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Breast Cancer Knowledge as a Predictor of Regular Breast Self-Examination among Women Aged 20–49 in Ejisu Municipality, Ghana

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Abstract

Breast cancer is the leading cause of cancer-related morbidity and mortality among women globally, and in low-resource settings such as Ghana, breast self-examination (BSE) remains a cost-effective strategy for early detection, yet a persistent gap exists between awareness and consistent practice. This study assessed women's knowledge of breast cancer and examined whether knowledge predicts regular BSE practice among women aged 20–49 years in Ejisu Municipality, Ghana. A community-based cross-sectional survey was conducted among 635 women selected using systematic random sampling. Data were collected using a structured questionnaire assessing socio-demographic characteristics, breast cancer knowledge, and BSE practice, with knowledge scores categorized as low, moderate, or high using tertiles. Descriptive statistics, chi-square tests, and multivariate logistic regression were applied, with statistical significance set at $p < 0.05$. The mean age of participants was 32.9 ± 7.1 years, and most (67.2%) demonstrated high breast

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cancer knowledge, primarily sourced from health professionals (53.5%). Although 72.0% had heard of BSE, only 32.1% practiced it monthly as recommended, with key barriers including lack of knowledge of the correct technique (47.8%) and fear of detecting a lump (22.8%). Knowledge level was significantly associated with regular BSE practice ($\chi^2 = 42.57$, $p < 0.001$), and multivariate analysis showed that women with high knowledge were more than three times as likely to perform regular BSE (AOR = 3.45, 95% CI: 2.18–5.52, $p < 0.001$) compared with those with low knowledge. Tertiary education (AOR = 2.26, $p = 0.004$) and receiving information from health workers (AOR = 2.06, $p = 0.008$) also independently predicted regular BSE. The study concludes that breast cancer knowledge is a strong predictor of regular BSE practice; despite relatively high awareness, routine BSE remains low due to skill-related and psychological barriers. Strengthening health education with practical demonstrations and integrating BSE counseling into routine clinical care and community outreach may enhance preventive behavior and contribute to earlier breast cancer detection.

Keywords: Breast Cancer; Breast Self-Examination; Knowledge; Preventive Behavior; Women's Health in Ghana.

INTRODUCTION

Breast cancer remains the most commonly diagnosed cancer and the leading cause of cancer-related mortality among women worldwide, posing a significant public health burden across countries and health systems [1,2]. According to global cancer statistics from the International Agency for Research on Cancer (IARC), breast cancer accounted for approximately 2.3 million new cases and 685,000 deaths in 2020, representing about one in every four cancer diagnoses among women [2]. While breast cancer affects women across geographical and socioeconomic boundaries, global disparities in incidence, access to care, and survival outcomes are profound. High-income countries report higher incidence rates, largely attributed to widespread screening and improved surveillance, whereas the highest increases in both incidence and mortality are increasingly being documented in low- and middle-income countries (LMICs) [3,4]. This shift has been attributed to urbanization, changes in reproductive patterns, delayed childbearing, obesity, and adoption of Western lifestyles [3].

However, despite increasing incidence, breast cancer mortality has been declining in many developed countries due to early detection, timely diagnosis, and advances in

treatment innovations such as targeted therapy and improved surgical techniques [5]. Conversely, in LMICs, the mortality rate continues to rise because women frequently present with late-stage disease, often when treatment options are limited or unaffordable [4,6]. Poor health-seeking behaviour, financial barriers, low community awareness, insufficient screening programs, and inadequate oncology infrastructure contribute significantly to late diagnosis [6].

In sub-Saharan Africa, breast cancer has emerged as the most frequently diagnosed cancer among women and a major cause of premature death [7]. More than 60% of breast cancer cases in the region are detected at advanced clinical stages (III or IV), compared to less than 20% in developed countries [6]. Factors contributing to delayed diagnosis include socio-cultural beliefs that normalize breast symptoms, reliance on traditional healers, stigma associated with cancer, and pervasive misconceptions that breast cancer is always fatal [8]. Limited access to mammography, weak referral systems, and shortages of trained specialists further worsen the disease trajectory [7]. As a result, women in sub-Saharan Africa are disproportionately affected by aggressive breast cancer subtypes and have lower five-year survival rates compared to women in high-income countries [3].

Ghana mirrors these regional trends. Breast cancer is currently the most frequently diagnosed cancer among women and one of the top causes of cancer-related mortality in the country [9]. Evidence suggests that over 70% of breast cancer cases in Ghana are diagnosed at late stages (stage III or IV) when the chances of successful treatment and survival are significantly reduced [10]. Structural health system limitations, including scarcity of diagnostic facilities, underutilization of mammography, and lack of organized screening programs, remain major constraints. Furthermore, cultural taboos, low perceived susceptibility, fear of diagnosis, and misconceptions regarding breast cancer causation are frequently cited as barriers to early breast cancer detection among Ghanaian women [11,12].

Breast Self-Examination (BSE) has long been recognized as a simple, non-invasive, and cost-free technique that enables women to develop familiarity with their breasts and detect unusual changes at an early stage [13]. Although BSE alone does not reduce mortality, it is an important breast awareness strategy, especially in settings where mammography is inaccessible or unaffordable [14]. For LMICs such as Ghana, where

specialized cancer diagnostic services remain limited, BSE serves as an important first-level preventive action that can facilitate early presentation and treatment.

Despite continuous public health campaigns and global awareness activities such as Breast Cancer Awareness Month, the regular practice of BSE in Ghana remains low [12]. Previous research indicates that women often fail to perform BSE due to lack of knowledge about the correct technique, fear of detecting abnormalities, and misconceptions that BSE is unnecessary without breast pain [11]. Multiple studies have demonstrated that knowledge of breast cancer is positively associated with preventive behaviours, including clinical breast examination, mammography uptake, and regular BSE practice [15,16]. Knowledge enhances perception of personal susceptibility, reduces fear, dispels myths, and empowers women to engage in breast health monitoring.

However, although research in Ghana has explored breast cancer awareness and BSE knowledge separately, there is limited empirical evidence linking breast cancer knowledge directly to routine BSE practice within community-based populations, particularly among women of reproductive age (20–49 years). Understanding whether knowledge predicts regular BSE practice is crucial for designing effective health promotion interventions.

Therefore, this study examined whether knowledge of breast cancer predicts regular practice of breast self-examination among women aged 20–49 years in the Ejisu Municipality of Ghana. The findings will provide insights for policymakers, public health practitioners, and non-governmental organizations to develop targeted, context-specific breast cancer education programs. Ultimately, enhancing early detection behaviours such as BSE may contribute to reducing breast cancer morbidity and mortality in resource-constrained settings.

METHODS

Study Setting

The study was conducted in the Ejisu Municipality, one of the 43 administrative districts in the Ashanti Region of Ghana. Located approximately 20 km from Kumasi, the municipal capital, Ejisu covers an estimated area of 1,252 km² and has an estimated population size of 180,687, comprising 87,978 males and 92,709 females [17]. The

municipality consists of both urban and peri-urban communities and is served by a network of public and private healthcare facilities, including a municipal hospital, several health centres, and Community-Based Health Planning and Services (CHPS) compounds. These facilities provide maternal and reproductive health services, offering opportunities for health promotion and interaction with women of reproductive age.

Study Design

A community-based analytical cross-sectional design was used to assess breast cancer knowledge and BSE practices among women. Data collection was undertaken over three months using a structured, interviewer-administered questionnaire.

Study Population and Eligibility Criteria

The study population consisted of women aged 20–49 years residing in the Ejisu Municipality. Women were eligible to participate if they had lived in the municipality for at least six months and voluntarily consented to participate. Women who had been previously diagnosed with breast cancer were excluded to avoid bias associated with experience-based knowledge and practices.

Sample Size Determination

The minimum sample size was calculated using Cochran's formula for estimating a single proportion. Using a prevalence of breast self-examination practice of 54.8% reported by Ampofo et al. [18], a 95% confidence level ($Z = 1.96$), and a 5.0% margin of error, the initial required sample size was approximately 381. Accounting for a design effect of 1.5 to adjust for the multistage sampling procedure increased the sample size to approximately 571. Finally, allowing for a 10% non-response rate (inflation by dividing by 0.90) yielded a final sample size of 635 participants.

Sampling Technique

A multistage sampling procedure was employed. First, communities were randomly selected using simple random sampling. Second, systematic sampling was used to select households within each community. Finally, within each selected household, one eligible woman was randomly chosen to participate in the study.

Data Collection Instrument and Procedures

Data was collected using a structured questionnaire comprising three main sections. The first section captured respondents' socio-demographic characteristics, including age,

marital status, educational level, occupation, and other household-level variables. The second section assessed breast cancer knowledge using a validated 25-item breast cancer knowledge scale, which evaluated respondents' understanding of breast cancer risk factors, early warning signs, symptoms, and recommended screening practices. The third section focused on awareness, frequency, and perceived barriers to breast self-examination (BSE), capturing information on whether respondents had ever heard of BSE, the regularity with which they performed it, and factors influencing their practice, such as lack of knowledge on proper technique, perceived absence of symptoms, or fear of discovering abnormalities.

Prior to field administration, the questionnaire underwent pre-testing in a community with similar characteristics but outside the study area to ensure clarity, appropriateness, and cultural relevance of the items. Feedback from the pre-test was used to refine wording, improve flow, and ensure that the tool was contextually acceptable. The breast cancer knowledge scale demonstrated good internal consistency, with Cronbach's alpha coefficient of $\alpha = 0.82$, exceeding the recommended threshold of 0.70 for reliability in public health surveys.

Data collection was conducted through face-to-face interviewer-administered interviews. Trained research assistants fluent in English and the local language facilitated the interviews to accommodate varying literacy levels and minimize the risk of misinterpretation. Standardized data collection procedures were followed throughout to maintain uniformity and reduce interviewer bias.

Data Management and Analysis

Completed questionnaires were reviewed daily for completeness and accuracy. Data was entered and analyzed using IBM SPSS Statistics version 26. Descriptive statistics (frequencies, percentages, means and standard deviations) were used to summarize participant characteristics and key outcome variables. Chi-square tests were applied to determine associations between breast cancer knowledge and BSE practice. Variables with $p < 0.20$ in the bivariate analysis were entered into a multivariate logistic regression model to determine independent predictors of regular BSE. Adjusted odds ratios (AORs) and 95% confidence intervals (CIs) were computed, with statistical significance set at $p < 0.05$.

RESULTS

Socio-Demographic Characteristics of Respondents

A total of 635 women aged between 20 and 49 years participated in the study. The mean age of the participants was 32.9 ± 7.1. The age distribution shows that the largest proportion (43.0%, n = 273) was aged 25–34 years, followed by those aged 35–49 years (35.6%, n = 226). The smallest group consisted of women aged 20–24 years (21.4%, n = 136). Regarding marital status, 57.6% (n = 366) of respondents were married, 33.7% (n = 214) were single, and 8.7% (n = 55) were widowed or divorced. Regarding educational level, most respondents had received formal education. Approximately 36.5% (n = 232) had completed secondary/SHS education, and 32.4% (n = 206) had attained tertiary education. Only 9.8% (n = 62) reported no formal education {Table 1}.

Table 1. Socio-demographic characteristics of respondents (n = 635)

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	20–24	136	21.4
	25–34	273	43.0
	35–49	226	35.6
Marital status	Single	214	33.7
	Married	366	57.6
	Divorced/Widowed	55	8.7
Educational level	No formal education	62	9.8
	Primary/JHS	133	20.9
	Secondary/SHS	232	36.5
	Tertiary	206	32.4

Knowledge of Breast Cancer

Breast cancer knowledge indicates that the majority (67.2%, n = 427) demonstrated high knowledge of breast cancer, while 21.1% (n = 134) exhibited moderate knowledge, and only 11.7% (n = 74) had low knowledge {Table 2}.

Table 2. Knowledge of breast cancer (n = 635)

Knowledge Level	Frequency (n)	Percentage (%)	Mean Score ± SD
Low	74	11.7	6.3 ± 1.6
Moderate	134	21.1	13.0 ± 2.8
High	427	67.2	19.8 ± 2.3

Practice of Breast Self-Examination (BSE)

The practice of breast self-examination indicated that only 32.1% (n = 204) practiced it monthly as recommended {Table 3}.

Table 3. Breast self-examination practice (n = 635)

BSE Practice Category	Frequency (n)	Percentage (%)
Regular practice	204	32.1
Irregular/no practice	431	67.9

Bivariate Analysis of Association Between Breast Cancer Knowledge and BSE Practice

A chi-square test was performed to determine the association between breast cancer knowledge level and regular BSE practice. The result was statistically significant: χ^2 (2, N = 635) = 42.57, $p < 0.001${Table 4}.

Table 4. Association between knowledge level and BSE practice (n = 635)

Knowledge Level	Regular BSE (n = 204)	Irregular/No BSE (n = 431)	p-value
High	154 (75.5%)	273 (63.3%)	< 0.001
Moderate	42 (20.6%)	92 (21.3%)	—
Low	8 (3.9%)	66 (15.3%)	—

Multivariate Logistic Regression Analysis

Multivariate logistic regression was used to determine independent predictors of regular BSE practice. After adjusting for potential confounders, three predictors emerged as significant. Women with high knowledge of breast cancer were 3.45 times more likely to perform regular BSE compared to those with low knowledge (AOR = 3.45; 95% CI: 2.18–5.52; $p < 0.001$). Similarly, respondents with tertiary education were more than twice as

likely to practice BSE (AOR = 2.26; 95% CI: 1.30–3.73; p = 0.004) compared to those without formal education. Additionally, women who received BSE information from health workers had significantly higher odds of practicing BSE regularly (AOR = 2.06; 95% CI: 1.22–3.45; p = 0.008). Other potential information sources, such as the internet, television/radio, and friends/family, were not statistically significant predictors (p > 0.05) {Table 5}.

Table 5: Predictors of Regular BSE Practice (Multivariate Logistic Regression Model)

Predictor	AOR	95% CI	p-value
Knowledge level			
High knowledge	3.45	2.18–5.52	< 0.001
Moderate knowledge	1.53	0.90–2.60	0.119
Low knowledge	1.00	—	—
Educational level			
No formal education	1.00	—	—
Primary/JH	1.19	0.62–2.27	0.593
Secondary/SHS	1.42	0.78–2.59	0.248
Tertiary education	2.26	1.30–3.73	0.004
Source of BSE information			
Health workers	2.06	1.22–3.45	0.008
Internet	1.56	0.87–2.81	0.128
Television/Radio	1.34	0.79–2.29	0.271
Friends/Family	1.11	0.64–1.94	0.692
Other sources	1.00	—	—

DISCUSSION

This study examined the knowledge of breast cancer and the practice of breast self-examination (BSE) among women aged 20–49 years in the Ejisu Municipality. The findings reveal that although the majority of respondents possessed good knowledge of breast cancer, this awareness did not correspond with regular BSE practice. This disparity highlights the persistent gap between knowledge and preventive health behaviour, an issue well documented in public health research and within health psychology. The results confirm that knowledge, while necessary, is not sufficient to drive behaviour change.

The socio-demographic characteristics of respondents indicate that most participants were within the productive and reproductive age range of 25–34 years. More than two-thirds had attained secondary education or higher, and education plays a central role in shaping health literacy, enabling individuals to interpret health information accurately and apply it to improve health outcomes [19]. As reported in earlier studies, women with higher education levels tend to have a more advanced understanding of breast cancer symptoms, risk factors, and the importance of screening [20].

Consistent with findings from other developing countries, a substantial proportion of respondents exhibited high levels of breast cancer knowledge [21,22]. Health professionals were the predominant source of information, similar to findings by Oluwatosin, who noted that women are more receptive to screening recommendations when information comes from trained health personnel [23].

However, media-based information and informal sources did not significantly predict BSE practice, suggesting that passive exposure to information may be insufficient. Health communication theories argue that preventive behaviours are more likely to be adopted when individuals receive practical guidance rather than information alone [24].

Despite adequate knowledge levels, only 32.1% of respondents performed BSE monthly. This aligns with sub-Saharan African studies reporting BSE prevalence between 18% and 35% [25,26]. Barriers included fear of detecting abnormalities, uncertainty about correct technique, and misconceptions—consistent with findings that fear and fatalistic beliefs discourage screening behaviours [8].

Bandura's self-efficacy theory explains that women may lack confidence in performing BSE correctly, even when knowledgeable, leading to inconsistent practice [27].

The significant association between knowledge and BSE practice in this study aligns with prior research [25,28], but knowledge alone did not guarantee sustained practice. Tertiary education and receiving information from health professionals were independent predictors of regular BSE performance, underscoring the importance of structured, skills-based education.

Cultural factors may limit the influence of media sources. In many African communities, breast health discussions are sensitive, and interactive learning environments may be more effective. Community-based strategies, peer support, and culturally appropriate communication can improve screening behaviour.

Overall, the findings highlight missed opportunities in the healthcare system to integrate BSE training into routine reproductive health services. Strengthening health promotion programs with skill-building, counseling, and follow-up may improve BSE uptake and support early detection in resource-limited settings.

CONCLUSION

The study revealed that although knowledge of breast cancer among women aged 20–49 years was relatively high, BSE practice remained low. High knowledge, tertiary education, and receiving BSE information from health professionals were significant predictors of regular BSE performance. The gap between knowledge and practice underscores the need for skill-based and confidence-building interventions rather than solely focusing on information dissemination.

To improve BSE practice, health promotion strategies should incorporate practical demonstrations, counseling, and ongoing support from healthcare professionals. Strengthening community-based education, integrating BSE into routine clinical care, and addressing psychosocial barriers such as fear and misconceptions are fundamental to improving early detection of breast cancer. Ultimately, enhancing women's self-efficacy and ensuring equitable access to screening education could contribute to earlier diagnosis, reduced treatment costs, and improved survival outcomes.

Limitations of the Study

This study has several limitations that should be acknowledged. First, the data were collected through a self-administered questionnaire, which is subject to recall bias and social desirability bias; respondents may have over-reported their knowledge levels or BSE practices to appear more health-conscious. Second, the cross-sectional design limits the ability to establish cause-and-effect relationships between breast cancer knowledge and BSE practice. Although associations were identified, no temporal relationship can be inferred. Third, the study was conducted in a single district and may not be generalizable to all women in Ghana, particularly those in rural areas with limited access to health information and services. Lastly, although efforts were made to include diverse socio-demographic groups, women without formal education and those not accessing health services may have been underrepresented, potentially influencing the trends observed.

Despite these limitations, the study provides important insights into breast cancer awareness and BSE practices among women, offering valuable evidence to guide future interventions and public health planning.

Declaration

Ethical Approval and Consent to Participate

The study followed the Declaration of Helsinki guidelines. Ethical approval for this study was obtained from the appropriate institutional review board (IRB). Participation was voluntary, and informed consent was obtained from all respondents. Confidentiality and anonymity were ensured throughout the research process.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

JO, conceptualized the study, developed the methods, conducted the analysis, and prepared the manuscript. BI advised on data collection, analysed the data, and helped write the paper. All authors read and approved the final manuscript.

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