

Breast Cancer Awareness and Uptake of Breast Cancer Screening Services Among Undergraduate Female Students in the Oldest University of Tanzania: A Cross-Sectional Study

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ABSTRACT

BACKGROUND: Breast cancer is the leading cause of cancer-related death among women worldwide. Mortality from breast cancer can be reduced through early detection and prevention. Despite the availability of breast cancer screening methods, the uptake of screening services remains very low, especially in low-resource countries like Tanzania. This low uptake of screening services may be attributed to a lack of awareness regarding the importance of early detection of the disease.

OBJECTIVES: This study was set to determine breast cancer awareness and the uptake of breast cancer screening services among undergraduate female students in Dar es Salaam, Tanzania.

DESIGN: The study was a descriptive cross-sectional study using the quantitative approach.

METHODS: The sample size calculated for this study was 434 undergraduate female students. The tool used for data collection was self-administered questionnaires, with data collection taking place in July 2022. Data were analyzed using Stata Version 15 and presented using descriptive and inferential statistics.

RESULTS: We found that most of the participants (92.38%) had heard about breast cancer, and only 39% of the participants were able to correctly identify the risk factors for breast cancer. Participants who had ever used breast cancer screening services by at least 1 method were 37 (9.23%), and the most common screening method practiced by the study participants was breast self-examination (48.65%).

CONCLUSIONS: Most of the participants were not aware of the screening methods for early detection of breast cancer. In addition, they lacked knowledge of some of the risk factors as evidenced by the low uptake of breast cancer screening services among the study participants. This calls for an awareness-raising campaign on the importance of breast cancer screening.

KEYWORDS: Breast cancer, screening methods, risk factors, awareness

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Introduction

Breast cancer is the most common type of cancer among women worldwide. In 2018, it was estimated that there were more than 2 million new breast cancer cases, with a mortality rate of 626.7 per 100 000.^{1,2} According to the World Health Organization (WHO), more than half of the cases of breast cancer and 36.8% of deaths occur in low- and middle-income countries (LMICs).³

The breast cancer rate has increased by 5% per year in sub-Saharan Africa and other developing countries.^{4,5} The number of breast cancer cases is expected to rise by 13.5% by 2040.¹ Rising life expectancy and the adoption of Western lifestyles

will increase the prevalence rates of breast cancer in developing countries.^{4,6}

The mortality rate due to breast cancer in Africa is estimated to remain high until therapeutic care and screening techniques are improved. Apart from African women being predisposed to a more inflammatory component of breast cancer, factors such as a lack of public awareness of the disease, the absence of structured detection methods, late presentation of the disease, and limited effective and accessible treatment options can all contribute to the inconsistent and higher death rate.^{7–9} Studies show that 90% of African women are diagnosed with breast cancer at stage III or IV.^{10,11}



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The common methods for detecting breast cancer in its early stage are breast self-examination (BSE), clinical breast examination (CBE), and mammography.² Mammography screening is expensive, requiring a significant amount of financial and human resources, and is thus not feasible in developing nations.¹² The BSE is a means for a woman to examine her breast for changes such as discharge, lumps, or thickenings, as well as the early diagnosis of breast lumps. It is a free technique, safe, requires no equipment, and can be done in privacy.^{13,14}

In low-resource countries like Tanzania, educating women about the danger of breast cancer is a crucial first step toward early detection. This empowers women to assess their risks and take appropriate precautions. Health care providers, educational institutions, and the media are all essential sources of breast cancer information for women.¹⁵

Breast cancer affects more women aged 40 years or older; it is important to note that it can also affect young women. According to the guidelines for the early detection and screening of breast cancer, women should start screening at the age of 20.¹⁶ This study aims to determine breast cancer awareness and the uptake of breast cancer screening services among undergraduate female students at the University of Dar es Salaam, Tanzania.

Materials and Methods

Study setting

The University of Dar es Salaam is Tanzania's oldest and one of the most prestigious public universities in Tanzania. It was launched in 1961 as a University of London affiliate college. The number of students admitted has steadily increased, reaching 39 958 in the academic year 2020/2021, with female students accounting for 46% of the total student population.

Study design and approach

The study employed a descriptive cross-sectional design using a quantitative approach. The design and method were chosen because of their appropriateness in answering the research objective of determining the level of awareness and uptake at a certain point in time.

Study participants

Inclusion criteria. All enrolled undergraduate female students aged 15 to 35 years. We did not exclude students based on their time spent at the university.

Exclusion criteria. All undergraduate females who did not attend the classes during the 5 days of data collection, which were collected from 26 to 29 July, 2022.

Sample size

The Cochran single proportion formula was employed in calculating the sample size, using the formula $n = Z^2 pq/d^2$, where

n = sample size, Z = Z-score at 95% confidence level, p = estimated proportion of an attribute present in the population, $q = 1 - p$, and d = margin of error. For this study, a margin of error (d) of 0.05 at a 95% confidence level was assumed with an estimated proportion of 27.7% of women screened for breast cancer.¹⁷ Adjusting for a nonresponse rate of 5%, the calculated sample size was 434.

Sampling procedure

We employed a 2-level stratified sampling method to ensure the representativeness of the study participants. Initially, students were stratified according to their college affiliation, including the College of Natural and Applied Sciences, the College of Arts and Social Sciences, the College of Humanities, the College of Engineering and Technology, and the College of Agriculture Sciences and Food Technology. All these colleges are located in the University compound. In each college, further stratification occurred based on the student's year of study. The years included in this study were first year, second year, third year, and fourth year.

Simple random sampling was used to select the required number of students in each college. This process involved obtaining the names of all female students, organized by college and year of study, from the university's administration. Subsequently, the names of eligible students were alphabetically arranged and assigned numbers in a Microsoft Excel sheet. Random numbers were then generated, and the corresponding students were selected to participate in the study.

Variable and measurements

The primary outcome of this study was the uptake of breast cancer screening services among undergraduate female students. Awareness of breast cancer was assessed by asking participants if they had ever heard of breast cancer. The question had a dichotomous response of either "Yes" or "No."

The knowledge regarding the risk factors for breast cancer was assessed by asking participants to identify if certain factors could cause breast cancer, with "Yes" or "No" responses. This was measured using a Likert scale, where participants who scored 5 or more by identifying correctly the risk factors for breast cancer were categorized as having good knowledge, whereas those who scored less than 5 were categorized as having poor knowledge of breast cancer risk factors. This knowledge of risk factors for breast cancer was then expressed in proportion. Exposure variables such as demographic factors were also included in this study. The variables were categorized as follows: (1) age group (18-21 years, 22-25 years, 26-28 years, and ≥ 29 years)—this age categorization aimed to capture age group and potential variations in utilization of the breast cancer screening services; (2) year of study: this was categorized into 4 groups (first year, second year, third year, and fourth year)—this categorization was intended to assess the influence of the level of study year on utilization of breast cancer screening services, as the level of the

classes may influence knowledge and decision-making processes; and (3) marital status: this was categorized as married, single, and separated—this categorization was based on the understanding that marital status may affect the utilization of breast cancer screening services.

Data collection

Data were collected using a self-administered questionnaire comprising structured and open-ended questions. The questionnaire was developed based on previous studies.^{1,17-19} Initially written in English, it was later translated into Kiswahili. Before the actual data collection, the instruments were pre-tested. The questionnaire consisted of a total of 22 questions, which are divided into 3 sections: sociodemographic information (8 questions), knowledge regarding breast cancer (2 questions), and breast cancer screening practices (12 questions).

Data analysis

The data were entered into a Microsoft Excel spreadsheet, where cleaning and coding procedures were carried out before exporting to STATA for analysis. Subsequently, the cleaned data were transferred from the Excel sheet into Stata software version 15 for analysis. A descriptive analysis was then conducted to outline demographic characteristics and the proportion of the uptake of breast cancer screening services among undergraduate females. The results were presented in tables and charts.

Results

Sociodemographic information of the participants

A total of 434 undergraduate females from the University of Dar es Salaam participated in this study. The mean age was 2.73 (standard error [SE] = 0.24). Out of them, 3.23% were married, and 96.54% were single. The study participants' aged from 18 to 29 years old, with the majority (68.20%) falling between 22 and 25 years. Most of the participants were Christians (77.88%). In addition, 22.12% of the participants were first-year, 28.8% were second-year, 36.18% were third-year, and 12.9% were fourth-year students (Table 1).

Awareness about breast cancer

Most of the participants (400 [92.38%]) had heard of breast cancer. Participants' knowledge about the risk factors for breast cancer was poor. Only 171 (39.4%) had good knowledge about the risk factors for breast cancer. The most commonly identified risk factors were radiation exposure (67.08%), followed by previous history of breast cancer (60.85%) (Table 2 and Figure 1).

Awareness of the symptoms of breast cancer

Awareness of the symptoms of breast cancer was also assessed to determine whether participants were aware of the signs and

Table 1. Sociodemographic information of the participants.

VARIABLES	FREQUENCY	PERCENTAGE (%)
Age		
18-21 years	129	29.72
22-25 years	296	68.20
26-28 years	6	1.38
≥29 years	3	0.69
Religion		
Christian	325	74.88
Muslim	108	24.88
No religion	1	0.23
Marital status		
Married	14	3.23
Single	419	96.54
Separated	1	0.23
Year of study		
First year	96	22.12
Second year	125	28.8
Third year	157	36.18
Fourth year	56	12.9
Source of income		
Loan board	199	45.85
Parent	235	54.15

Table 2. Knowledge of the risk factors for breast cancer.

RISK FACTORS FOR BREAST CANCER	FREQUENCY	PERCENTAGE (%)
Increasing age	195	48.63
Alcohol consumption	160	39.9
Positive family history of breast cancer	216	53.87
First child at a late age	76	18.95
Obesity/overweight	106	26.43
Breastfeeding	55	13.72
Smoking	191	47.63
Previous history of breast cancer	244	60.85
Late menopause	99	24.69
Radiation exposure	269	67.08
Physical inactivity	139	34.66
Early menarche	67	16.83
Long-term contraceptive use	213	53.25

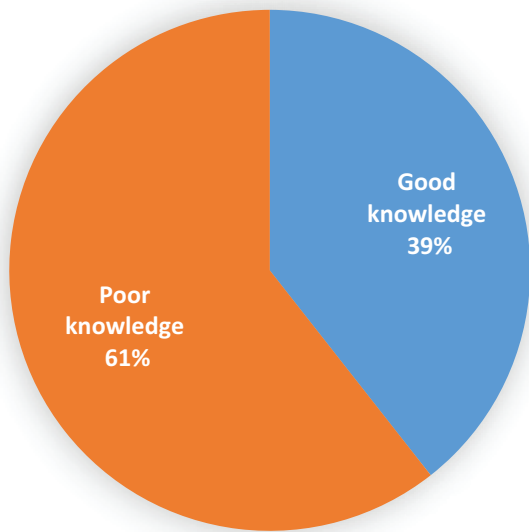


Figure 1. Knowledge of the participants regarding risk factors for breast cancer.

Table 3. Awareness of the signs and symptoms of breast cancer.

SIGNS AND SYMPTOMS OF BREAST CANCER	FREQUENCY	PERCENTAGE (%)
Change in the breast shape	207	51.62
Change in the breast region	330	82.29
Painless lump under armpit	197	49.13
Discoloration of the breast	242	60.35
Nipple discharge	254	63.34
Swelling or enlargement of the breast	285	71.07
Lump in the breast	252	62.84

symptoms of breast cancer. The most known symptoms of breast cancer were pain in the breast region (285 [71.07%]), followed by swelling or enlargement of the breast (254 [63.34%]), lump in the breast (252 [62.84%]), change in the breast shape (207 [51.62%]), and discoloration of the breast and painless lump under the armpit (241 [60.35%]) and (197 [49.13%]), respectively (Table 3).

Uptake of breast cancer screening services

Out of the total participants, 162 (40%) had heard of the breast cancer screening methods, and only 9.23% had ever used breast cancer screening services. The most common method used by participants was BSE (48.65%), followed by clinical BSE (32.43%) (Table 4).

Table 4. The uptake of the breast cancer screening services.

BREAST CANCER SCREENING METHODS	FREQUENCY	PERCENTAGE (%)
Breast self-examination	18	48.65
Clinical breast examination	12	32.43
Mammogram	2	5.42

Motivation for breast cancer screening

Participants who had ever used breast cancer screening services were able to provide reasons for their decision to undergo screening. The majority (54.05%) mentioned screening for early detection and treatment as their primary motivation, followed by a recommendation from the health care provider (24.32%) (Figure 2).

Barriers for breast cancer screening

Participants who had never used breast cancer screening services provided reasons for their decision not to screen. The most common reason cited was the absence of symptoms for breast cancer (37.66%), followed by a lack of information on breast cancer screening services (22.44%) (Figure 3).

Discussion

The primary objective of our study was to assess breast cancer awareness and the uptake of breast cancer services among undergraduate female students at the University of Dar es Salaam, Tanzania. The study has revealed the level of awareness about breast cancer and its risk factors among the study participants, as well as their utilization of breast cancer screening services.

The study indicates that most of the participants (92.36%) are aware of breast cancer, indicating a high level of awareness about the disease through mass media (TV and radio). However, when specifically assessing knowledge of the factors that may contribute to the risk of breast cancer, only (39%) of the participants were able to correctly identify these factors. This suggests that the knowledge of the study participants regarding the risk factors for breast cancer is poor, despite their awareness of the disease. This is a sign that there should be more effort to educate women, especially young women about the risk factors for breast cancer, such effort can potentially increase the number of women opting for screening services.

Owing to the poor knowledge of the risk factors for breast cancer, our study findings reveal a low uptake of breast cancer screening services, with only 9.23% of the study participants having ever used breast cancer services by at least 1 method. The study further identifies that 48.65% of the study participants had ever used BSE, which emerged as the most common

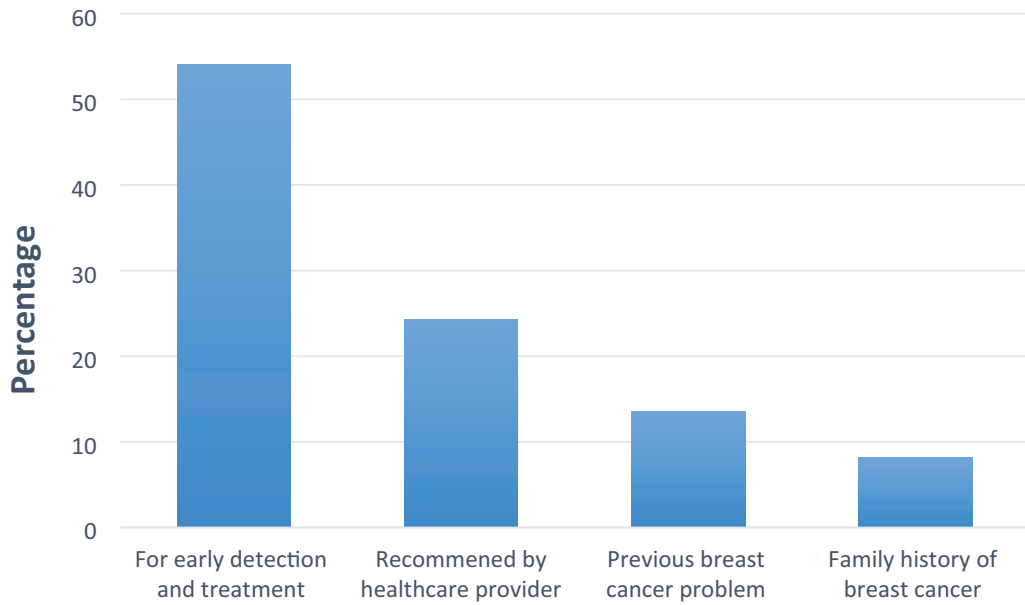


Figure 2. A bar graph showing reasons for screening for breast cancer.

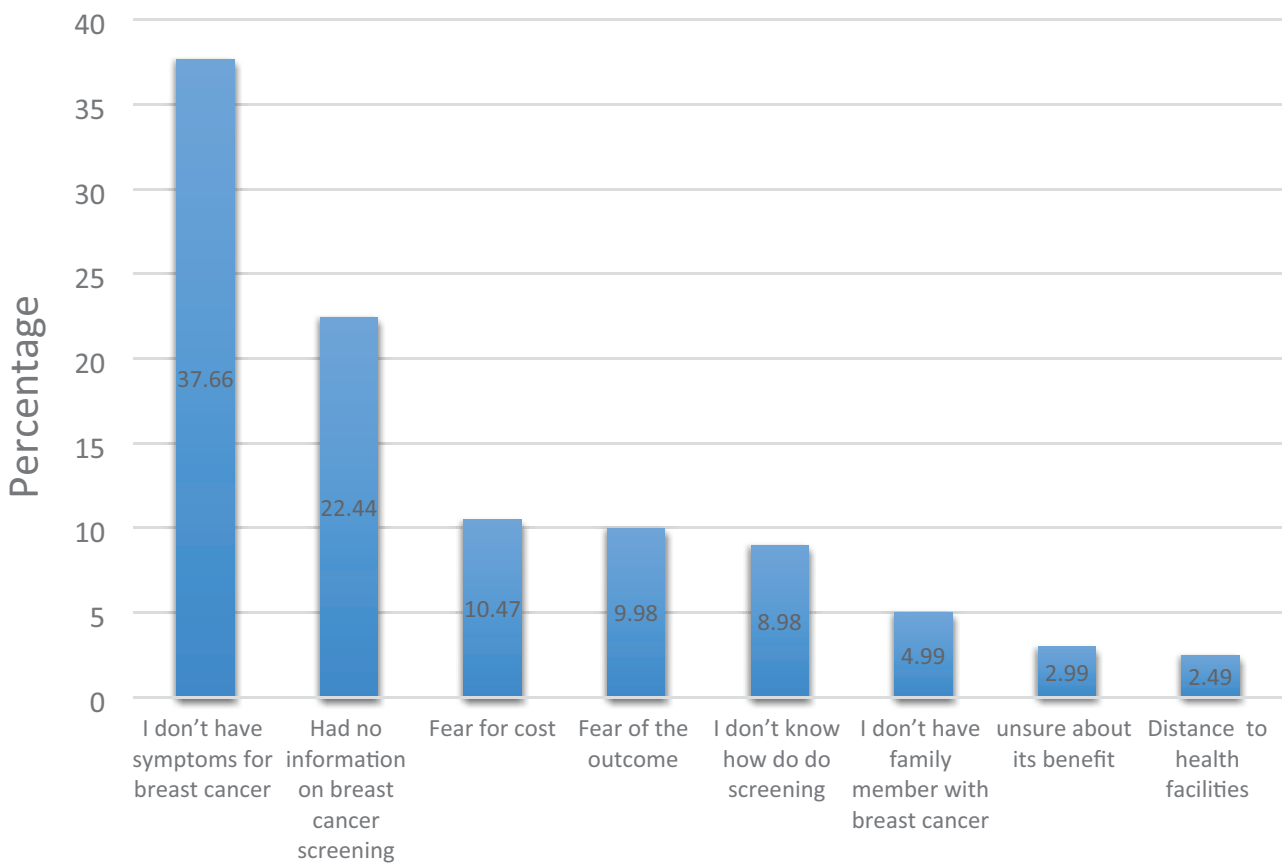


Figure 3. A bar graph showing barriers/obstacles for breast cancer screening.

method in this study. These findings are consistent with the studies conducted in Gaza, Ghana, and Ethiopia.^{1,13,14} However, the findings differ from studies among young women in Ethiopia and Malaysia,^{17,18} possibly due to variations in the previous populations, where health science students were the study

population. On the contrary, studies conducted in Kenya and Ghana found that 50% and 55.1% of the participants, respectively, had used BSE which is slightly higher than this study.^{13,20}

When assessing the awareness of the screening methods for early detection of the disease among study participants, it was

found that 40% of them reported having never heard of breast cancer screening methods. The most commonly identified breast cancer screening method was BSE, followed by clinical breast examination, respectively. These findings contrast with a study conducted in Ethiopia.¹⁴ The disparity between this study's findings and the previous study may be attributed to the poor knowledge of the study participants regarding breast cancer screening methods compared with medical school students, who are more exposed to information about breast cancer screening services.

In addition, among the participants who reported having heard of breast cancer screening methods, they identified mass media as their main source of information about breast cancer screening methods. This finding is similar to previous studies conducted in Ethiopia and Kenya.^{17,20} Moreover, the finding contrasts studies conducted in Gaza and Malaysia, where the main sources of information for the participants were derived from their university studies and newspapers, respectively.^{1,18}

Furthermore, the participants who underwent breast cancer screening services provided reasons motivating them to do so, including the fear of developing breast cancer, early detection and recommendation of screening from a health provider, as well as a positive family history of breast cancer. This finding is similar to a study conducted in Gaza, where participants mentioned 2 important reasons that encourage them to screen for breast cancer: the presence of a family history of breast cancer and breast cancer early detection purposes.²¹ Similarly, the study conducted in Ethiopia aligns with this study, as most of the participants mentioned that the reasons for screening for breast cancer included early detection and treatment, recommendations from health providers, fear of developing breast cancer, family history, and previous breast problems.¹⁷

In this study, given the observed low uptake of breast cancer screening services, we also assessed the barriers for undergoing screening services. The study revealed that the barriers include the absence of signs of the disease, a lack of information about breast cancer screening services, the absence of a family member with the disease, and a lack of knowledge on how to undergo screening. Similar results were found in studies conducted in Ghana and Turkey.^{13,22} Considering these findings, there is a need for a breast cancer screening program that can contribute to raising public awareness, especially among young women, regarding the importance of screening and the impacts of late detection and treatment of breast cancer.

Strengths and limitations of the study

Only a few studies have been conducted in Tanzania on the uptake of breast cancer screening services. This study was conducted in the Dar es Salaam region to assess breast cancer awareness and the uptake of breast cancer screening services among undergraduate female students. The scope of our study was limited to 1 university, which is the oldest and one of the

biggest universities in the country, with students from all over the country. Second, in this study, all enrolled students had an equal chance of participating. We did not exclude students according to the time they had spent at the university. The fresher students could affect the results because they are not exposed to the knowledge offered in the university compared with others. Therefore, caution should be taken before generalizing the results, as university students are not representative of young adults in general. Perception, risk factors, and breast cancer screening practices may differ from those of the general population.

Conclusions

The study findings provided baseline information regarding knowledge related to breast cancer, its risk factors, and screening services among female students. Overall, awareness of breast cancer was found to be good, but knowledge of the risk factors for breast cancer was poor, leading to low uptake of breast cancer screening services among study participants. There is a greater need to enhance awareness among female students regarding risk factors for breast cancer and the importance of early detection. In this regard, both public and private sectors as well as health care professionals can play an essential role in creating awareness about breast cancer and preventive measures. This study findings should be used as an advocacy tool for policymakers and planners to introduce breast screening and awareness programs in the country.

Declarations

Ethics approval and consent to participate

The authors confirm that the research was conducted by the Declaration of Helsinki. Ethical approval was obtained from the Muhimbili University of Health and Allied Sciences Review Board (MUHAS-REC-O7-2022-1278). Permission to conduct the study was obtained from the University of Dar es Salaam. Furthermore, verbal and written informed consent was obtained from the participants. Consent was obtained by having participants sign the consent form after a comprehensive explanation, including the benefits and risks of participation. Participation was voluntary, and participants were informed that they were free to decline to participate or withdraw from the study without any consequences. Confidentiality was assured to participants, and personal identifiable information such as names was not captured.

Consent for publication

Not applicable.

Author contributions

Mary Mally: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing—original draft; Writing—review & editing.

Novatus Tesha: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Resources; Software; Supervision; Validation; Visualization; Writing—original draft; Writing—review & editing.

Amani Anaeli: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Writing—original draft; Writing—review & editing.

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Availability of data and materials

The data sets used and/or analyzed during this study are available from the corresponding author on reasonable request.

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