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Evaluation of Mammography Screening for Early Detection of Breast Cancer Among Women Attending St. Paul's Hospital, Addis Ababa (2023)

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Abstract:

In Ethiopia, breast cancer is the primary cause of death and the most common cancer among women worldwide. The purpose of this study was to evaluate how well Mammography works for early breast cancer identification in women betw

een the ages of 40 and 60. The study, conducted in Addis Ababa between April 20 and May 20, 2023, examined the opinions of 45 female patients who were purposefully selected to assess their knowledge of breast cancer and clinical breast examinations (CBE). The study combined primary and secondary sources in a quantitative research design. Women had CBE administered by a doctor, and then they had a mammogram to assess its efficacy in detecting breast cancer early. Participants were selected using a purposive sampling technique from St. Paul's Hospital, focusing on breast cancer patients who were receiving follow-up care and treatment at the facility. Data was collected through experiments and surveys, and descriptive statistical analysis was conducted using Excel and STATA software. The mean age of the 45 women who were screened was 51.02 years. 84.44% of participants had average CBE results, while 73.33% of the women had negative mammogram results for breast cancer. Mammography is more advantageous for the early identification of breast cancer than CBE since it discovers more cases of the disease. The study's results, however, are constrained by its small sample size and narrow age range, which calls for more extensive and varied population-based research. The study's results, however, are constrained by its small sample size and narrow age range, which calls for more extensive and different population-based research. According to the study findings, 73.33% of respondents are not formally educated. It is a noteworthy discovery since it implies that a sizable portion of the population could not have access to or a chance to pursue an education.

Keywords:

Mammography; Breast Cancer; Clinical Breast Examination; Early detection

I. Introduction

Breast cancer is the most common cancer in women worldwide and the leading cause of death in Ethiopia (Duche et al., 2021). Various studies show that breast cancer is the leading cause of cancer mortality in adult women, accounting for one-third of all cancer cases in women and one in every five cancer cases (Ayele et al., 2022). According to 2018 breast cancer estimates, approximately 626,679 women died from breast cancer in the world, representing a crude mortality rate of 13 per 100,000 women (Dechasa et al., 2022).

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A recent study established that the number of breast cancer cases among Ethiopian women was estimated to be around 10,000, with thousands more cases going unreported (Dibisa et al., 2019). According to the Addis Ababa Cancer Registry, breast cancer accounts for 34% of all female cancer cases, followed by cervical cancer at 16% (Agide et al., 2019). Early detection of breast cancer reduces mortality and thus increases the likelihood of survival (Yang et al., 2022).

Mammography is the most effective and well-proven imaging technology for breast cancer screening. It is used as a diagnostic tool for patients who are symptomatic or have a positive screening mammogram (Washington, 2016). Various studies suggest that early screening with Mammography can reduce mortality in women aged 50 to 70 (Hadgu et al., 2018).

Various studies have been conducted on the early detection of breast cancer to start treatment and increase the chance of survival (Tahmooresi et al., 2018). Despite this, more research is needed to determine the effectiveness of Mammography in the early detection of breast cancer. WHO recommends organized, population-based mammography screening programs for women aged 50–69 every two years in well-resourced settings (World Health Organization, 2014). According to a recent study, screen-film mammography is a well-established screening tool that has been shown to reduce breast cancer mortality due to earlier detection (Hambly et al., 2009).

This study has consistently found that Mammography has the utmost impact on identifying risk factors and reducing breast cancer. However, these interventions have yet to affect women aged 40 to 60. This study aimed to evaluate the effectiveness of Mammography in detecting breast cancer early in comparison to clinical breast examination in women between the ages of 40 and 60. This quantitative study measured the effectiveness of mammography screening in detecting breast cancer early in comparison to clinical breast examination in women between the ages of 40 and 60.

1.1 Statement of the Problem

Mammography screening in Ethiopia has decreased steadily over the past two years, in contrast to other African Countries. Several studies show that screening is lowest among those under 40 years. In the past two years, there have been several successful efforts to engage these age groups in other screening modalities. A vast majority of breast cancer patients increased their knowledge about mammography screening. However, these interventions have yet to have any significant effect on screening.

Low mammography screening has been shown to have a negative impact associated with breast cancer mortality. It is becoming an area of increasing concern for many Ethiopians. A study conducted in Addis Ababa Tertiary Hospital found that only 17% of women are aware of screening Mammography, while 83% have never heard of it (Duguma et al., 2022).

The study's findings highlighted the low mammography uptake among Ethiopian women. When breast cancer patients lack knowledge of Mammography, they are likely to suffer from the disease. Addressing this problem will have practical benefits for Ethiopians as well and will increase the uptake of mammography screening. This will improve Ethiopians' chances of survival. This study aimed to evaluate the effectiveness of Mammography in detecting breast cancer early in women between the ages of 40 and 60. This quantitative study

measured the effectiveness of mammography screening in detecting breast cancer early in women between the ages of 40 and 60.

1.2 Significance of the Study

Breast cancer is a global health issue with a higher incidence, morbidity, and mortality rate, and it has a significant impact on the physical, psychological, and economic aspects of a woman, family, and community as a whole, particularly in developing countries such as Ethiopia.

Early detection of breast lumps through screening is critical for the prevention and early detection of breast cancer, as well as for reducing morbidity and mortality. Any concerned bodies, such as governmental and non-governmental organizations working on health promotion activities, mainly breast cancer, can use it to plan interventions in different health education programs and implement proper health promotion programs.

This study is significant because it can assess the efficacy of Mammography among women who visit St. Paul's Hospital in Addis Ababa. The study also found a significant correlation between education and Mammography awareness. Women with breast cancer who had completed secondary school were 4.5 times more likely to have undergone a mammogram compared to those who were illiterate.

II. Research Method

2.1 Study Area

The research was conducted from April 20, 2023, to May 20, 2023, in Addis Ababa, Ethiopia. The study focused on 45 female patients who were purposefully selected to examine their perceptions of breast cancer and clinical breast examinations (CBE).

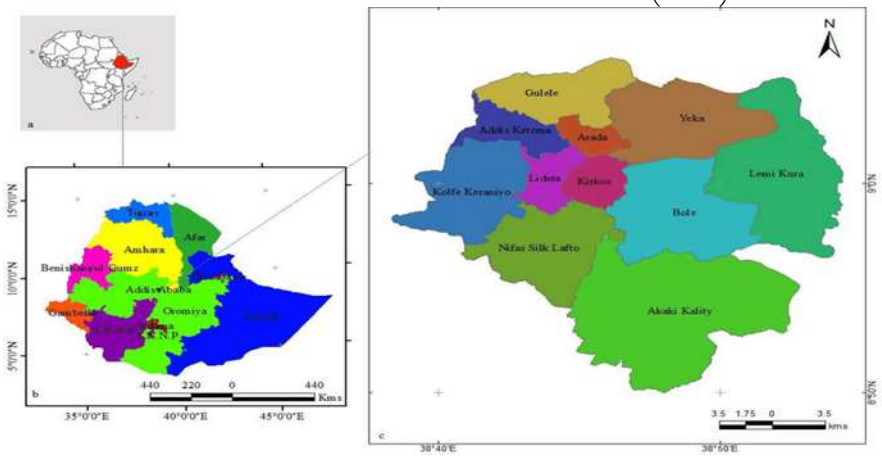

Figure 1. Geographical location of the study area using Ethio GIS (2022)

2.2 Research Design

This study combined primary and secondary sources with a quantitative research design. After performing clinical breast examinations on women, the doctor experimented with mammography screening to find breast cancer early and lower morbidity in women between 40 and 60. Thus, the researcher gathered data regarding clinical breast examinations and screening mammogram respondents.

2.3 Sample Population

The study population was recruited from a population included all females above 40 years old attending St. Paul's Hospital. A purposive sample size method was used. All adult female relatives of participants at least 40 years old were included. The inclusion criterion for this study was breast cancer patients who were having treatment and follow-up at St. Paul's Hospital. Voluntary female Patients who were 40 years old and above were also included in the study. The exclusion criteria were patients not enrolled at St. Paul's Hospital Radiology Rooms. Severely ill and non-communicative patients were also excluded from the study.

a. Sample Size and Sample Size Determination

The respondents for the study were chosen using simple purposive sampling methods. In simple purposive sampling, not every member of the population has an equal chance of being selected or receiving a response, which can be greater than the chance depending on the data analysis justification. Purposive sample size determination was employed to obtain the most accurate and sensible data. As the nature of the hospital changed, this study employed nonprobability (purposive) sampling methods. The total sample size was determined using the single population proportion formula

$$n = \frac{Z_{\frac{\alpha}{2}} p(1-p)}{d^2} \qquad (1)$$

where d is the margin of error (or intended precision), n is the necessary sample size, $Z_{a/2}$ is the standard average value corresponding to the desired confidence level, p is the estimated population percentage, and $1\text{-}p$ is the complement of the calculated proportion. Assuming Zα/2= Z-value for a 95% confidence level is 1.96, d =margin of error was considered 5%, and P = 29.5 %, this prevalence was taken from a household-based study in St. Paul's at Addis Ababa. Significant level at α= 0.05, at 95% confidence interval, and considering 10% no response rate, the sample size was calculated by the following formula: n= (Zα/2)2 p (1-p) = (1.96) 2. 0.295(1-0.295) = 319 d 2 (0.05)2 The total sample size will be computed to be n = 351

2.4 Data Sources

a. Primary Data Sources

It was obtained from the original information source. Because the trusted analysis was directly intact with the occurrence of the events, the primary data were more reliable and, therefore, more confident in decision-making. The primary data sources were the questionnaires and experiments.

b. Secondary Data Sources

Secondary data sources were obtained from the literature, and the remaining data were obtained from the Hospitals' manuals and reports.

c. Data Collection Methods

Primary data sources include quantitative information, which was collected using experiments that are part of the quantitative methods. Secondary data is information gathered by someone other than the researcher. This data source provides insights into the method's current state of research. These secondary data sources were both internal and external information sources that covered a wide range of topics.

Data were collected using questionnaires and experiments. The questionnaires were designed according to the study's objectives and included questions on socio-demographic information, breast cancer history, commitment to performing clinical breast examinations and mammograms, and reasons for not undergoing these procedures.

2.5 Methods of Data Analysis

The primary dependent variables were clinical breast examination and mammography screening, while the independent variables included socio-demographic factors and family history of breast cancer. The data analysis section answers the questions posed in the introduction. Firstly, mammography screening was performed for all patients who undergo clinical breast examination to detect possible signs of breast cancer before they experience symptoms of the disease.

Breast cancer patients were investigated about the commutative cost of examination and treatment if they undergo mammography screening before coming to this screening exam. These data were analyzed using descriptive statistical analysis. This data analysis focused on numerical data analysis. This data analysis was performed using Excel and STATA software. The answers to the questionnaire were initially coded into Excel to make data analysis easier. This task entailed identifying, classifying, and assigning a numeric or character symbol to data. In this study, all responses were pre-coded. They were drawn from the list of responses, with a number corresponding to each selection. Following completion, the data were entered into a statistical analysis software package, STATA on Windows 10pro, for further processing. Data were explored using descriptive statistics and graphical analysis as part of the data analysis. This analysis entails investigating the relationship between variables and comparing how groups affect one another.

III. Result and Discussions

3.1 Results

a. Demographic characteristics of patients

Forty-five women in the age group of 40–60 years underwent screening for breast cancer. The mean age of the study group was 51.02 years. The age distribution of the participants reveals that the majority fall within the 55-60 age group, comprising 31.11% of the total sample. More than half of the participants, totaling 33 (73.33%), had no formal education, while only 7 participants (15.56%) had achieved a maximum high school diploma. All women except three (6.67%) were married. Among the married women, only one (2.22%) of them in the study group had gotten divorced, 39 (86.67%) of them lived together with their husbands, and the remaining 2 (4.44%) were widows. The religious composition of the study group shows a predominance of Christianity, with 25 (55.56%) of participants identifying as Christians. Islam represents the second-largest religious group, comprising 20 (44.44%) of the sample.

Table 1. Demographic characteristics of patients

Characteristics	Frequency (n=45)	Percent (%)
Age Group		
40-44	9	20.00
45-49	11	24.44
50-54	11	24.44
55-60	14	31.11
Sex		
Female	45	100
Education		
Illiterate	33	73.33
Primary	2	4.44

Secondary	1	2.22
High School	2	4.44
Bachelor's Degree	7	15.56
Variable	Obs.	Mean
Age	45	51.02
Marital Status		
Single	3	6.67
Married	39	86.67
Divorce	1	2.22
Widow	2	4.44
Religion		
Christian	25	55.56
Muslim	20	44.44

b. Clinical Breast Examination (CBE) Practices and Awareness

According to this survey, eight individuals (17.78%) had ever performed a clinical breast examination, whereas 37 participants (82.22%) had never heard of the procedure. The majority of participants (36, 80.00%) who reported performing clinical breast exams had not noticed any lumps, discomfort, or discharge. This suggests that symptomatic breast diseases are not as common in this subset of participants. Notably, only 9 (20%) of the study participants reported experiencing breast difficulties, such as pain, discharge, or lumps. This suggests that there may be underlying health issues related to the breasts that need to be further evaluated and managed.

A family history of breast cancer was present in 11 women, that is, 24.44% of the study population. Among the 11 women who had a family history of breast cancer, eight women had a history of breast cancer in their sisters, two women had previous breast cancer in their daughters, and in one case, the mother had a history of breast cancer. The majority of participants, 33 (75.56%), were free from genetic predispositions to breast cancer, as evidenced by the absence of a family history of the disease.

Of the frequency of clinical breast examination, only 12 (26.67%) of the study participants reported undergoing clinical breast examination in the last six months, indicating suboptimal adherence to recommended screening guidelines. On the other hand, a substantial number of participants, 33 (73.33%), did not receive a clinical breast examination within the specified timeframe, indicating missed early detection and intervention.

Table 2. Clinical Breast Examination (CBE) Practices and Awareness

Variables	Category	Frequency (n=45)	Percent (%)
Have you ever performed a CBE before?	Yes	8	17.78
	No	37	82.22
Do you have any breast problems, such as lump pain or discharge?	Yes	9	20.0
	No	36	80.00
Has any blood relative had breast cancer?	Yes	11	24.44
	No	34	75.56
Did you perform CBE in the last six months?	Yes	12	26.67
	No	33	73.33

c. Mammography Screening Practices and Awareness

This result found that 14 (31.11%) had mammography screening, while 31 (68.89%) had not. Among the study participants who underwent mammography screening, only 7 (15.56%) were diagnosed with breast lumps by a physician during the screening process. Conversely, of those screened, 38 (84.44%) were breast lump-free, indicating a potential false-negative rate or limitations in mammographic sensitivity for detecting subtle abnormalities. In terms of screening frequency, a notable proportion of study participants, comprising 18 (40.00%), reported having been screened for breast cancer within the last six months. However, a significant proportion of individuals, totaling 27 (60.00%), had not undergone screening within the specified timeframe.

Table 3. Mammography Screening Practices and Awareness

Variables	Category	Frequency (n=45)	Percent (%)
Have you ever performed a mammogram before?	Yes	14	31.11
	No	31	68.89
Did you or your doctor feel a lump in your breasts?	Yes	7	15.56
	No	38	84.44
Did you perform Mammography in the last six months?	Yes	8	40.00
	No	27	60.00

d. Clinical Breast Examination (CBE) Test Result

The CBE displayed in Table 4 was used to evaluate the screening for breast cancer in 45 women. The data show that 38 (84.44%) participants had normal CBE findings, showing no palpable breast abnormalities or worrisome lesions on clinical examination. On the other hand, only 7 patients (15.56%) had abnormal CBE findings, indicating the possibility of palpable breast lumps, masses, or other clinically significant abnormalities that call for more testing and investigation.

In this study, screening for breast cancer was assessed through the use of clinical breast examination (CBE) in a cohort of 45 women. The detection of abnormal CBE findings among a subset of study participants highlights the importance of regular breast cancer screening and clinical evaluation in identifying potential signs of breast pathology at an early stage.

Table 4. Clinical Breast Examination (CBE) Test Result

CBE test result	Frequency (45)	Percent (%)
Negative	38	84.44
Positive	7	15.56
Total	45	100

e. Breast Mammographic Screening Findings

The results demonstrate that the majority of women screened for breast abnormalities via Mammography exhibited negative findings, with 33 (73.33%) individuals showing no evidence of tumors or suspicious lesions on imaging shown in Table 5. However, tumors were detected in 12 (26.67%) women, indicating the presence of clinically significant abnormalities warranting further evaluation and diagnostic workup. Among the participants, 12 (26.67%)

with tumors detected on Mammography, all had previously been assessed as unfavorable for breast abnormalities during clinical breast examination (CBE).

Table 5. Breast Mammographic Screening Findings

Mammography test results	Frequency (n=45)	Percent (5%)
Negative	33	73.33
Positive	12	26.67
Total	45	100

3.2 Discussion

a. Demographic Characteristics and Screening Practices

The study's demographic profile of the women getting screening for breast cancer provides essential insights regarding participation patterns and educational differences. The participants (73.33%) lacked formal education, underscoring a crucial problem with healthcare awareness and access. Health literacy, which influences people's capacity to make knowledgeable health decisions and participate in preventive actions like cancer screenings, is heavily influenced by education (Nutbeam, 2008). Poorer health outcomes may result from a lack of knowledge regarding the significance of early identification of diseases like breast cancer brought on by low educational levels.

The majority of participants were between the ages of 55 and 60, which raises the possibility of raising awareness of breast cancer or developing tailored healthcare interventions for women as they age. This finding is consistent with studies showing that people become more aware of their cancer risk as they become older, and healthcare systems frequently prioritize older women for tests (Smith et al., 2018). Nonetheless, it is also important to note that the limited sample size restricts how broadly these results can be applied, necessitating additional research with more significant populations to comprehend these demographic trends.

Positively, 2.22% of respondents said they had completed at least elementary school, indicating that some women are getting access to educational opportunities despite the generally low level of education. Although modest, this development points to the possibility of future gains in health literacy, which may affect the use of preventive healthcare (Berkman et al., 2011).

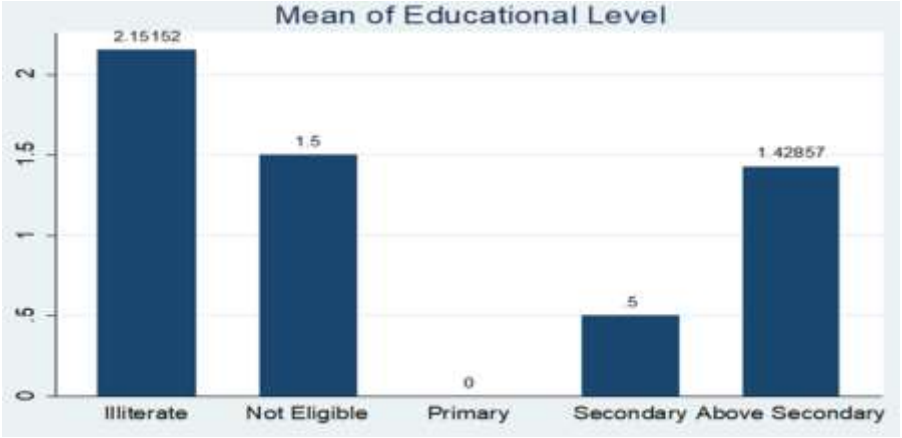

Figure 2. The education level of the participants in this study

The high percentage of participants without a formal education was an intriguing finding since it may indicate differences in access to healthcare and educational resources. The study found that the participants' awareness was relatively high (77.7%), suggesting that Abakiliki market women were well-informed about the disease. However, only 73.9% of them believed that breast cancer could be treated if it was discovered early. The findings are consistent with a related study conducted in Abakaliki among nurses at the Ebonyi State University Teaching Hospital; 98% of the participants knew of the illness, and 59.2% thought early detection could prevent death (Agwu et al., 2013). similarly, 93.7% awareness was reported in a Lagos University Teaching Hospital survey of nursing students. According to the same study, 99.3% of people who knew about breast cancer felt that survival rates may be raised with early identification.

An interesting observation was the high proportion of participants with no formal education, reflecting potential disparities in access to education and healthcare information. The participants' level of awareness of breast cancer was significantly high (77.7%), implying that the market women in Abakiliki were very much aware of the disease; only 73.9% believed that breast cancer could be treated if detected early. The above results correlate with a similar study done in Abakaliki among nurses at Ebonyi State University Teaching Hospital; 98% were aware of the disease, and 59.2% believed that early detection could help save lives Agwu et al., (2013).

The predominance of married participants in this study resonates with existing literature, highlighting the role of social support networks provided by spouses in accessing healthcare resources. However, the presence of divorced or widowed participants underscores the unique challenges faced by individuals without spousal support, necessitating targeted interventions to ensure equitable access to screening and healthcare services. This indicates that women who are in stable marriages may have better access to healthcare services and support systems for breast cancer screening and treatment.

55.56% of the participants identified as Christians. The religious diversity observed among participants emphasizes the need for culturally sensitive approaches to healthcare delivery.

3.3 Clinical Breast Examination (CBE) and Awareness

a. Frequency of Clinical Breast Examination

Consistent with previous studies conducted in the area, the low prevalence of clinical breast examination (CBE) practice and awareness among research participants underscores considerable gaps in breast health screening and understanding. Even though this study's awareness is low, it is still higher than that of Aba, Nigeria, where Nwagbo and Akpala (1996) found that only 1% and 2% of participants knew that doctors and nurses, respectively, could perform breast examinations. According to a study done on female teachers in Ilorin, Nigeria, 95.6 percent of the participants knew about CBE, which is consistent with results from studies done in Enugu and Lagos, where 92% of participants identified the process (Adenike et al., 2011; Kayode et al.,

2005). The association between participants' knowledge of breast self-examination (BSE) and their educational attainment emphasizes the importance of education in improving health literacy. This finding underscores the necessity of implementing focused educational initiatives to raise public awareness of clinical breast examination (CBE). These results are interestingly at odds with the Addis Ababa Cancer Registry study, which found that younger women between the ages of 30 and 49 had the highest incidence of breast cancer (38.4%). This suggests regional variations in cancer screening practices and awareness. (Tadesse, 2018).

3.4 Mammography Screening and Awareness

a. Mammography Screening Frequency

The low uptake of mammography screening observed in this study indicates a significant gap in breast cancer detection efforts. The fact that only a tiny percentage of women who underwent screening were determined to have breast lumps by a physician indicates the potential for Mammography to detect abnormalities that may not be apparent through clinical breast examination alone. Comparative studies should explore factors influencing mammography utilization, such as socioeconomic status, cultural beliefs, and healthcare access barriers, to inform targeted interventions improving screening rates.

The importance of clinical breast exams (CBEs) in the early detection of breast cancer has been supported by numerous studies. As an example, Roth et al. (2011) demonstrated that 39% of breast cancers were self-detected by patients and that 25% of these cases were discovered in breast cancer survivors. It is noteworthy that in their study, Mammography was only utilized to diagnose 43% of cases of breast cancer, underscoring the need for self-examination. According to a different study, two-thirds of women discovered they had breast cancer, highlighting the importance of self-awareness in breast health (Barton et al., 2009). Moreover, Szukis et al. (2017) found that women who had previously performed breast self-examinations (BSEs) had higher risks of breast cancer diagnosis. This evidence suggests that BSE or CBE practice can improve overall results and breast cancer detection.

b. Correlation with Clinical Breast Examination (CBE) Results

The results also revealed a discrepancy between the findings of clinical breast examination and mammography screening, with a subset of women showing tumors on Mammography that were not detected through clinical breast examination. This underscores the complementary nature of these screening methods and the importance of integrating multiple approaches to maximize the chances of early detection and intervention. The correlation between mammographic findings and clinical breast examination results highlights the complementary nature of these screening modalities. The overall findings of this study highlight several vital gaps and opportunities for improvement in breast cancer screening practices among women in the age group of 40-60 years. A notable segment of the research participants was non-informed about clinical breast examination, suggesting a deficiency in knowledge or accessibility to this crucial screening technique.

The low prevalence of clinical breast examination, mammography screening, and awareness of these screening methods underscores the need for targeted education, outreach, and advocacy efforts to increase access to preventive healthcare services and empower women to take charge of their breast health. Additionally, the presence of breast problems and family history of breast cancer in a subset of the study population emphasizes the need for comprehensive risk assessment, genetic counseling, and tailored support services for high-risk individuals.

IV. Conclusions

In conclusion, our study provides valuable insights into the demographic characteristics and screening practices of women undergoing breast cancer screening. In summary, there is a significant difference between CBEs and mammography screening in individuals presenting for breast lump assessment. Rather than relying solely on clinical breast examinations (CBEs), Mammography is more effective in detecting most breast cancers. This indicates that early detection of breast cancer can be achieved through mammography screening. Despite some contentious recommendations, women should continue to receive mammograms for early breast cancer screening. Not all clinical breast examinations (CBEs) are equal, but many standards favor CBEs over mammography screening. It is important to note that the findings of this study may not be generalizable to other populations due to the small sample size and the age range restrictions imposed on the participants.

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