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Review Article

Genetic Screening and Counseling: Tool to Reduce Incidence of Breast Cancer

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Abstract

Breast cancer poses a significant global health challenge, often linked to hereditary factors. Genetic screening and counseling have emerged as critical tools for identifying individuals at elevated risk and implementing effective preventive strategies. This paper explores the multifaceted role of genetic screening and counseling in reducing the incidence of breast cancer, with a focus on Nigeria. The primary objectives of this paper are to provide an overview of the genetic basis of breast cancer, emphasize the significance of genetic screening and counseling, and explore the existing barriers and implications. A comprehensive literature review from PubMed and google scholar using related themes on genetic counseling and breast cancer were reviewed and discussed, emphasizing studies and research conducted in Nigeria. The exploration includes genetic counseling awareness, knowledge gaps, utilization, and acceptance. The literature review highlights the escalating burden of breast cancer in Nigeria and emphasizes the urgent need for targeted interventions. Limited awareness and knowledge of genetic aspects among breast cancer patients and healthcare providers are identified as significant gaps. Barriers to genetic counseling and testing, both from the provider and patient perspectives, are discussed. Genetic screening and counseling emerge as invaluable tools in the fight against breast cancer, offering a proactive approach to risk assessment, prevention, and personalized management. The paper concludes by emphasizing the importance of incorporating genetic education into nursing curricula, conducting further research on the effectiveness of genetic services, and promoting interdisciplinary collaboration to address barriers and improve breast cancer outcomes.

Keywords: Breast Cancer, BRCA 1, BRCA 2, Hereditary Cancer Risk, Preventive Strategies, Maternal Health.

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Introduction

Background of Breast Cancer

Cancer contributes to approximately one in six deaths globally as per the 2020 report from the World Health Organization (WHO, 2022). According to the Global Cancer Observatory (GLOBOCAN), there were 19.3 million reported cases of new cancers and about 10 million deaths in the year 2020. Between 5-10% of all cancers are due to a hereditary component. They are caused by germline mutations in the genetic blueprint of the cell — the deoxyribonucleic acid (DNA). An individual carrying a genetic mutation responsible for hereditary cancer runs the risk of developing cancer at an early age. It is therefore important that such carriers be identified early in life to circumvent the predicament of a late-stage diagnosis of cancer.

Breast cancer is the commonest cause of cancer death in women worldwide (Menon, Alkabban & Ferguson, 2024). Rates vary about five-fold around the world, but they are increasing in regions that until recently had low rates of the disease. Breast cancer is the leading cause of cancer-related death in the United States for Black and Hispanic women. Breast cancer is the second-leading cause of cancer-related death in the United States, following lung cancer, for Asian and Pacific Islander women, American Indian and Alaska Native women, and white women. Despite a similar incidence, mortality from breast cancer among Black women is 40% higher compared with White women. (Siegel et al., 2023; American Cancer Society, 2022)

The incidence of breast cancer varies by region, with higher rates observed in developed countries compared to developing countries. This disparity is largely attributed to differences in lifestyle, reproductive factors, and the availability of screening and diagnostic services. However, it is important to note that breast cancer mortality rates are decreasing in many high-income countries due to early detection and improved treatment options.

The burden of breast cancer (BC) is rising in Nigeria. Sung et al. (2021), stated in their study that the International Agency Research on Cancer (IARC) recorded 28,380 new BC

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cases in Nigeria in 2020, representing 22.7% of new cancers and accounting for the highest proportion of all cancer types. Nigeria has one of the world's highest age-standardized mortality rates of BC and the highest in Africa. GLOBOCAN 2020 reported Breast cancer as the most common cause of cancer-related death in Nigeria, accounting for 14,274 (18.1%) of all cancer death. A recent sub-Saharan African (SSA) multinational study by McCormack et al. (2020) found that BC patients in Nigeria had the lowest three-year survival rate of six countries evaluated: 36% in Nigeria, compared to 44% in Uganda, 47% in Zambia, 56% for Black women in Namibia and 59% for Black women in South Africa. IARC. Nigeria-Global Cancer Observatory.

Every year, breast cancer accounts for about 30% of all new cancer cases in United States women. Breast cancer accounts for 12.5% of all new annual cancer cases worldwide, making it the most common cancer in the world. Breast cancer is the most commonly diagnosed cancer among U.S. women. Each year, about 30% of all newly diagnosed cancers in women are breast cancer. Approximately 13% (about one in eight) of U.S. women are going to develop invasive breast cancer in the course of their life. In 2023, an estimated 297,790 new cases of invasive breast cancer are expected to be diagnosed in U.S. women, along with 55,720 new cases of Ductal carcinoma in situ (DCIS) (American Cancer Society, 2022). In 2023, an estimated 2,800 new cases of invasive breast cancer are expected to be diagnosed in men. A man's lifetime risk of breast cancer is about 1 in 833. There are currently more than four million women with a history of breast cancer in the United States. This includes women currently being treated and women who have finished treatment. In the United States, less than 1% of all breast cancers occur in men (American Cancer Society, 2022).

The likelihood of a successful course of therapy and survival is greatly increased with early identification of breast cancer. Mammography, clinical breast exams, and self-examinations are examples of screening techniques that are essential for detecting breast cancer early on, when it is more manageable. Specifically, mammography has been demonstrated to lower the death rate from breast cancer in women between the ages of 40 and 74 by about 20–40%. Primary and secondary measures are both a part of prevention efforts. The goal of primary prevention is to lower risk factors by changing lifestyle choices including not smoking, drinking less alcohol, staying physically active on a regular basis, and maintaining a healthy weight. Secondary prevention, particularly for women who are more vulnerable because of a genetic predisposition or family history, emphasizes early detection by routine screening and surveillance.

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

Breast Cancer Risk

American Cancer Society: "Breast Cancer Facts highlighted some risk for breast cancer:

Sex at birth and getting older: The most significant risk factors for breast cancer are being a woman and getting older. If you're trans or non-binary, it's essential that you speak with your doctor about your personal risk level so you can make sure to get screened as often as makes sense for you.

Family history: A woman's risk of breast cancer nearly doubles if she has a first-degree relative (e.g. their mother, sister, or daughter) who has been diagnosed with breast cancer. Approximately 15% of women who get breast cancer have a family member diagnosed with it.

Genetics: About 5% to 10% of breast cancers can be linked to known gene mutations inherited from one's mother or father. Mutations in the BRCA1 and BRCA2 genes are the most common.

About 85% of breast cancers occur in women who have no family history of breast cancer. These occur due to genetic mutations that happen as a result of the aging process and life in general, rather than inherited mutations. On average, women with a BRCA1 mutation have up to a 72% lifetime risk of developing breast cancer. Women with a BRCA2 mutation have up to a 69% risk. Breast cancer that is positive for the BRCA1 or BRCA2 mutations tends to develop more often in younger women. An increased ovarian cancer risk is also associated with these genetic mutations. In men, BRCA2 mutations are associated with a lifetime breast cancer risk of about 6.8%; BRCA1 mutations are a less frequent cause (American Cancer Society, 2022).

Breast cancer disparities by race and ethnicity: There are persistent disparities in breast cancer incidence and death rates: Black women are more likely to die from breast cancer than women of any other racial or ethnic group. Experts believe that it's partially because about 1 in 5 Black women is diagnosed with triple-negative breast cancer, more than any other racial or ethnic group.

Many of the established risk factors are linked to oestrogens. Risk is increased by early menarche, late menopause, genetics and obesity in postmenopausal women, and prospective studies have shown that high concentrations of endogenous oestradiol are associated with an increase in risk. Both oral contraceptives and hormonal therapy for

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

menopause cause a small increase in breast-cancer risk, which appears to diminish once use stops.

Both oral contraceptives and hormonal therapy for menopause cause a small increase in breast-cancer risk, which appears to diminish once use stops. Alcohol increases risk, whereas physical activity is probably protective.

Overview of Genetic Screening and Counseling

Genetic counseling is vital in helping people at high risk for hereditary breast and ovarian cancer (HBOC) make informed decisions to undergo BRCA testing. Many people, particularly those in rural locations, lack access to these services. (Jacobs et al., 2016). Committee for the Study of Inborn Errors of Metabolism opined that Genetic testing is a powerful tool that allows for the detection of BRCA and non-BRCA germline mutations in individuals with high risks of breast cancer, which in turn aids in the individualization of treatment. Given the magnitude of this disease, it is of great benefit for physicians, including general surgeons, to understand the indications, interpretations, and costs associated with genetic testing in patients with breast cancer. Cost is an especially important part of the genetic testing process and point of discussion with patients.

The U.S. Preventive Services Task Force supports genetic counseling and risk assessment for women at high risk for these mutations (Mette et al., 2016). Genetic counseling and risk assessment involves analysis of personal and family medical history, education regarding cancer risk and prevention, as well as discussion of genetic testing and interventions for people who test positive for a BRCA mutation (Mette et al., 2016). Cancer genetic services have traditionally included in-person counseling with pre- and post-testing counseling provided by a qualified health professional. However, the National Society of Genetic Counselors Service Delivery Model Task Force identifies four distinct methods for delivering genetic counseling services (Bradbury et al., 2016), which include in-person genetic counseling (IPGC), group genetic counseling, telegenetics, and telephone genetic counseling (TGC) (McDonald, Lamb, Grillo, Lucas, & Miesfeldt, 2014)

Within the United States, an estimated 350,000 women carry a BRCA1/2 mutation; however, it is likely that only 15% of these cases have been identified (Schwartz et al., 2014). Identification of women with a BRCA1/2 mutation is of important clinical significance because interventions can help reduce their risk of developing hereditary breast and ovarian cancer (HBOC), including early initiation of breast cancer screening, chemoprevention, and risk-reduction surgery, such as mastectomy or oophorectomy (Schwartz et al., 2014).

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

Poor outcomes in patients who are racialized as Black are seen across geographies. Breast cancer is the second leading cancer among women of African heritage, and breast cancer–associated mortality ranks the highest in the world, with a disproportionately low 5-year survival of 66% in contrast to high-income countries where survival approaches 90%.3,4 Country-specific survival estimates are as low as 12% in Uganda and neighboring countries. A lot of research that seeks to explain these disparities is through the lens of genetics. Genetic testing (GT) is part of standard of care, but uptake has been relatively low. Globally, there is limited literature on genetic testing and counseling (GT/C) that considers how racial groups are constructed in different time periods and geographies. Furthermore, racism and its impacts on inclusion and access to GT/C at a global scale are underexplored. GT/C has been used as a standard model in high-income countries, and is suggested to increase cancer-related knowledge, perceived personal control, and risk perception accuracy, and decrease cancer-related anxiety and decisional conflict among patients. Further, GT can affect surgical planning and play an essential role in the treatment course.

Despite the disproportionate disease burden and potential benefits for improving screening and treatment, Genetic testing and counseling does not appear to be widely incorporated into breast cancer care for women of African heritage. Genetic testing must be delivered with rigorous consideration of sociocultural, economic, and ethical contexts and guidelines for GT/C implementation in populations of African heritage have yet to be standardized. The purpose of this scoping review was to evaluate the literature on germline GT/C for breast cancer in women of African heritage. We aimed to assess previous germline breast cancer GT/C applications, identify barriers and facilitators for implementation, and identify gaps in the present literature. While multiple genes may confer inherited cancer risk, BRCA mutations (genes linked to Hereditary Breast and Ovarian Cancer [HBOC] syndrome) are the most prevalent and penetrant mutations, accounting for the majority of hereditary breast cancers (Euhus, & Robinson, 2013).

This paper aims to explore the effectiveness of genetic screening in detecting predispositions to breast cancer, particularly mutations in the BRCA1 and BRCA2 genes, which significantly increase the risk of developing the disease. By identifying these genetic markers, healthcare providers can offer tailored surveillance and preventive strategies, including lifestyle modifications, pharmacological interventions, and prophylactic surgeries. The paper will also discuss the critical role of genetic counseling in supporting patients through the screening process, addressing psychological concerns, and aiding in informed decision-making. Furthermore, this paper will examine the

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

broader implications of genetic screening and counseling within the context of maternal and child health. Given the hereditary nature of certain breast cancers, understanding genetic risks not only benefits the individual but also has significant intergenerational implications. By educating and supporting mothers, genetic counseling can promote a healthier family environment and reduce the overall burden of breast cancer on future generations. In summary, the purpose of this paper is to provide a comprehensive analysis of genetic screening and counseling as vital tools in the prevention of breast cancer, highlighting their importance in enhancing maternal and child health outcomes.

Review of Literatures

Research work which has been done on Genetic testing on breast cancer in Nigeria is limited and focused on a specific area, not many research work has been done exploring the knowledge, utilization and acceptance of genetic counseling and testing. Some research work found to be done on Genetic counseling in Nigeria focus mostly on genetic testing in sickle cell anemia, two research papers by Adejumo et al. (2018) and Samuel et al. (2017) were seen to be done in Nigeria which focuses on genetic testing and counseling on breast cancer in Nigeria.

In the research which was done on Knowledge of Genetic Counseling Among Patients with Breast Cancer and Their Relatives at a Nigerian Teaching Hospital by Adejumo et al. (2018), it was revealed from the data that was gathered that 91% of participants did not know anything about the genetics of breast cancer or genetic counseling; these participants were curious to know what genetics is about. Some other responses that were gathered from the research are, I never heard about genetic counseling, I never knew it is part of cancer care and management, I trained here and I have nursed breast cancer patients, but I never gave them genetic counseling because I didn't know about it and I will like to know, we have come for treatment, not counseling. I don't know anything about genetic counseling but it is a welcome idea, I never had any information about cancer or genetic counseling, I also fear that my children may contract it from me, I never heard any investigation called genetic testing for breast cancer, so I will like to have the counseling.

The second research work that was reviewed was on Breast Cancer Genetics Knowledge and Testing Intentions among Nigerian Professional Women done by Samuel et al. (2017).

Result from the study also shows low knowledge on awareness about BRACA 1 and BRACA 2 genes as well as genetic counseling and testing on breast cancer. Less than one quarter (13.6%) had heard about BRCA 1 or BRCA 2 genes. Among those aware of the

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

genes, 27 (36.0%) knew about it from the internet and 34.6% from radio/television. Other sources of information mentioned include the following: hospital (8%), relatives (8.0%), conferences (9.3%), and books/posters (4.0%). About one third (35.7%) perceived that they would be at risk of breast cancer if their close relative had an altered BRCA 1 or BRCA 2.

Objectives of Genetic Screening and Counseling

The main purpose of genetic counseling is to help patients and their family members understand genetic diseases and risk, discuss disease and risk management options, and explain the risks and benefits of genetic testing. Counseling sessions focus on providing patients with vital, unbiased information and nondirective assistance during the patient's decision-making process. Other objectives are:

To confirm a specific diagnosis in an individual.

To provide early recognition of a disease before signs and symptoms occur.

To identify carrier of a genetic disease for the purpose of maximizing parenthood planning options.

Genetic Testing and Screening.

Goddard et al. (2003) conclude that Genetic screening refers to explicit and systematic programmes directed either at whole populations of asymptomatic individuals or at subpopulations in which risk is known to be increased.

WHO Guidelines for screening for disease

The World Health Organization (1968) enumerated the following 10 guidelines that should be considered before the implementation of a screening programme:

- Is the disease an important health problem?
- Is there a recognizable latent or early symptomatic stage?
- Do we know the natural history of disease?
- Is there an effective treatment for patients with recognized disease?
- Is there a suitable test that will identify the disease in its early stages?
- Is the test acceptable to the population?
- Do we agree on who treats the disease?
- Are facilities for diagnosis and treatment available?
- Case finding should be ongoing.

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

- The cost of case finding (including diagnosis and treatment) should be economically balanced in relation to possible expenditures on medical care as a whole.

But 1998, the WHO has reiterated that the main objective of genetic screening is to prevent disease or secure early diagnosis and treatment. They have reaffirmed the voluntary use of genetic screening and proposed the following guidelines:

Genetic screening should be voluntary, not mandatory
Genetic screening should be preceded by adequate information about the purpose and possible outcomes of the screen or test and potential choices to be made;
Anonymous screening for epidemiological purposes may be conducted after notification of the population to be screened;
Results should not be disclosed to employers, insurers, schools, or others without the individual's consent, in order to avoid possible discrimination; In rare cases where disclosure may be in the best interests of the individual or of public safety, the health provider may work with the individual towards a decision by him/her; Test results should be followed by genetic counselling, particularly when they are unfavorable; If treatment or prevention exists or is available, this should be offered with a minimum of delay; Newborn screening should be mandatory and free of charge if early diagnosis and treatment will benefit the newborn.

Steps in Genetic Counseling
Obtaining a detailed family history, which includes both sides of the family even if counseling has been requested for a dominant disorder affecting one parent. It is not rare that in taking such a history, other antecedents are revealed which also merit discussion.
A review of medical and/ or pregnancy histories is especially important when the diagnosis is not yet established, but also helps geneticists to learn more about etiologies and natural histories of certain disorders. A physical examination, of the affected person, and sometimes of other family members, is often needed. Medical and/or laboratory exams may be suggested. If a diagnosis has not been established these often include chromosome study, and may necessitate DNA analysis if the identity of the gene suspected to be involved is known. Other frequent suggestions include X-ray or ultrasound examinations, and various biochemical analyses. Once the diagnosis is known, medical tests aimed at evaluating health risks linked to the disorder may also be established.

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

Genetic counseling can only be given at the end of this process.

Genetic Consultation – Service Delivery Models

The standard model for cancer genetic counseling consists of pre-test counseling, results disclosure, and post-test counseling. Pre-test counseling takes place before any testing is ordered. During this session, genetic counselors build rapport and trust with patients and discuss various topics, including whether the patient meets testing criteria, potential costs, benefits and limitations of testing, and the impact of test results on the patient and their family members. Counselors address patient questions and explain how test results may influence their current cancer risk management. A thorough personal and family history is taken to ensure the appropriate test is ordered. (Schienda & Stopfer, 2020). In the pre-test session, counselors also discuss the different possible test outcomes and, when relevant, the risk of genetic discrimination. They finalize testing options and, through shared decision-making, determine the best testing method. The approach to results and post-test counseling varies based on the test outcome. A positive result leads to discussions about cancer risks, screening implications, inheritance patterns, family testing recommendations, and referrals to subspecialists if needed. While positive results can empower patients, they may also cause psychosocial effects that require supportive care resources. Genetic counselors provide patients with a family letter detailing results and implications for family members, and they coordinate cascade testing for at-risk relatives. Knowing whether relatives carry the familial mutation helps in early cancer detection and prevention, and it can provide relief to those who do not inherit the mutation.

For a negative result, the genetic counselor and patient review the test's limitations, implications for the patient and family, and the patient's feelings about the result. Following medical guidelines, genetic counselors may still offer cancer-risk assessments in the case of a negative result, potentially leading to additional screenings like breast MRI or colonoscopy to detect or prevent cancer. The final possible outcome is a variant of uncertain significance (VUS), prompting discussions about the uncertainty of cancer risk and the possibility of reclassification. As these uncertain results are often reclassified as benign, changes to medical management are generally not recommended.

Barriers to Genetic Counseling and Testing Providers aspect

Inadequate knowledge, Perception of preconception care as time consuming, inadequate reimbursement for providing counseling services. Lack of trained medical professionals **(**Vogel, Niendorf, Lee et al. 2018).

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

Patient's aspects
Costs, High rate of unintended pregnancies, Ignorance, Limited access to health services in general, Conflict of interest between individual, family, society, public health and insurances. (Geer, Ropka, Cohn & Jones, 2001).

Relevance to Maternal and Child Health
Impact of Breast Cancer on Mothers and Families
Breast cancer diagnosis and treatment can have profound impacts on mothers and their families. Mothers play a central role in family dynamics, and their health significantly affects the household's emotional, psychological, and economic well-being. A breast cancer diagnosis can lead to physical limitations, emotional distress, and financial burdens due to medical expenses and loss of income (Inhestern, Johannsen & Bergelt, 2021). The treatment process, which may include surgery, chemotherapy, radiation, and hormonal therapy, often requires substantial time and energy, affecting a mother's ability to care for her children and manage household responsibilities. The psychological toll of coping with cancer can also strain family relationships, potentially leading to anxiety and depression among family members (Al-Zaben et al., 2014).

Moreover, mothers with young children face unique challenges in balancing their health needs with parenting responsibilities. Studies have shown that children of mothers with breast cancer are at increased risk of experiencing emotional and behavioral issues due to the stress and uncertainty associated with the illness. Therefore, the mother's health directly influences the family unit's overall well-being (Inhestern et al., 2021). The presence of breast cancer in a mother can strain family dynamics and child-rearing. The illness often necessitates adjustments in household roles and responsibilities, with partners or extended family members stepping in to support childcare and household management.

Children of mothers with breast cancer may experience emotional and behavioral challenges, including anxiety, fear, and academic difficulties. The uncertainty surrounding the mother's health can create an unstable environment, affecting the children's sense of security and well-being. Furthermore, the financial burden of breast cancer treatment can impact the family's economic stability, potentially leading to reduced access to resources and opportunities for the children. Understanding these impacts underscores the importance of comprehensive support systems for mothers with breast cancer, including psychological counseling, social support, and financial assistance programs. Such support can help mitigate the negative effects on both the mother and her family, promoting better health outcomes and overall family well-being.

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

Long-Term Benefits for Maternal and Child Health

1. **Healthier Mothers:** Implementing preventive strategies leads to healthier mothers who can maintain their physical health, psychological well-being, and ability to care for their families. Early detection and prevention mean that women can avoid the debilitating effects of advanced breast cancer, including aggressive treatments and their side effects.

2**. Family Stability:** The health of mothers directly impacts family stability. By reducing the incidence of breast cancer, preventive measures contribute to the well-being of the entire family unit. This stability is crucial for child development and family dynamics.

3**. Intergenerational Health:** Women who undergo genetic screening and counseling can inform their family members, including daughters and granddaughters, about their genetic risks. This knowledge enables future generations to take proactive steps in managing their health, thus potentially reducing the incidence of breast cancer in future generations.

4**. Economic Benefits:** Preventive strategies, although sometimes costly upfront, can lead to significant economic benefits by reducing the need for extensive cancer treatments, hospitalizations, and associated healthcare costs. Healthier mothers can remain active in the workforce, contributing economically to their families and society.

Strategies for Incorporating Genetic Services into Existing Maternal and Child Health Programs

1**. Integration into Prenatal Care:** Including genetic counseling and screening as part of standard prenatal care can help identify families at risk for hereditary cancers. This proactive approach ensures early detection and management of potential risks.

2. **Community Health Programs**: Leveraging existing community health programs to provide education about genetic risks and the availability of genetic services can enhance outreach. Community health workers can be trained to disseminate information and guide families to appropriate resources.

3. **Collaborative Care Models:** Establishing multidisciplinary teams that include genetic counselors, oncologists, primary care providers, and maternal health specialists ensures

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

comprehensive care for at-risk individuals. This team-based approach enhances patient outcomes and continuity of care.

Training and Resources for Healthcare Providers

1**. Professional Training**: Ongoing education and training programs for healthcare providers are essential. This includes continuing medical education (CME) courses, workshops, and seminars focused on the latest advancements in genetic screening and counseling.

2**. Resource Development:** Developing and disseminating educational materials, such as guidelines, toolkits, and patient education brochures, helps providers stay informed and effectively communicate with patients.

3. **Telemedicine:** Utilizing telemedicine platforms can expand the reach of genetic counseling services, especially in rural and underserved areas. This approach ensures that more individuals have access to genetic risk assessment and counseling.

Implications to Nursing Practice, Research and Education.

Intergenerational Implications

The implications of breast cancer extend beyond the immediate family to future generations. Genetic mutations, such as those in the BRCA1 and BRCA2 genes, can be inherited, increasing the risk of breast and ovarian cancers in descendants. Women who carry these mutations have a significantly higher lifetime risk of developing breast cancer, with estimates ranging from 45% to 87%. Genetic screening and counseling can help identify individuals at higher risk, enabling early intervention and preventive measures. For example, women with BRCA mutations may opt for enhanced surveillance, prophylactic surgeries, or chemoprevention to reduce their risk. By identifying and managing these risks early, it is possible to decrease the incidence of breast cancer in future generations, thereby promoting long-term health and reducing the burden of the disease on families.

In addition to genetic factors, lifestyle and environmental influences on breast cancer risk can also be passed from one generation to the next. Educating families about healthy lifestyle choices, such as proper nutrition, regular exercise, and avoidance of harmful substances, can foster a culture of health and prevention that benefits multiple generations. Genetic screening and counseling play a crucial role in reducing the

ISSN: 3043–6087. Science and Education Development Inst., Nigeria

incidence of breast cancer by identifying individuals at high risk and providing appropriate interventions.

Here are the implications for nursing education, research, and practice:
Education: Nursing education programs should include comprehensive training on genetic screening, counseling techniques, and the interpretation of genetic test results. Nurses need to understand the complexities of genetic testing, its implications for patients and families, and how to effectively communicate this information.

Research: Nursing research can focus on assessing the effectiveness of genetic screening and counseling programs in reducing the incidence of breast cancer, as well as exploring patient outcomes and experiences. Research can also identify barriers to accessing genetic services and develop strategies to overcome them.

Practice: Nurses play a vital role in the delivery of genetic screening and counseling services. They can provide pre-test counseling, facilitate genetic testing, interpret test results, and offer post-test counseling and support. Nurses also advocate for patients and families, ensuring they receive appropriate care and resources.

Conclusion

Genetic screening and counseling are critical tools in the early detection and prevention of breast cancer, especially for those with a hereditary risk. These services provide valuable information that can guide preventive measures and improve health outcomes. Incorporating genetic services into maternal and child health programs ensures that at-risk families receive the support and resources they need. This approach benefits not only individual patients but also their families and future generations. Overall, integrating genetic screening and counseling into nursing education, research, and practice can enhance the quality of care for individuals at risk of breast cancer and contribute to reducing its incidence through early detection and prevention strategies.

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