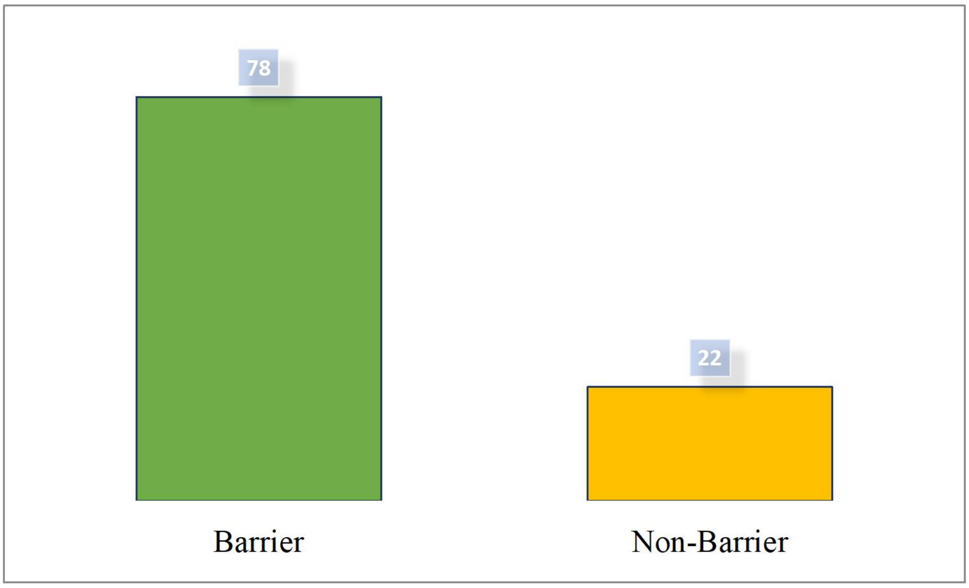

*Figure 4:Figure 4.4: Bar chart showing barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital*

**Fig 4.4: Bar chart showing barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.**

**Fig 4.4 shows** the barriers that hinder the utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The figure indicates that 128 (78) of the respondents identified various factors as barriers to the utilization of genetic counselling, while only 35 (22) did not perceive such barriers.

**Hypothesis Testing.**

1. There is no significant relationship between the level of awareness and the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital

**Table 4.6:** Relationship between the level of awareness and the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.

*Table 6:Table 4.6: The relationship between the level of awareness and the perception of genetic counselling among relatives of patients with cancer in the University of Benin Teaching Hospital.*

| **Awareness** | **Perception** | | **Test Statistics ($\chi^2$)** | **df** | **P value** | **Decision** |
|---|---|---|---|---|---|---|
| | **Positive** | **Negative** | | | | |
| **Good** | 58(36) | 64(39) | 5.787 | 1 | 0.012 | Rejected |
| **Poor** | 105(64) | 99(61) | | | | |

**Table 4.6 shows** the relationship between the level of awareness and the perception of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The result indicates that 58 (36) with good awareness had a positive perception, while 64 (39) with good awareness had a negative perception. In contrast, 105 respondents (64) with poor awareness demonstrated a negative perception of genetic counselling. The chi-square test yielded a value of 5.787 with 1 degree of freedom and a p-value of 0.012, which is less than the 0.05 level of significance. This shows a statistically significant relationship between the level of awareness and the perception of genetic counselling for breast cancer among the respondents; hence, the null hypothesis is rejected.

2. There is no significant relationship between the perception and the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital

**Table 4.7:** Relationship between the perception and the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.

*Table 7:Table 4.7: Relationship between the perception and the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital.*

| **Perception** | **Utilization** | | **Test Statistics ($\chi^2$)** | **df** | **P value** | **Decision** |
|---|---|---|---|---|---|---|
| | **High** | **Low** | | | | |
| **Positive** | 64(39) | 40(25) | 6.785 | 1 | 0.01 | Rejected |
| **Negative** | 99(61) | 125(75) | | | | |

**Table 4.7 shows** the relationship between the perception and the level of utilization of genetic counselling for breast cancer among relatives of patients with cancer in the University of Benin Teaching Hospital. The result reveals that 64 (39) with a positive perception had a high level of utilization, while 40 (25) with a positive perception and 99 respondents (61) with a negative perception had a low level of utilization of genetic counselling. The chi-square value ($\chi^2$) of 6.785 with 1 degree of freedom and a p-value of 0.01, which is less than the 0.05 level of significance, indicates a statistically significant relationship between perception and the level of utilization of genetic counselling for breast cancer. Therefore, the null hypothesis is rejected.

# CHAPTER FIVE

# DISCUSSION OF FINDINGS

This chapter discusses the major findings of the research compared with the literature reviewed, the implication for nursing, summary, conclusion, Recommendations and Suggestions for further Studies.

## 5.1. Discussion of major Findings

This study assessed awareness of genetic counselling for breast cancer among relatives of cancer patients at the University of Benin Teaching Hospital (UBTH). The socio-demographic profile of 163 respondents provided insights into their awareness, perception, utilization, and barriers to genetic counselling.

Most respondents were young adults (25–44 years), the group most likely to benefit from early preventive counselling. Effiong et al. (2023) similarly reported higher but shallow knowledge levels among young adults, while Hanson et al. (2023) and Ye et al. (2025) emphasized early engagement before disease onset. Females (58.3%) predominated, reflecting breast cancer's prevalence and women's higher health-seeking behavior, though men remain at genetic risk. The generally poor awareness (64%) and negative perception (61%) across genders underscore the need for targeted, gender-sensitive education. Over half of respondents were married (54.6%), which influences family decision-making. Meshkani et al. (2025) found married individuals more willing to test due to family motivations, though Meadows and Padamsee (2021) noted time and caregiving constraints—mirrored in this study, where 73% cited time-related barriers. Siblings (28.2%) and spouses (23.3%) formed the largest relationship groups, yet only 30.7% encouraged others to seek counselling. Afaya et al. (2024) and Kahn et al. (2023) observed that family communication enhances uptake, while fear and silence impede it.

Although 50.9% had tertiary or postgraduate education, awareness and utilization remained low (64% and 77%). Effiong et al. (2023) and Adejumo et al. (2023) found that education alone does not guarantee participation without targeted genetic literacy. Dron et al. (2023) and Sun et al. (2020) also linked poor health literacy to uncertainty and avoidance. Economically, most respondents earned ₦100,000 or less, with 82.8% identifying cost as a major barrier. Adejumo et al. (2023) similarly found willingness to pay well below actual testing costs, consistent with financial deterrents noted by Meadows and Padamsee (2021) and Kamaraju et al. (2024).

### The level of awareness of genetic counselling for breast cancer

Findings revealed that 64% of respondents demonstrated poor awareness, while only 36% showed good awareness. The grand mean score of 1.4, below the 1.5 benchmark, confirmed overall low awareness among individuals potentially at increased genetic risk. Item analysis exposed key misconceptions: only 30.1% correctly recognized that genetic counselling helps individuals understand hereditary breast cancer risk, and just 33.7% identified BRCA1 and BRCA2 as the key genes involved. These gaps indicate limited understanding of both the purpose and genetic basis of counselling. Adejumo et al. (2021) similarly reported that 89% of Nigerian nursing students had poor genomic knowledge, underscoring systemic deficits in genetic literacy even among health trainees. Effiong et al. (2023) also found that while 94.8% of Nigerians were aware of breast cancer, their mean knowledge score was only 40.57%, showing that superficial awareness rarely translates into informed understanding. Globally, Powell et al. (2024) found that 71% of breast cancer patients rated their pre-diagnosis genetic awareness as “low to moderate,” suggesting that limited literacy is a widespread issue. However, the especially low awareness in this study reflects contextual barriers such as inadequate access to counselling, weak public health education, and resource constraints in Nigeria.

Further deficits appeared in knowledge of counselling purpose and providers. Only 35.6% correctly identified that counselling guides individuals about inherited cancer risk, and 31.9% knew it is provided by trained professionals. The majority (68.1%) mistakenly believed that herbalists or family members offer such services, reflecting deep-seated misconceptions that may delay accurate diagnosis and prevention. Equally concerning, only 37.4% recognized that genetic counselling is recommended for those with a family or personal history of breast or ovarian cancer—despite all respondents being relatives of cancer patients. Wuraola et al. (2025) reported a similar trend, noting that only 32.2% of Nigerian healthcare providers had ever requested genetic testing, implying that low professional awareness further limits public understanding and referral. Moreover, only 36.8% understood that genetic test results can guide preventive actions or early screening, representing a missed opportunity for proactive cancer prevention. Overall, consistently poor response rates (30–39.9% correct) indicate that knowledge gaps are broad rather than topic-specific. These findings align with Adejumo et al. (2021), who identified inadequate funding, lack of trained personnel, and weak institutional support as barriers to genomic practice in Nigeria. Such systemic limitations likely underpin the low public exposure and poor awareness observed in this study.

### The perception of genetic counselling for breast cancer

Findings revealed that 61% of respondents held negative perceptions toward genetic counselling, while 39% expressed positive views. The grand mean score of 2.3, below the 2.5 benchmark, confirmed overall negative perception. This suggests that beyond knowledge deficits, attitudinal barriers impede acceptance and utilization among high-risk individuals.

Item analysis showed consistent negativity across perception statements. Only 48% agreed that genetic counselling is important for breast cancer prevention, and 47.8% believed it aids early identification of at-risk individuals (mean = 2.5). These indicate that many relatives fail to appreciate the preventive and early detection value of genetic counselling. Emotional apprehension also shaped responses—27% agreed that counselling “creates unnecessary fear and anxiety.” Dibble et al. (2022) and Shin et al. (2021) reported similar anxiety among BRCA1/2 carriers and individuals receiving pathogenic results, showing that fear of emotional distress can deter participation even before counselling occurs.

Only 44.8% believed that knowing genetic risk would motivate preventive action, contrasting with Meshkani et al. (2025), who found 89.5% of Iranian women willing to undergo testing when adequately informed and supported. This disparity likely reflects Nigeria’s contextual barriers—low awareness, poor access, and strong cultural influence on health behaviour. Encouragingly, 77.9% disagreed that genetic counselling is only for diagnosed patients (mean = 1.9), though awareness did not translate to willingness, affirming that knowledge alone cannot drive attitude change.

Cultural and religious influences were notable, with 35.6% agreeing that such beliefs discourage participation (mean = 2.2). Olanrewaju and Olayiwola’s Ibadan study showed that education and psycho-education can improve attitudes; their SMS-based intervention significantly enhanced perception ($t(43) = 47.84$; $p < .05$). This demonstrates that negative perceptions are modifiable through culturally relevant education. In Nigeria, where spirituality and tradition strongly shape health choices, counselling programs must address these dynamics.

Only 41.1% believed that discussing family history with health professionals is useful, while 58.9% disagreed (mean = 2.3). Since family history assessment is central to hereditary risk detection, this misconception is concerning. Earla et al. (2025) found U.S. patients valued open family and clinician dialogue, highlighting a contrast with Nigerian respondents who undervalue communication. Likewise, only 41.1% expressed comfort undergoing counselling (mean = 2.3), aligning with Hanson et al. (2023), who noted that fear, cost, and family implications reduce willingness, particularly among emotionally distressed individuals. Limited pre-test education and counselling availability may amplify these barriers locally. Furthermore, only 41.1% recognized the emotional support role of counselling (mean = 2.3), contrasting with Dibble et al. (2022), who reported its value in fostering family solidarity and psychological relief. Similarly, just 45.4% believed that counselling can reduce breast cancer deaths, reflecting poor understanding of its clinical benefits despite evidence that early identification enables life-saving interventions. Overall, negative perceptions appear rooted in the poor awareness identified earlier. Ye et al. (2025) demonstrated that knowledge positively predicts attitude ($\beta = 0.343$, $p < 0.001$), which in turn influences practice ($\beta = 0.942$, $p < 0.001$). Thus, addressing knowledge without attitude will yield limited behavioural change. Systemic gaps also persist—Wuraola et al. (2025) found that only 9.9% of Nigerian healthcare providers had formal genetics training and 13.2% had access to a genetic counsellor. Without competent professionals to guide and reassure patients, misconceptions endure.

### The level of utilization of genetic counselling for breast cancer

The findings revealed that 77% of respondents demonstrated low utilization of genetic counselling services, while only 25% showed high utilization. With a grand mean score of 1.9—below the 2.5 cut-off—the overall utilization level was classified as low. This indicates that despite being a high-risk group due to family history, most relatives are not accessing or engaging with genetic counselling services. Item-specific analysis revealed consistently poor engagement: over half (57.7%) had never followed up on counselling recommendations, and 57.1% had never attended any genetic counselling session (mean = 1.7). Similarly, 52.8% had never been referred by a healthcare provider (mean = 1.7), suggesting limited provider-initiated referrals. These findings align with Wuraola et al. (2025), who reported that only

32.2% of Nigerian healthcare providers had ever requested genetic testing and just 13.2% had access to genetic counsellors—underscoring systemic gaps that hinder referrals and utilization. Likewise, Acevedo et al. (2023) found that only 15.7% of eligible Chilean breast cancer patients underwent genetic testing, indicating that low uptake is a widespread issue in low-resource settings. Powell et al. (2024) further showed that patients offered counselling were significantly more likely to undergo genetic testing, highlighting proactive provider engagement as a critical determinant of utilization. Although Adejumo et al. (2023) found that 86.6% of Nigerian cancer patients were willing to undergo testing, the current study's data (7.4% always seeking information; 37.4% never doing so; mean = 2.0) expose a gap between intention and action, likely driven by financial, informational, and accessibility constraints. Conley et al. (2021) demonstrated that removing such barriers through culturally tailored education and free counselling increased uptake over thirteenfold, implying similar strategies could transform utilization in Nigeria.

Family engagement was also poor: only 9.2% always encouraged relatives to undergo counselling, while 35.6% never did so (mean = 2.0), indicating weak intra-family communication. Afaya et al. (2024) stressed that supportive family dynamics promote cascade testing, yet this appears minimal among respondents. Furthermore, 48.5% never used hospital resources to learn about genetic counselling (mean = 1.8), reflecting both low health-seeking behaviour and limited institutional outreach. Alarmingly, 26.4% never sought professional advice upon noticing breast-related symptoms, implying broader healthcare avoidance patterns. Dominic et al. (2024) similarly reported that high treatment costs and reliance on traditional or faith-based alternatives constrain hospital-based decision-making in Tanzania—patterns likely mirrored in Nigeria. Additionally, 44.2% never prioritized appointments for risk assessment, suggesting low perceived urgency. Morand et al. (2022) found that even motivated patients cited time and scheduling barriers, implying similar local constraints. Community-level awareness was also weak: 32.5% never shared information on genetic counselling (mean = 2.1), despite interpersonal communication being a key health promotion channel in African contexts. Olanrewaju and Olayiwola (2021) showed that SMS-based psychoeducation can effectively improve attitudes, suggesting potential for scalable interventions. Overall, the consistently low utilization observed across all indicators reflects the combined effects of limited awareness (Objective One), negative perceptions (Objective Two), and systemic constraints—including service scarcity, poor provider training, high costs, and weak integration of genetic counselling into routine care. These findings highlight that willingness alone is insufficient; without structural support and targeted educational interventions, utilization will remain low.

### Barriers that hinder the utilization of genetic counselling for breast cancer

Findings showed that 78% of respondents identified multiple barriers to genetic counselling utilization, while only 22% did not. With a grand mean score of 3.1 (above the 2.5 benchmark), all examined factors were confirmed as significant barriers, revealing a complex interplay of financial, structural, and psychosocial constraints. Lack of awareness and cost emerged as the most prominent (mean = 3.3). About 81.6% agreed that poor awareness discouraged utilization, and 82.8% cited prohibitive cost. These results align with Meadows and Padamsee (2021) and Dron et al. (2023), who identified financial constraints and lack of insurance as major deterrents even in high-income contexts. In Nigeria, Adejumo et al. (2023) similarly found that most patients and relatives could only afford ₦10,000–₦30,000 for testing—far below actual costs—underscoring the impact of socioeconomic disparities.

The widespread lack of awareness mirrors earlier findings of poor knowledge about genetic counselling. Effiong et al. (2023) reported that although breast cancer awareness was high, only 40.6% demonstrated adequate understanding. This knowledge gap perpetuates low demand and advocacy, reinforcing the need for continuous public education. Limited-service availability and shortage of trained professionals also emerged as critical barriers (mean = 3.2). Most respondents (82.8%) noted that genetic counselling was unavailable in their communities. Wuraola et al. (2025) found that only 13.2% of Nigerian facilities had access to a counsellor, while Adejumo et al. (2021) identified inadequate training as a constraint to genomic nursing. These systemic weaknesses persist even where awareness and affordability improve.

Psychological barriers—fear of discrimination, stigma, and anxiety about test results—were reported by over 75% of respondents. Hanson et al. (2023), Kahn et al. (2023), and Smith-Uffen et al. (2021) similarly observed that such fears discourage engagement. Yet Shin et al. (2021) showed that effective counselling alleviates anxiety and improves well-being. Cultural and religious beliefs (mean = 3.1) also influenced utilization, consistent with Dominic et al. (2024) and Cicin et al. (2024), who found that traditional beliefs in Tanzania and Türkiye discouraged genetic testing. However, Conley et al. (2021) demonstrated that culturally tailored education improved uptake, suggesting that cultural sensitivity can transform barriers into facilitators.

Inadequate provider recommendation (75.4%, mean = 3.1) further constrained use. Powell et al. (2024) reported that only 44% of tested breast cancer patients received counselling, while Wuraola et al. (2025) found that merely 9.9% of Nigerian providers had formal genetics training. Expanding provider education and capacity-building is therefore essential. Time constraints (mean = 3.0) were cited by 73% of respondents, echoing Morand et al. (2022), who found that scheduling conflicts hinder participation. Poor institutional and governmental support (78.5%, mean = 3.2) was another major obstacle, linked to limited funding, weak policy frameworks, and lack of integration into cancer care. Acevedo et al. (2023) similarly noted policy gaps in Chile, while Kamaraju et al. (2024) and Levine et al. (2024) emphasized that underutilization reflects intertwined financial and social determinants.

The convergence of these barriers aligns with Afaya et al. (2024), who categorized psychosocial factors into facilitators, barriers, and bidirectional influences. In Nigeria, most currently function as barriers due to weak systems and scarce resources. Nonetheless, evidence from Meshkani et al. (2025) and Wollney et al. (2025) shows these challenges are surmountable—free or subsidized testing, targeted education, digital tools, and active clinician engagement have significantly improved uptake elsewhere.

Overall, the study underscores the need for multi-level interventions addressing individual, institutional, and policy dimensions. As recommended by Dron et al. (2023) and Cicin et al. (2024), effective strategies should include sustained public awareness, provider training, culturally sensitive communication, financial subsidies or insurance coverage, and integration of genetic counselling into national cancer control frameworks. Holistic action across these fronts is essential to enhance access and reduce the breast cancer burden in Nigeria.

## 5.2 Implications to Nursing Practice

The findings of this study have significant implications for nursing practice, particularly in the area of oncology and community health nursing. The observed poor level of awareness and negative perception of palliative care among caregivers of cancer patients highlight a critical need for nurses to take a proactive role in health education and advocacy. Nurses, being at the forefront of patient care, are strategically positioned to bridge the knowledge gap by providing continuous education to patients, families, and caregivers on the meaning, purpose, and benefits of palliative care. This will not only enhance understanding but also help dispel misconceptions that often hinder acceptance and utilization of such services. In clinical practice, nurses must integrate palliative care principles early in the management of cancer patients, emphasizing holistic care that addresses physical, psychological, social, and spiritual needs. The study's findings imply that nurses should assess caregivers' understanding of palliative care as part of routine care and provide individualized support based on identified needs. This patient- and family-centered approach aligns with the core values of nursing, ensuring compassionate and dignified care even in life-limiting conditions. From a community nursing perspective, the low utilization of palliative care services identified in this study calls for stronger community outreach and collaboration. Nurses working in primary health care settings should engage in community sensitization programs, workshops, and home visits to promote awareness and accessibility of palliative care. Through partnerships with religious leaders, traditional rulers, and local organizations, nurses can foster positive perceptions and encourage early referral to palliative care services.

### 5.3 Summary

This study examined the awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer at the University of Benin Teaching Hospital, Benin City, Edo State. The main objectives were to assess the level of awareness and understanding of genetic counselling, determine perceptions toward it, evaluate the extent of its utilization, and identify barriers affecting its uptake among this population.

A descriptive cross-sectional design was adopted, and data were collected using structured questionnaires administered to 169 respondents, of which 163 were valid for analysis, representing a 96.5% response rate. Data were analyzed using descriptive statistics, including frequencies, percentages, and mean scores. Findings revealed that the majority of respondents had poor awareness of genetic counselling for breast cancer. The overall grand mean score (1.4) was below the 1.5 cut-off, indicating inadequate knowledge of the concept, purpose, and benefits of genetic counselling. Although a few participants demonstrated some awareness, misconceptions about its role were widespread.

Respondents also exhibited generally negative perceptions toward genetic counselling, with a grand mean score of 2.3—below the 2.5 threshold. Many were uncertain about its usefulness in preventing breast cancer or identifying individuals at risk. Cultural and religious beliefs, fear of stigmatization, and emotional anxiety were identified as key contributors to these negative attitudes. Utilization of genetic counselling services was equally low. With a grand mean score of 1.9 (below the 2.5 benchmark), most respondents rarely or never engaged in genetic counselling-related activities such as seeking information, attending sessions, or encouraging relatives to participate. Several barriers were identified as limiting utilization, with a grand mean of 3.1 (above the 2.5 benchmark), confirming their significance. The most prominent included the high cost of counselling and testing, lack of awareness, limited availability of services, shortage of trained professionals, and weak institutional or governmental support. Additional barriers comprised fear of discrimination, cultural and religious influences, and the time-consuming nature of accessing services.

## 5.4 Conclusion

This study assessed the awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer at the University of Benin Teaching Hospital (UBTH). The findings revealed that despite being a high-risk population due to their familial relationship with cancer patients, most respondents demonstrated poor awareness, negative perceptions, and low utilization of genetic counselling services. The overall results suggest a significant knowledge gap and attitudinal resistance toward genetic counselling, compounded by financial, cultural, and systemic barriers.

The study further established a statistically significant relationship between awareness and perception, as well as between perception and utilization of genetic counselling. This implies that improving knowledge and positive attitudes toward genetic counselling could enhance its acceptance and utilization among at-risk groups. However, poor access to trained genetic counsellors, high cost of services, and limited institutional or governmental support remain major challenges that need to be addressed.

These findings highlight the urgent need for multi-level interventions that include public health education, provider training, policy support, and financial assistance to make genetic counselling more accessible and acceptable. Nurses and other healthcare professionals have a crucial role to play in this process, as they are strategically positioned to educate patients and families, provide emotional support, and advocate for the integration of genetic counselling into routine cancer care. While genetic counselling offers immense potential for the prevention and early detection of hereditary breast cancer, its impact in Nigeria remains limited due to low awareness and utilization. Strengthening health education, building professional capacity, and implementing culturally sensitive and affordable counselling services will be vital to improving outcomes and reducing the burden of breast cancer among high-risk populations.

### 5.5 Limitations of the Study

Although this study provided valuable insights into the awareness, perception, and utilization of genetic counselling for breast cancer among relatives of patients with cancer at the University of Benin Teaching Hospital, certain limitations should be acknowledged.

Firstly, the study was conducted within a single tertiary hospital, which may limit the generalizability of the findings to other settings in Nigeria. The experiences and perceptions of respondents in other regions or healthcare institutions may differ due to variations in access to services, cultural beliefs, and socioeconomic conditions.

Secondly, the study relied on self-reported data collected through questionnaires. This approach may have been influenced by recall bias or social desirability bias, as some respondents might have provided answers they perceived as acceptable rather than their true opinions or experiences.

### 5.6 Recommendations

Based on the findings and conclusions of this study, the following recommendations are made to improve awareness, perception, and utilization of genetic counselling for breast cancer among relatives of cancer patients and the general population:

- The Ministry of Health, non-governmental organizations, and healthcare institutions should develop and implement comprehensive health education programs to increase public awareness about genetic counselling, hereditary breast cancer, and the importance of early screening. These campaigns should utilize mass media, community outreach, and social media platforms to reach diverse populations, including rural communities.
- Genetic counselling should be incorporated into routine cancer care and preventive health services in both public and private healthcare facilities. This will help ensure early identification of individuals and families at high risk and facilitate timely preventive measures.
- There is a need to train more healthcare providers, especially nurses, on genetic counselling principles and practices. Incorporating genetics and genomics into nursing and medical curricula will equip professionals with the knowledge and skills required to educate patients and refer them appropriately.
- The government, in collaboration with health insurance agencies and development partners, should subsidize the cost of genetic counselling and testing to make these

services affordable. Inclusion of genetic counselling in the National Health Insurance Scheme (NHIS) would also help improve access and utilization.

- Policymakers should establish clear national guidelines and frameworks for the integration of genetic counselling into cancer control programs. Hospitals should also establish functional genetic counselling units equipped with trained personnel and the necessary resources to deliver quality services.
- Public education and counselling strategies should be designed to respect cultural and religious values. Engaging community and religious leaders in advocacy efforts will help dispel myths and misconceptions and improve community acceptance of genetic counselling.
- Further research should be encouraged to generate local data on genetic counselling awareness, attitudes, and outcomes. This will help guide evidence-based policies and ensure interventions are tailored to the Nigerian context.
- Nurses should take a proactive role in educating patients and their families about hereditary cancer risks. Nurse-led awareness programs in oncology and primary healthcare settings can significantly improve knowledge, perception, and willingness to utilize genetic counselling services.

## 5.7 Suggestions for Further Study

In light of the findings and limitations of this study, the following suggestions are made for future research to deepen understanding and improve practice in the area of genetic counselling for breast cancer:

1. Similar studies should be conducted in other tertiary hospitals, primary healthcare centers, and rural communities across different geopolitical zones in Nigeria to compare findings and enhance generalizability.

2. Future research should adopt longitudinal or experimental designs to evaluate how awareness and perception influence long-term utilization of genetic counselling services over time.
3. Further studies should explore the level of knowledge, attitude, and preparedness of healthcare professionals especially nurses and physicians regarding genetic counselling and testing for breast cancer.
4. Researchers should design and test the effectiveness of educational interventions such as community outreach, digital health tools, and nurse-led psycho-education programs in improving awareness and perception of genetic counselling.
5. Studies assessing the cost-effectiveness, affordability, and policy implications of integrating genetic counselling into Nigeria’s cancer care framework would provide valuable evidence for government and stakeholders.
6. Qualitative studies should be carried out to explore in depth how cultural beliefs, religious views, and family dynamics affect decision-making and acceptance of genetic counselling among Nigerians.
7. Future research could extend to other hereditary cancers such as ovarian, prostate, and colorectal cancers to provide a broader understanding of genetic counselling utilization across cancer types.

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# APPENDIX I

# QUESTONNAIRE

## FACULTY OF NURSING SCIENCES

## COLLEGE OF MEDICAL SCIENCES

## UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

Dear Respondent,

I am a 500L student of the Department of Nursing Science, University of Benin carrying out research on: genetic counselling awareness for breast cancer among relatives of patients with cancer in a tertiary health institution, Benin-City, Edo State. As your contribution to the research, the questions are meant to generate reliable information. Your honest answers are appreciated and will be treated confidentially. This questionnaire is purely designed for academic research and will not be used for any other purpose. This shall be treated with utmost confidentiality.

Yours faithfully,

Instruction: please do not write your name, provide and tick the appropriate answer.

### Section A: Socio-Demographic Information

**Instruction:** Please tick (✓) the option that applies to you.

1. **Age:** ( ) 18–24 ( ) 25–34 ( ) 35–44 ( ) 45–54 ( ) 55 and above
2. **Sex:** ( ) Male ( ) Female
3. **Marital Status:** ( ) Single ( ) Married ( ) Divorced ( ) Widowed
4. **Relationship to the Cancer Patient:** ( ) Parent ( ) Sibling ( ) Child ( ) Spouse ( ) Other (specify) __________
5. **Educational Level:** ( ) No formal education ( ) Primary ( ) Secondary ( ) Tertiary ( ) Postgraduate
6. **Occupation:** ( ) Student ( ) Trader ( ) Civil servant ( ) Private employee ( ) Unemployed ( ) Other __________
7. **Monthly Income (₦):** ( ) Less than 50,000 ( ) 50,000–100,000 ( ) 100,001–200,000 ( ) Above 200,000 ( ) Prefer not to say
8. **Place of Residence:** ( ) Urban ( ) Rural
9. **Religion:** ( ) Christianity ( ) Islam ( ) Traditional ( ) Other __________
10. **Ethnicity:** ( ) Edo ( ) Yoruba ( ) Igbo ( ) Hausa ( ) Other __________
11. **Family History of Cancer (other than the patient):** ( ) Yes ( ) No

**Section B: Awareness of Genetic Counselling for Breast Cancer**

**Instruction:** Choose the correct answer by ticking (✓) the option that best fits your understanding.

1. Genetic counselling for breast cancer mainly helps individuals to: ( ) Cure breast cancer completely (✓) Understand their risk of inheriting or passing on breast cancer genes ( ) Avoid all types of cancer
2. The genes most commonly linked with hereditary breast cancer are: (✓) BRCA1 and BRCA2 ( ) HPV and HIV ( ) DNA and RNA

3. Who usually provides genetic counselling? ( ) Herbal practitioners (✓) Trained health professionals or genetic counsellors ( ) Family members
4. The main purpose of genetic counselling is to: ( ) Predict future gender of children (✓) Provide information and guidance about inherited cancer risk ( ) Treat already diagnosed breast cancer
5. Genetic counselling is recommended for: ( ) Only elderly women ( ) Everyone regardless of family history (✓) Individuals with personal or family history of breast or ovarian cancer
6. Which of the following is true about genetic testing for breast cancer? (✓) It can identify inherited mutations that increase cancer risk ( ) It is used to detect active breast cancer tumours ( ) It replaces normal cancer screening
7. The result of a genetic test can help a person to: ( ) Avoid regular medical check-ups (✓) Take preventive actions or start early screening ( ) Stop worrying about cancer completely
8. Where can genetic counselling services usually be obtained? (✓) In hospitals or specialized genetic clinics ( ) In community markets ( ) Only through online advertisements
9. Which of the following statements is correct about breast cancer inheritance? ( ) It can never be inherited (✓) It can run in families due to genetic mutations ( ) It is only caused by lifestyle and diet
10. Awareness of genetic counselling helps individuals to: (✓) Make informed health decisions and reduce cancer risk ( ) Depend solely on self-medication ( ) Avoid visiting hospitals

## Section C: Perception of Genetic Counselling for Breast Cancer

**Instruction:** Indicate your level of agreement with each statement by ticking (✓) the appropriate option.
**Scale:**
**SA = Strongly Agree | A = Agree | D = Disagree | SD = Strongly Disagree**

| S/N | Statements | SA | A | D | SD |
|---|---|---|---|---|---|
| 1 | Genetic counselling is important for the prevention of breast cancer. | | | | |
| 2 | I believe genetic counselling can help identify individuals at risk of breast cancer early. | | | | |
| 3 | Genetic counselling creates unnecessary fear and anxiety among people. | | | | |
| 4 | Knowing my genetic risk for breast cancer would motivate me to take preventive actions. | | | | |
| 5 | Genetic counselling is only necessary for people who already have breast cancer. | | | | |
| 6 | I think discussing family history of breast cancer with a health professional is useful. | | | | |
| 7 | I am comfortable with the idea of undergoing genetic counselling if recommended. | | | | |
| 8 | Genetic counselling can help reduce the number of breast cancer deaths. | | | | |
| 9 | Religious or cultural beliefs discourage participation in genetic counselling. | | | | |
| 10 | Genetic counselling provides emotional support for individuals and families at risk. | | | | |

## Section D: Utilization of Genetic Counselling for Breast Cancer

**Instruction:** Indicate how often each of the following applies to you by ticking (✓) the appropriate option.
**Scale:**
**A = Always | S = Sometimes | R = Rarely | N = Never**

| S/N | Statements | A | S | R | N |
|---|---|---|---|---|---|
| 1 | I visit the hospital or clinic to seek information about genetic counselling for breast cancer. | | | | |
| 2 | I discuss the possibility of genetic counselling with healthcare providers. | | | | |
| 3 | I encourage family members to undergo genetic counselling for breast cancer. | | | | |
| 4 | I have attended any session or program related to breast cancer genetic counselling. | | | | |
| 5 | I seek professional advice when I notice symptoms or changes that may be related to breast cancer. | | | | |
| 6 | I use available hospital resources to learn about genetic counselling for breast cancer. | | | | |
| 7 | I have been referred for genetic counselling by a healthcare professional. | | | | |
| 8 | I take steps to follow up on recommendations given during genetic counselling sessions. | | | | |
| 9 | I share information about genetic counselling with others in my community. | | | | |
| 10 | I prioritize attending appointments related to genetic counselling and cancer risk assessment. | | | | |

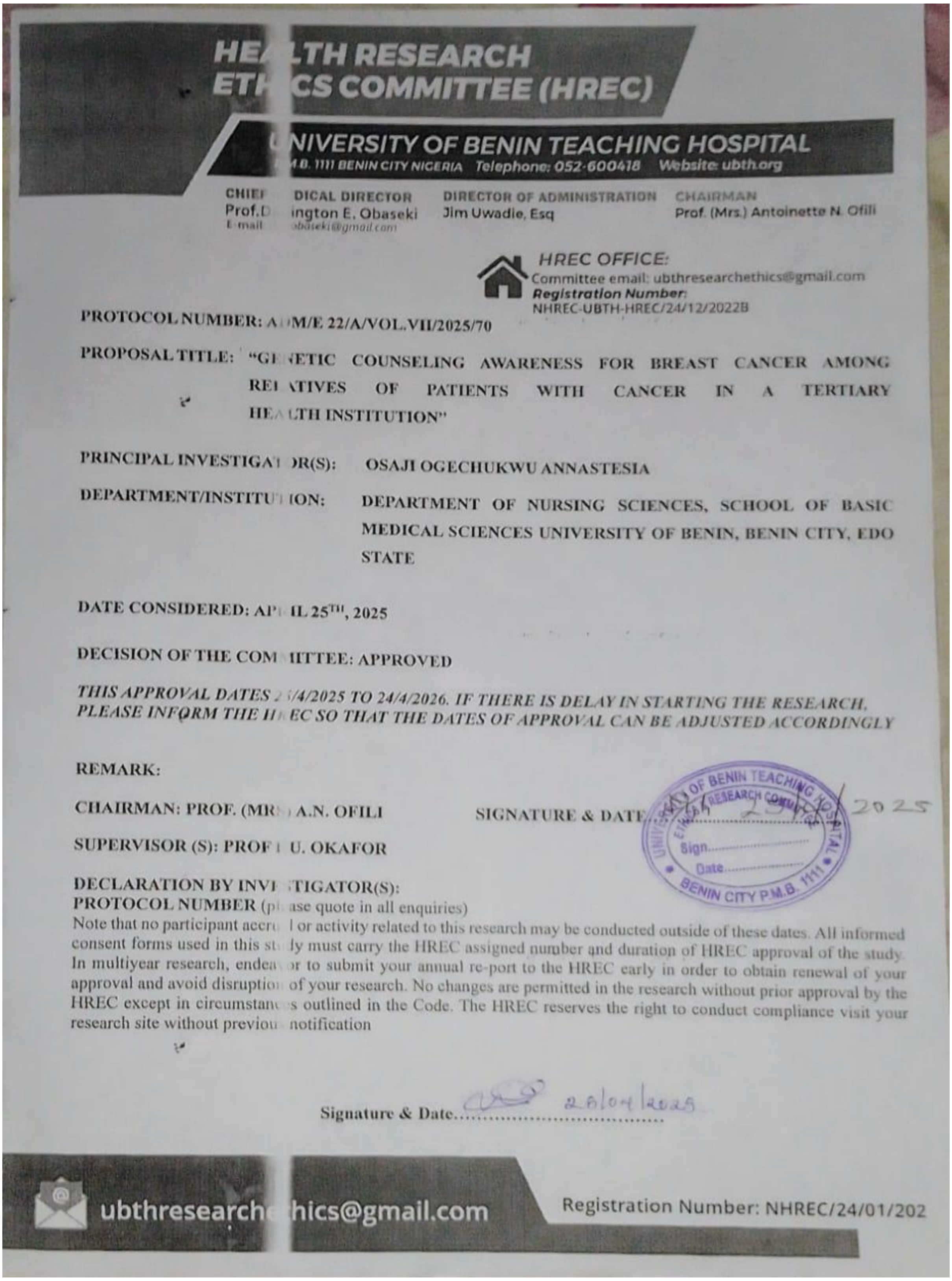
## Section E: Barriers to the Utilization of Genetic Counselling

**Instruction:** Indicate your level of agreement with the following statements by ticking (✓) the appropriate option.
**Scale:**
**SA = Strongly Agree | A = Agree | D = Disagree | SD = Strongly Disagree**

| S/N | Statements | SA | A | D | SD |
|---|---|---|---|---|---|
| 1 | The cost of genetic counselling and testing is too expensive for most people. | | | | |
| 2 | Genetic counselling services are not easily available in my community or hospital. | | | | |
| 3 | I am afraid that the results of genetic testing could lead to discrimination or stigma. | | | | |
| 4 | There are not enough trained professionals to provide genetic counselling in Nigeria. | | | | |
| 5 | Lack of awareness about the benefits of genetic counselling discourages people from using the service. | | | | |
| 6 | Cultural and religious beliefs make people reluctant to go for genetic counselling. | | | | |
| 7 | Fear of discovering a high risk of breast cancer prevents people from attending counselling sessions. | | | | |
| 8 | Healthcare providers rarely recommend genetic counselling to patients or their relatives. | | | | |
| 9 | The process of booking and attending counselling sessions is time-consuming. | | | | |
| 10 | There is poor government and institutional support for integrating genetic counselling into cancer care. | | | | |

**Thanks For Your Participation.**

# APPENDIX II



**HE LTH RESEARCH**
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Registration Number:
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**PROTOCOL NUMBER:** A M/E 22/A/VOL.VII/2025/70

**PROPOSAL TITLE:** "GE ETIC COUNSELING AWARENESS FOR BREAST CANCER AMONG REL ATIVES OF PATIENTS WITH CANCER IN A TERTIARY HEA LTH INSTITUTION"

**PRINCIPAL INVESTIGA OR(S):** OSAJI OGECHUKWU ANNASTESIA

**DEPARTMENT/INSTITUT ION:** DEPARTMENT OF NURSING SCIENCES, SCHOOL OF BASIC MEDICAL SCIENCES UNIVERSITY OF BENIN, BENIN CITY, EDO STATE

**DATE CONSIDERED:** AP IL 25TH, 2025

**DECISION OF THE COM ITTEE: APPROVED**

***THIS APPROVAL DATES /4/2025 TO 24/4/2026. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE H EC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY***

**REMARK:**

**CHAIRMAN:** PROF. (MR ) A.N. OFILI **SIGNATURE & DATE** 25/4/2025

**SUPERVISOR (S):** PROF U. OKAFOR

**DECLARATION BY INV TIGATOR(S):**
**PROTOCOL NUMBER** (pl ase quote in all enquiries)

Note that no participant accr l or activity related to this research may be conducted outside of these dates. All informed consent forms used in this st ly must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endea or to submit your annual re-port to the HREC early in order to obtain renewal of your approval and avoid disruptio of your research. No changes are permitted in the research without prior approval by the HREC except in circumstan s outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previou notification

Signature & Date.................................... 28/04/2025

ubthresearch hics@gmail.com Registration Number: NHREC/24/01/202