Awareness and Utilization of Screening Mammography in Birnin Kebbi, Northwest Nigeria

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Abstract
Background: *Screening mammography plays a crucial role in the early detection of breast cancer; however, its awareness and utilization remain low in many resource-limited settings.*
Aim and objectives: *This study assesses the level of awareness and utilization of screening mammography among women in Birnin Kebbi, Nigeria, and examines the factors influencing these outcomes.*
Materials and Methods: *A retrospective analysis was conducted on data from 92 women aged 40–68 years who underwent mammographic screening at the Federal Teaching Hospital, Birnin Kebbi, between January 2020 and December 2023.*
Results: *The findings revealed that only 31.5% of women referred for mammography utilized the service, while 65% had no prior awareness of the procedure. Key determinants of awareness and utilization included education, marital status, and age. The primary barriers identified were financial constraints, lack of perceived need, and cultural misconceptions.*
Conclusion: *The study highlights the low levels of awareness and poor utilization of screening mammography among women in Birnin Kebbi, underscoring the significant gaps in preventive breast cancer care in rural areas.*

Keywords: *Breast cancer screening, Mammography utilization, Awareness, Barriers to healthcare*

INTRODUCTION

Breast cancer is the most frequently diagnosed cancer among women globally and remains a leading cause of cancer-related mortality, particularly in low- and middle-income countries (LMICs), where late-stage presentation and lack of screening are prevalent [1,2]. According to the Global Cancer Observatory (GLOBOCAN), breast cancer accounted for 2.3 million new cases and 685,000 deaths worldwide in 2020, with a disproportionately high burden in LMICs due to limited access to early detection and treatment services [3]. Early detection through screening mammography has been shown to significantly reduce mortality by enabling the identification of cancers at treatable stages, thereby improving survival rates and treatment outcomes [4,5].

Despite its proven benefits, the awareness and utilization of mammographic screening remain alarmingly low in sub-Saharan Africa due to multiple barriers, including cultural beliefs, economic constraints, inadequate healthcare infrastructure, and a shortage of trained personnel [6,7,8]. In Nigeria, breast cancer remains the most common malignancy among women, and the absence of organized screening programs exacerbates late-stage diagnoses and poor prognosis [9,10]. Although the Nigerian National Cancer Control Plan (2018–2022) recognizes

the importance of early detection, challenges such as limited mammography facilities, high screening costs, and misconceptions about cancer further hinder participation [11,12].
Rural regions such as Kebbi State face unique challenges that contribute to the low uptake of screening mammography. Factors such as low literacy levels, sociocultural stigmas, religious beliefs, and geographical barriers limit access to preventive healthcare services [13]. In addition, a lack of awareness about breast cancer symptoms and screening guidelines further diminishes the likelihood of early detection [14]. Understanding the level of awareness and utilization of mammographic screening in Birnin Kebbi is crucial for designing targeted interventions aimed at improving participation and reducing breast cancer mortality in the region.
This study seeks to evaluate the levels of awareness and utilization of screening mammography among women in Birnin Kebbi, examining the influence of demographic factors and identifying key barriers to participation. By assessing these factors, the study aims to provide insights that can inform public health strategies to enhance early detection efforts and bridge gaps in breast cancer screening services within northwest Nigeria.

MATERIALS AND METHODS

Study design and setting

This retrospective study was conducted at the Federal Teaching Hospital, Birnin Kebbi, a tertiary healthcare facility in Northwest Nigeria. The study covered the period from January 2020 to December 2023. The hospital operates as referral centre in Kebbi State, providing diagnostic and interventional radiology services, including mammographic screening.

Study Population

A total of 92 women aged 40–68 years who were referred for screening mammography were included in the study. Inclusion criteria encompassed women within the specified age range who were referred for screening mammography at Federal Teaching Hospital, Birnin Kebbi during the study period. Exclusion criteria included women below 40 years of age, incomplete medical records, previous breast surgeries, and cases where mammography was performed for diagnostic rather than screening purposes.

Data Collection

Data were collected retrospectively from hospital records and mammographic patient information forms. Sociodemographic variables recorded included age, marital status, level of education, ethnicity, and contraceptive use. Awareness of mammography was assessed based on whether participants had prior knowledge of the procedure before their referral. Utilization was defined as the completion of the mammographic screening following referral. Additional data on reasons for non-utilization were obtained from medical records where available.

Statistical Analysis

Data analysis was conducted using SPSS version 25. Descriptive statistics were employed to determine frequencies and proportions for categorical variables. Continuous variables were summarized using means and standard deviations. The chi-square test was used to evaluate associations between sociodemographic factors and both awareness and utilization of screening mammography. A p-value of less than 0.05 was considered statistically significant. Results were presented in tabular and graphical formats where appropriate to illustrate key findings.
Ethical approval for the study was obtained from the Research and Ethics Committee of Federal Teaching Hospital, Birnin Kebbi. Patient confidentiality was maintained by anonymizing all data, and the study adhered to the principles outlined in the Declaration of Helsinki for medical research involving human subjects.

RESULTS

A total of 92 screening mammograms were evaluated. The participant's ages ranged from 40 to 68 years with a mean of 53.8±9.1 years. The 40 – 50 years group constituted the highest frequency (n = 42) and the least was the 61 – 68 years group (n = 22) as shown in table 1.

Table 1: shows the sociodemographic characteristics of study participants

Variable	Frequency (n = 92)	Percentage (%)
Age group (years)		
40 – 50	42	45.7
51 – 60	28	30.4
61 - 68	22	23.9
Marital status		
Married	65	70.7
Single	20	21.7
Widowed	7	7.6
Education level		
None / Primary	40	43.5
Secondary	30	32.6
Tertiary	22	23.9

A significant proportion of participants (65%) reported having no prior awareness of mammography as a preventive screening tool before their referral. Among those who were aware, the majority (80%) received information from healthcare providers, while public health campaigns accounted for only 15% of awareness. Additionally, a small fraction (5%) learned about mammography through social media platforms or community discussions as shown in figure 1.

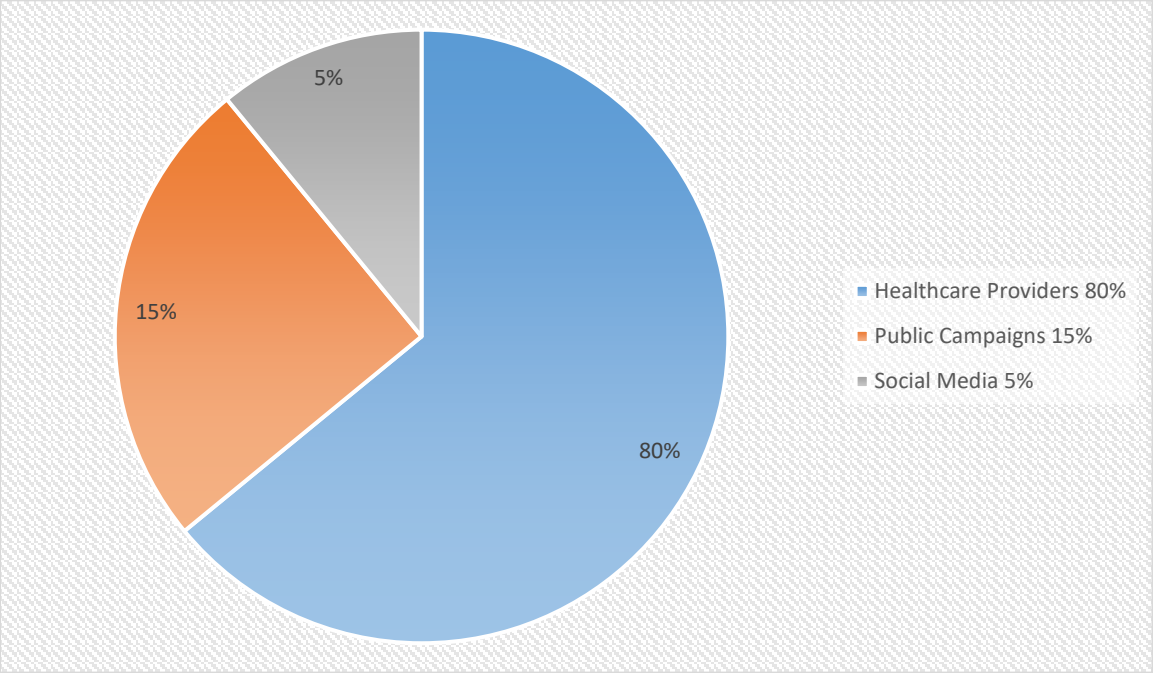

Figure 1: A pie chart showing the sources of mammography awareness among the study participants

Utilization of mammography

Despite referrals for mammography screening, only 31.5% of the women utilized the service, indicating a considerable gap between referral and actual uptake.

Table 2: shows barriers to mammography utilization

Barrier	Percentage (%)
Financial constraints	45
Lack of perceived need	30
Fear of the procedure	15
Cultural beliefs	10

Demographic factors influencing awareness and utilization of screening mammography

Education, marital status and age were found to significantly influence both awareness and utilization of mammography services. Women with tertiary education had significantly higher awareness and utilization rates ($p < 0.01$), whereas those with only primary or no formal education had the lowest levels of participation. Married women were more likely to be aware of and utilize mammography services compared to their single or widowed counterparts ($p < 0.05$). Factors such as spousal encouragement and financial stability may contribute to this trend as shown in tables 3 and 4.

Table 3: Association between Education level versus Awareness and utilization

Education Level	Aware (n = 32)	Unaware (n = 60)	Utilized (n = 29)	Did Not Utilize (n = 63)
No/Primary Education	7 (21.9%)	40 (66.7%)	4 (13.8%)	43 (68.3%)
Secondary Education	8 (25.0%)	13 (21.7%)	6 (20.7%)	15 (23.8%)
Tertiary Education	17 (53.1%)	7 (11.6%)	19 (65.5%)	5 (7.9%)
Total	32 (100%)	60 (100%)	29 (100%)	63 (100%)

Table 4: Association between marital status versus awareness and utilization of mammography

Marital Status	Aware (n = 32)	Unaware (n = 60)	Utilized (n = 29)	Did Not Utilize (n = 63)
Single	6 (18.8%)	17 (28.3%)	3 (10.3%)	20 (31.7%)
Married	22 (68.8%)	31 (51.7%)	22 (75.9%)	31 (49.2%)
Widowed/Separated	4 (12.5%)	12 (20.0%)	4 (13.8%)	12 (19.0%)
Total	32 (100%)	60 (100%)	29 (100%)	63 (100%)

P-value: *$p < 0.05$ for both awareness and utilization

Older women, particularly those aged 61–70 years, had the highest participation rate (28.3%), while younger women (40–50 years) demonstrated lower utilization, likely due to a lower perceived risk of breast cancer as shown in tables 5.

Table 5: Association between age group versus awareness and utilization

Age Group	Aware (n = 32)	Unaware (n = 60)	Utilized (n = 29)	Did Not Utilize (n = 63)
40–50 years	10 (31.3%)	28 (46.7%)	6 (20.7%)	32 (50.8%)
51–60 years	12 (37.5%)	20 (33.3%)	10 (34.5%)	22 (34.9%)
61–70 years	10 (31.3%)	12 (20.0%)	13 (44.8%)	9 (14.3%)
Total	32 (100%)	60 (100%)	29 (100%)	63 (100%)

P-value: *$p < 0.05$ for both awareness and utilization

Discussion

The study revealed that 65% of participants were unaware of mammography as a preventive tool. This finding aligns with previous research, which reported similarly low awareness levels in Southwest Nigeria [7]. The reliance on healthcare providers as the primary source of information highlights the limited impact of public health campaigns, as also noted in other studies [8]. In contrast, high-income countries have achieved greater awareness through sustained, large-scale public health initiatives and government-supported cancer screening programs [4]. The lack of structured screening programs in Nigeria underscores the need for increased advocacy and public education to enhance mammography awareness and accessibility.

Only 31.5% of referred women completed the procedure, with financial constraints being the most cited barrier. Similar findings were reported in Sokoto and Uganda, where out-of-pocket healthcare costs limit access to screening services [15,16]. The cost of mammography, coupled with transportation expenses in rural areas, restricts participation, particularly among lower-income groups. Additionally, the lack of perceived need, especially among asymptomatic women, reflects cultural and educational gaps in breast cancer knowledge [2]. This underscores the importance of community-based education to dispel myths and reinforce the benefits of early detection.

Fear of pain or a cancer diagnosis also deters utilization, as observed in studies from Kenya [17]. Misconceptions that mammography itself could induce cancer or cause unnecessary anxiety further discourage participation. Addressing these fears through culturally sensitive education programs, including testimonials from survivors and healthcare providers, may help alleviate concerns and encourage screening uptake.

Higher education levels were strongly associated with increased awareness and utilization, consistent with findings from other studies [6,8]. Educated women are more likely to understand the benefits of early detection and overcome misconceptions. Similarly, married women demonstrated higher participation rates, likely due to spousal support and financial stability, as previously observed [18]. These findings suggest that public health interventions should prioritize outreach efforts for less-educated and single women who may lack the necessary support networks to access screening services.

The participation rate in this study (31.5%) is comparable to findings in Sokoto [15] but significantly lower than urban areas such as Lagos, where better healthcare infrastructure and awareness campaigns exist [7]. These disparities highlight the uneven distribution of healthcare resources and the urgent need for equitable access to screening services across rural and urban settings. Improving infrastructure, increasing the number of trained radiologists, and implementing mobile mammography programs could help bridge this gap.

Countries with established breast cancer screening programs achieve higher utilization rates due to subsidized services and comprehensive public awareness campaigns [2]. The adoption of similar models in Nigeria, such as government-sponsored mammography programs, community-based screening initiatives, and strategic collaborations with non-governmental

organizations, could significantly improve participation. Strengthening health policies and implementing cost-reduction strategies for mammography services will be essential in scaling up breast cancer screening efforts in underserved regions.
These findings underscore the need for targeted interventions to address financial, educational, and cultural barriers that hinder screening mammography uptake among women in Birnin Kebbi.

Conclusion

This study highlights the low levels of awareness and poor utilization of screening mammography among women in Birnin Kebbi, underscoring the significant gaps in preventive breast cancer care in rural Nigeria. Despite referrals, only a minority completed the procedure, primarily due to financial constraints, lack of perceived need, and sociocultural misconceptions. Higher levels of education and marital status were significantly associated with better awareness and uptake of screening services. These findings reflect a pressing need for targeted interventions to address educational, economic, and cultural barriers that limit access to early detection services. Expanding awareness and accessibility of mammography could play a critical role in reducing the burden of breast cancer and improving survival outcomes in this population.

Recommendations

The study advocates for the implementation of targeted community-based educational programs to enhance mammography knowledge and utilization in Birnin Kebbi, particularly for women with lower educational attainment and those residing in rural areas.

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