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Practice of breast self-examination and associated factors among women of reproductive age in the North Shoa Zone, Oromia, Ethiopia, 2022: a convergent mixed-methods study

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ABSTRACT

Objective To assess practice of breast self-examination (BSE) and associated factors among women of reproductive age in the North Shoa Zone, Oromia, Ethiopia.

Design Community-based cross-sectional study with a convergent mixed-methods approach.

Setting The study was conducted in the North Shoa Zone of Oromia, Central Ethiopia, between 1 May 2022 and 30 June 2022.

Participants 1076 women of reproductive age were selected using simple random sampling technique for the quantitative study. For the qualitative part, a total of 46 women were approached purposively to elicit rich ideas and insight into the issue. The quantitative data were collected using an interviewer-administered questionnaire, and focus group discussions were used for the qualitative part. Quantitative data were analysed using SPSS V.26. An adjusted OR with a 95% CI was employed. Thematic analysis approach was applied for the qualitative data analysis.

Outcome measures Participants were interviewed to respond whether they practised BSE.

Results Overall, 192 (18.2%; 15.7%–20.5%) of the participants had ever performed BSE. Having a family history of breast cancer (BC) (adjusted OR (AOR)=6.9, 95% CI 4.6 to 10.3), being knowledgeable on BSE (AOR=3, 95% CI 1.9 to 4.3), having high perceived susceptibility (AOR=1.7, 95% CI 1.2 to 2.5), having high self-efficacy (AOR=1.5, 95% CI 1.1 to 2.3) and having a high perceived benefit to BSE (AOR=1.5, 95% CI 1.1 to 2.3) were significantly associated with increased odds of BSE practice.

Four main themes emerged from the qualitative analysis: BC and BSE-related knowledge, perceived benefits of treatment, barriers to BSE practice and enablers of BSE practice.

Conclusion The practice of BSE in this area was considerably low. The North Shoa Zonal Health Office and other stakeholders should disseminate instructional materials that cover the techniques and benefits of regularly performing BSE. Healthcare professionals should engage in the community to address the obstacles women face in practising BSE.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ Eleven knowledge-related items with a Cronbach's alpha of 0.8 were used to assess knowledge of breast self-examination (BSE), indicating excellent consistency between items.
⇒ A community-based cross-sectional study design with a concurrent mixed-methods approach was employed to assess BSE practice and associated factors.
⇒ The study excluded older women, for whom breast cancer concerns may be greater, and only included women who were of reproductive age.
⇒ A causal inference cannot be drawn due to the cross-sectional nature of the study.

INTRODUCTION

Breast cancer (BC) has become a significant issue for women's health around the world. The estimated global number of new BC cases is 252 710, and there have been about 459 000 associated deaths.[1] One in eight American women may get BC over their lifetime, according to the American Cancer Society (ACS).[2] In 2050, it is anticipated that there would be about 3.2 million new cases of BC in women worldwide.[2] Meanwhile, primary prevention for BC is still not available. Primary BC prophylaxis is still not readily available.[3]

The Global Burden of Cancer in 2020 reports that of the 19.3 million new instances of cancer diagnosed worldwide, BC accounted for 24.5%, with 16.8% of those cases occurring in sub-Saharan Africa (SSA).[4] Of the 9.9 million deaths caused by cancer worldwide, BC was responsible for 15% of the deaths, with SSA accounting for 12.1%.[4] In Ethiopia, there were 50 598 new cases of cancer among females of all ages in 2020, with BC accounting for 31.9% of those instances.[5] BC incidence is

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increasing and is now the most prevalent cancer in Ethiopia, with high rates of morbidity and mortality. BC incidence accounts for 15 244 (22.6%) of all cancer cases and 8159 (17.5%) of cancer-related deaths each year.[6]

Since around 40% of all cancer deaths can be prevented, WHO advises cancer prevention as a crucial component of all cancer control programmes.[7] Breast clinical examination and mammography are used by healthcare professionals to intermittently or periodically screen for BC, whereas breast self-examination (BSE), which involves a person continuously checking for signs and symptoms of cancer, is an easy, safe and economical approach for early detection of BC.[7–9] More than 90% of cases of BC can be detected by women themselves.[10] This reality stresses the importance of BSE as the key BC detection mechanism.

BSE is one of the screening methods, which involves the woman looking at herself and feeling each breast for possible lumps, distortions or swelling.[2] It is advised that a nation with inadequate resource facilities and poor health systems has to promote early diagnosis programmes based on BSE, awareness of early signs and symptoms, and prompt referral to diagnosis and treatment.[7 9]

The practice of BSE has been reported in different countries. About 12.5% in Indonesia,[11] 11% in Yemen,[12] 4.0% in Saudi Arabia,[13] 37.6% in Ghana,[14] 15% in Cameroonian,[15] 13.2% in Bale zone,[16] 15% in Jimma,[17] 51.4% in Adama,[10] 45.8% in Gondar[18] and 6.25% in Adwa[19] town women had performed BSE on a regular basis (monthly).

Factors affecting the practice of BSE were reported from different countries. These are age, family history of BC, knowledge of BSE, level of education and women's perception towards BSE practice and BC.[11 13 14 19–21] BSE is the only feasible approach that is cheap and easily applied method across a wide population. Its ultimate purpose is early detection and treatment. Despite its importance as an early detection strategy, the poor practice of women has been a major obstacle. So, increasing women's practice of BSE is essential through creating BC awareness campaign.[10–13 16 17]

Fewer BSE studies have been done on women of reproductive age in the general community in Ethiopia than have been done on university students,[22 23] healthcare professionals[24–27] and urban populations.[10 18] Additionally, qualitative methods were not added to the existing studies. Furthermore, a Health Belief Model (HBM), which is more crucial to comprehending health-seeking behaviour or the reasons why people do not use health services,[10 16 28 29] was not used in these studies. Due to this, many women miss early detection as well as treatment opportunities.

The risk of BC generally increases with age. However, there are several compelling reasons to focus on women of reproductive age in this study. Specifically, this age group represents a significant portion of the female population and has implications for future generations. Additionally, research on BSE practice among women of reproductive age can make a substantial contribution to the early detection and prevention of BC. By exploring BC risk factors and outcomes in this age group, we can inform public health initiatives, healthcare policies and reproductive health strategies, ultimately leading to improved health outcomes for women and their families. Thus, this study aimed to assess the BSE practice and associated factors among women of reproductive age in the North Shoa Zone, Oromia.

Theoretical framework: the HBM

The HBM was originally developed by Rosen Stock in 1966 to explain preventive health behaviours such as check-ups (screenings) and immunisations.[30] It is important to understand health-seeking behaviours. Therefore, the theoretical framework for this study will be based on the HBM.

This model (as presented in online supplemental figure 1) consists of six constructs that cover perceived susceptibility (ie, a subjective evaluation of contracting BC and breast-related problems), perceived severity (ie, a subjective evaluation of the severity of BC and breast-related health problems), perceived benefits (ie, positive outcomes of practising BSE), cues to action (ie, stimuli that trigger the decision-making process to practise BSE), perceived barriers (ie, the degree to which women think the practice of BSE will be challenging or have adverse consequences) and self-efficacy (ie, the level of confidence women have in performing BSE) (online supplemental figure 1).

HBM has been widely tested and validated in various studies, providing empirical evidence for its effectiveness in predicting health-related behaviours. It allows for a comprehensive understanding of the factors that influence BSE practice among women in the reproductive age group. It provides a framework for developing interventions that can effectively promote the behaviour in question, which is BSE practice. It can be applied to various health-related behaviours. This adaptability makes it a versatile tool for researchers who want to study different health-related behaviours in various populations.

Since self-reported data are used in the HBM, respondents may give responses that they think reflect society norms rather than reflecting their true views or behaviours. The HBM assumes that people make rational decisions based on how they weigh the advantages and risks of a particular course of action. However, people's perceptions might not always match reality, and they might have false beliefs or insufficient knowledge about BSE.

METHODS

Study setting

The study was conducted in the North Shoa Zone, Oromia region, Ethiopia. Ethiopia was the second most populous nation in Africa, with over 110 million populations.[31] It was 1 of 38 nations labelled by the World Bank as fragile and conflict-affected and was categorised as a medium-intensity conflict country.[32] Based on the 2021 World Bank

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reports, Ethiopia had a gross national income per capital of US$940.[33] North Shoa is one zone of Oromia regional states, which is found in the central part of Ethiopia.

The North Shoa Zone has 13 districts with 1 town administration, 267 rural kebeles and 36 urban kebeles. Fitche is the capital town of the zone which is 112 km away from Addis Ababa. Based on the information obtained from the Zonal health office, Population Projection of Oromia Region by Zone, Wereda, Urban and Rural as of 1 July 2020 indicates that the population of the North Shoa Zone is about 1.7 million, of whom 49.9% are female.[34] Women of reproductive age account for 374 949 (44.2%) of the female population. Additionally, the zone has 5 public hospitals, 64 health centres and 268 health posts that provide various healthcare services for the catchment populations.

Study design

A community-based cross-sectional study design with a convergent mixed-methods approach was employed. A convergent parallel mixed methods is a type of design in which qualitative and quantitative data are collected in parallel, analysed separately and then merged during interpretations.[35] In this study, the quantitative study was conducted to determine the magnitude of the BSE and associated factors, while the qualitative study was conducted to explore the factors that are related to BSE practice among women of reproductive age. The study was conducted from 1 May 12022 to 30 June 2022.

Population

All women of reproductive age (15–49) living in the North Shoa Zone (393 856) were the source population and all randomly selected women of reproductive age (15–49) living in the selected kebeles of the North Shoa Zone constituted the study population. All women of reproductive age who had lived in the North Shoa Zone for at least 6 months were included in the study; however, those who were unable to speak or hard of hearing, or who had mental illness were excluded. A qualitative study was conducted among purposely selected women of reproductive age (15–49) living in the selected districts of the North Shoa Zone.

Sample size determination

The sample size was determined using a single population proportion formula in Epi Info STAT CALC V.7.2.4 based on the assumptions of a 95% confidence level, 3% margin of error and a 13.2% proportion of BSE among women of reproductive age from the study conducted in Bale zone.[16] After applying a design effect of 2 and a 10% non-response rate, the final sample size obtained was 1076.

For the qualitative part, a total of 46 women were involved in five focused group discussions (FGDs). FGDs were conducted in four districts of the North Shewa Zone, namely, Kuyu, Degam, Girar-Jarso and Jidda, which included 6–10 members in each group.

Sampling procedures

A multistage, stratified sampling technique was used to select the study participants. In the first stage, four districts were selected randomly from 14 districts of the zone. The kebeles in the selected districts were identified and stratified into urban and rural kebele. In the second stage, 4 urban and 22 rural kebeles were randomly selected. In the third stage, from the selected kebeles, a list of all eligible women of reproductive age with their households (HH) in each selected kebeles was obtained from the kebele health post by using family folders collaborating with health extension workers. The sample size for each selected kebeles was determined proportionally allocated to the number of eligible HH within each selected kebeles. Finally, a simple random sampling technique was used to select the required number of women of reproductive age from each kebele by using the HH listed as a sampling frame which was obtained from family folders.

In the case of more than one eligible woman being encountered in the selected HH, a lottery method was used to determine which women have to be interviewed. If eligible women of reproductive age were not present at the time of data collection, a re-visit would be arranged for a minimum of three times during the time of the HH survey.

For the qualitative part, a purposive sampling technique was used to select participants for FGD. From each selected district, one group of women of reproductive age, being that study population and not included in the quantitative study, have participated in the FGD. The authors judged to include diversified participants in order to elicit rich ideas and insight into the issue considering some factors such as their educational level, residence, marital status and age.

Data collection tools and procedures

For quantitative data collection, a data collection tool was developed after reviewing previously done studies and the revised champion's HBM.[16 22 30 36] A structured and pretested questionnaire was used for data collection. It has four sections including sociodemographic characteristics, family and personal history of BC, knowledge of BSE, perception towards BSE practice and BC. The questionnaire was prepared in English and translated to the local language Afaan Oromo for better understanding for both data collectors and respondents and translated back to the English version to verify consistency. Data were collected by using face-to-face interview method with eight Bachelor's Science nurse collectors recruited.

Qualitative data were collected in the local language (Afaan Oromo) by using semistructured FGD guides. The guides were prepared in English by the authors, translated into Afaan Oromo and checked by experts for more clarity. The FGD guides had a list of a few discussion points such as knowledge about BC and BSE, barriers to BSE practice and enablers of BSE with several follow-up probes used to capture the issue. The FGDs were moderated by an experienced health professional

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with the assistance of a note-taker. At each selected site, the discussion lasted between 60 and 90 min. Notes were taken during it, and their voices were recorded using a tape recorder.

Operational and terms definition

Breast self-examination (BSE)

The self-examination of the breasts is done to identify any changes in the breasts.[10]

BSE practice

BSE practice was assessed by using an item with the responses of 'Yes or No' type like 'did you perform BSE in last 6 months?' Those who responded 'Yes' were considered as if they were practising BSE.[17]

BSE knowledge

Knowledge was measured by the total number of correct answers to 11 questions on knowledge related to BSE practice. Participants who scored mean and above the value of the provided 11 questions were categorised as knowledgeable, while those who scored below the mean value were considered not knowledgeable.[28]

Measurement of variables

A total of 32 questions were used to assess the perceptions of a woman of reproductive age towards BSE practice. A 5-point Likert scale response, with choices ranging from 'strongly disagree (scores 1 point)' to 'strongly agree (scores 5 points)' was used. Based on the scales, for susceptibility of BC, the seriousness of BC, BSE benefits and BSE self-efficacy five questions were asked to assess. Items scored from 5 to 20, while BSE barriers were asked seven questions, which scored from 7 to 35 and cues to action consisted of 5 items with 'yes or no' questions. For all constructs of the health belief model, higher scores (mean and above) were indicated as having a high perception towards performing BSE except for barriers to BSE, in which a higher score indicated a high barrier to performing BSE.[23]

The reliability coefficient for the constructs of HBM for this study was 0.8, 0.7, 0.8, 0.8, 0.7 and 0.8 for susceptibility, seriousness, benefits, barriers, cues to action and self-efficacy to BSE, respectively. Concerning knowledge, 11 knowledge-related items were used for assessing knowledge about BSE. Reliability analysis was done and Cronbach's alpha was 0.8, which means there were consistencies between items.

Data quality assurance

To assure data quality for the quantitative study, the questionnaire was pretested on 54 women of reproductive age (5% of the total sample size) in the Warra-Jarso district and necessary corrections were made before the actual data collection. Internal consistency was checked by using Cronbach's alpha at the value of 0.8 for knowledge and HBM constructs questions.

From the beginning, 2 days of training were given for data collectors on information about the data collection tools (kobo toolbox), research objective, eligible study subject procedures and interview methods. On each data collection day, some percent of the collected data was examined by the authors, and any forwarded problems got an immediate solution.

After data were exported and downloaded from the kobo toolbox through Excel and converted Excel data to Statistical Package of Social Science (SPSS) to screen for outliers, missing values and fulfilment of assumptions were made through running descriptive statistics and data cleaning measures were taken accordingly before data analysis.

To ensure the quality of data for the qualitative study, the authors considered credibility, transferability, dependability and conformability assumptions.

Credibility (related to internal validity)

Credibility is based on how closely data collection, presentation and interpretation align with the guiding principles of the research technique selected to answer the research question. Therefore, before collecting data, the authors assessed the FGD criteria to ensure the validity of the research findings. To avoid unnecessary interruptions and preserve the rights of the participants, the two individuals who mentored the FGD also received an orientation regarding the FGD's goals and their respective responsibilities prior to the FGD's start. Triangulation was performed by using multiple data sources and varying the ages, places of residence and educational levels of study participants to better understand the BSE practice.

Transferability (related to generalisability)

Transferability is about providing enough information in understandable language to allow others to answer the research question in a different setting. To maintain the transferability of the findings, appropriate probes were used to obtain detailed information on responses. For all FGDs, thorough field notes and digital audio recordings were made both before and during analysis to provide thick descriptions.

Dependability (related to reliability)

Dependability is the process of making sure that research questions are explicit and appropriate for the study design, that the researcher's role is transparent and that the right data gathering techniques are used. To maintain the dependability of the findings, member checking was conducted by returning the preliminary findings to the participants to correct errors and challenge any perceived wrong interpretations. Prolonged engagement was also used to build acceptance with participants who had different ideas. Furthermore, the interpretations of the authors were challenged through group meetings with data collectors to discuss the preliminary analysis.

Conformability (related to objectivity)

To ensure the conformability of the findings, FGD guidelines were followed to homogenise the groups in terms of age, educational level and residence. To allow

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participants to respond freely to the topic at hand, the discussion was led by two bilingual female moderators. All FGDs included detailed field notes, digital audio recordings and cross-checking of data analysis from each substudy. The authors examined the findings for overarching themes and subthemes related to the original data.

Data processing and analysis

For quantitative study, data were exported and downloaded from the kobo toolbox through Excel and converted Excel data to SPSS V.26.0 software package to edit, clean for inconsistencies and check missing values, and finally to analyses. Descriptive statistics like frequency, percentages, the mean and SD were carried out to describe the data. Then, binary logistic regression was done to assess the crude relationship between the independent variables and the dependent variable. All variables having a p value <0.25 were a candidate for multivariable logistic regression to control for possible confounding effects.

To see the independent influence of each variable on the outcome variable, multivariable logistic regression was used. Multicollinearity was checked with a variance inflation factor which was less than 5. Model fitness was checked using the Hosmer and Lemeshow goodness-of-fit model and it was fitted (p value=0.8). The final results of the association were presented based on AOR at 95% CI, and a p value <0.05 was considered statistically significant.

For the qualitative data, the audio-recorded data were first transcribed verbatim and then translated from local languages into English. The translated data were uploaded into Atlas.ti V.9.17 software for data management and analysis. The authors employed deductive approach to thematic analysis to identify a set of key themes that captured the different perspectives and sentiments revealed by the participants. Prior to the actual coding process, the authors thoroughly read and reread all the transcripts multiple times to familiarise themselves with the data. The transcripts were also reviewed by the authors to identify important topics and create a codebook. To enhance intercoder reliability, each coder independently used the codebook, and any discrepancies in coding were resolved through discussion.

A final version of the codebook was then developed. Line-by-line coding of each transcript was performed by the authors. Codes were organised into meaningful groups to identify categories and major themes. For each theme and category, the coded transcripts were further analysed and summarised in narratives. The findings include direct quotations alongside detailed explanations.

Patient and public involvement

Patients or the public were not involved in the study design, conduct, reporting or distribution strategies of the research.

Table 1 Sociodemographic characteristics of study participants (n=1055), 2022

Variables	Categories	Frequency	Percent (%)
Age (years)	15–24	661	62.7
	25–34	301	28.5
	35–49	93	8.8
Residence	Urban	222	21.0
	Rural	833	79.0
Marital status	Single	335	31.8
	Married	686	65.0
	Divorced	34	3.2
Educational level	Unable to read and write	100	9.5
	Primary education	677	64.2
	Secondary education	225	21.3
	College and above	53	5.0
Occupational status	Student	166	15.7
	Housewife	489	46.4
	Merchant	89	8.4
	Government employed	82	7.8
	Day lobar	75	7.1
	Farmers	154	14.6
Wealth index	Lower	354	33.6
	Middle	340	32.2
	Higher	361	34.2

RESULTS

Quantitative results

Sociodemographic characteristics of respondents

A total of 1055 respondents have completed the study, making a response rate of 98%. The median age of the respondents was 22 years, with 10 IQR. Out of those respondents, 833 (79%) were from rural, 686 (65%) were married, 677 (64.6%) were in primary education, 489 (46.4%) were housewives, 154 (14.6%) were farmers and 354 (33.6%) were women of poor household (table 1).

Family and personal history of BC

The majority of respondents, 858 (81.3%), have reported they did not have a family history of BC. Among respondents who had a family history of BC, 67 (33.5%) of them were their sisters, and 65 (32.5%) of their mothers were affected by BC. Only 4 (0.4%) of respondents had a personal history of BC and 693 (65.7%) knew someone who suffered from BC.

Knowledge of study participants about BSE

Slightly more than half 594 (56.3%) of the respondents had enough knowledge about BSE. Regarding sources of

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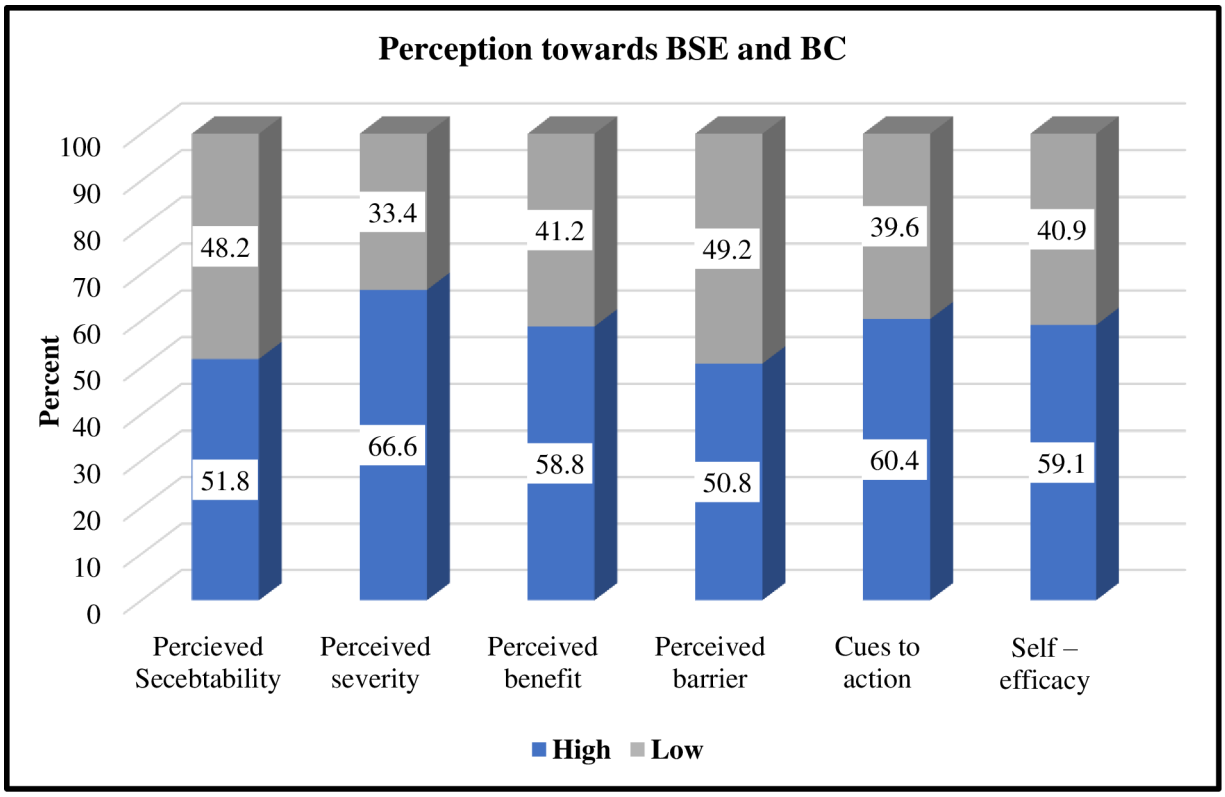


Figure 1 Perception towards breast self-examination (BSE) practice and breast cancer (BC) among women of reproductive age in North Shoa Zone, Central Ethiopia, 2022.

information, mass media (television and radio) were the main sources, 83.6%, and another 17 (3.1%) heard from patients with BC. Only 318 (30.1%) of participants knew the appropriate timing to perform BSE and only 417 (39.5%) knew how frequently BSE was practised. Furthermore, only 192 (18.2%) of the 1055 study participants knew how to perform it. Regarding knowledge about risk factors, the majority of them, 748 (70.9%), did not know any risk factors of BC.

Perception towards BSE and BC

The perception of participants was measured by using HBM constructs. About half of the participant had high perceived susceptibility to BC 547 (51.8%), and 705 (66.6%) of the participants have high perceived severity of BC (figure 1).

Relationship between HBM constructs and practice of BSE

A statistical analysis was conducted using Pearson's correlation coefficient (r) to establish a significant relationship between the HBM constructs and the practice of BSE among women. A strong negative correlation exists between the perceived barrier and the practice of BSE (r=−0.6, p 0.001), while a strong positive correlation was found between the perceived benefit of BSE and its practice (r=0.6, p=0.001). This indicates that a unit decrease in the perceived barrier towards BSE may produce a corresponding increase in the practice of BSE.

BSE practice of the respondents

In this study, the overall prevalence of BSE practice was 18.2%, with 95% CI 15.7% to 20.5%. Among these, only 20 (10.4%) had practised monthly (regularly). Those women who performed BSE had detected abnormalities in their breasts such as nipple discharge, 125 (65.1%), and nipple retraction, 44 (22.9%). The majority, 115 (59.9%), of the respondents who detected positive findings in their breasts did not consult health professionals (table 2).

Reason for practising and not practising BSE

More than half of the respondents, 102 (53.1%), practised the BSE due to recommendations by health professionals and 87 (45.3%) of the respondents practised BSE for early detection and treatment.

The most common reasons for not performing were that I do not know how to do it (30.2%), have no symptoms (29.5%) and do not believe that it is beneficial (24.9%). Another 63 (5.9%) participants denied performing BSE due to lack of privacy (figure 2).

Qualitative results

A total of 46 women were involved in five FGDs, who were considered participants with and without cancer. Participant's age ranged from 15 to 49. Accordingly, most of the participants were between the age of 25–34 years, and educational background varies among them and ranges from primary (n=18) to secondary (n=22) to tertiary level (n=6). Each participant showed good interest in

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Table 2 Breast self-examination practice among study participants (n=1055), 2022

Variables	Categories	Frequency	Percent (%)
Ever performed BSE	Yes	192	18.2
	No	863	81.8
Age when you started performing BSE (n=192)	At the age of less than 20	74	38.5
	At age 20	92	47.9
	At age above 20	26	13.6
Frequency of performing BSE (n=192)	Once a month	20	10.4
	Once in 3 months	33	17.2
	When it comes to mind	139	72.4
Time of performing BSE (n=192)	Few days before menses	65	33.8
	5–7 days after menses	75	39.1
	1–7 days of menses	52	27.1
Body position used while performing BSE (n=192)	Standing in front of a mirror	149	77.6
	Sitting in front of a mirror	43	22.4
What to look for when doing BSE (n=192)	Nipple discharge	125	65.1
	Lump	44	22.9
	Nipple retraction	23	12.0
What did you do on a positive finding (n=192)	Consult health professional	77	40.1
	Consult traditional healers	115	59.9

BSE, breast self-examination.

the topic and gave enthusiastic answers to the questions. Codes were compared for similarity and differences. Then, those codes were merged and categorised. Finally, themes emerged. Four main themes were emerged: BC and BSE-related knowledge; perceived benefits of treatment; barriers to BSE practice; and enablers of BSE practice (online supplemental table 1).

Theme 1: BC and BSE-related knowledge

Category 1: knowledge about BC

Low awareness of BC was corroborated by all FGDs. The participants mentioned that even though they had heard of BC from the victims and the media, they were unsure of exactly what it was, including its signs and symptoms, risk factors, screening methods and management.

Most women agreed that BC was a painful lump.

> It is a painful ulcer or lump, but I do not know well. (Women 16, Groups 1–5)
>
> I do not know the symptoms … It is a lump and painful. (Women 13, Groups 1–3)

Some participants connected breastfeeding to the early signs of BC.

> I thought that was the norm. Women have always felt that way, but it disappears when the baby stinks. So, I figured it would as well. (Women 8, Groups 1–4)

Various opinions about risk factors and causes have emerged. They believed that women who were menopausal or unmarried might experience BC more frequently.

> It is common in women after menopause and in spinsters. I don't think I could contract it … I am not old enough and I am already married. (Women 6, Groups 1–3)
>
> What is said in our tradition is that if a child eats greasy food and sucks the breast, the disease may occur through the mechanism of sunburn. (Women 5, Groups 3–5)

Many women in the current study recognised a lump in the breast or under the arm as a sign of illness, but they were unaware that this might signify BC.

> For a while, I had a little lump in my breast. I rubbed it with cream, hoping it would go away. I gave it no thought. Then, after three or four days, I experienced severe pain and remained awake all night. (Women 3, Group 4)

Category 2: knowledge and experience of BSE practice

The participants' understanding of BSE was inadequate. Although the women were aware of and recognised BSE as a method to detect BC, they were not fully knowledgeable about the procedure, particularly the best time to perform, the proper technique and the position to perform.

> I heard about BSE, but didn't know how to do it. (Women 14, Groups 1–5)
>
> We are unsure of the ideal technique or posture for performing BSE. As a result, we do not consider conducting BSE to be important. When we have a condition, we check to see if it is improving on a regular basis; if not, we visit a healthcare provider or a traditional healer. (Women 16, Groups 1–4)
>
> I had read that lumps may be used to detect breast cancer early. The mass in my breasts was noticeable when I touched them. Although there has been no change so far, the mass is still present. I believe

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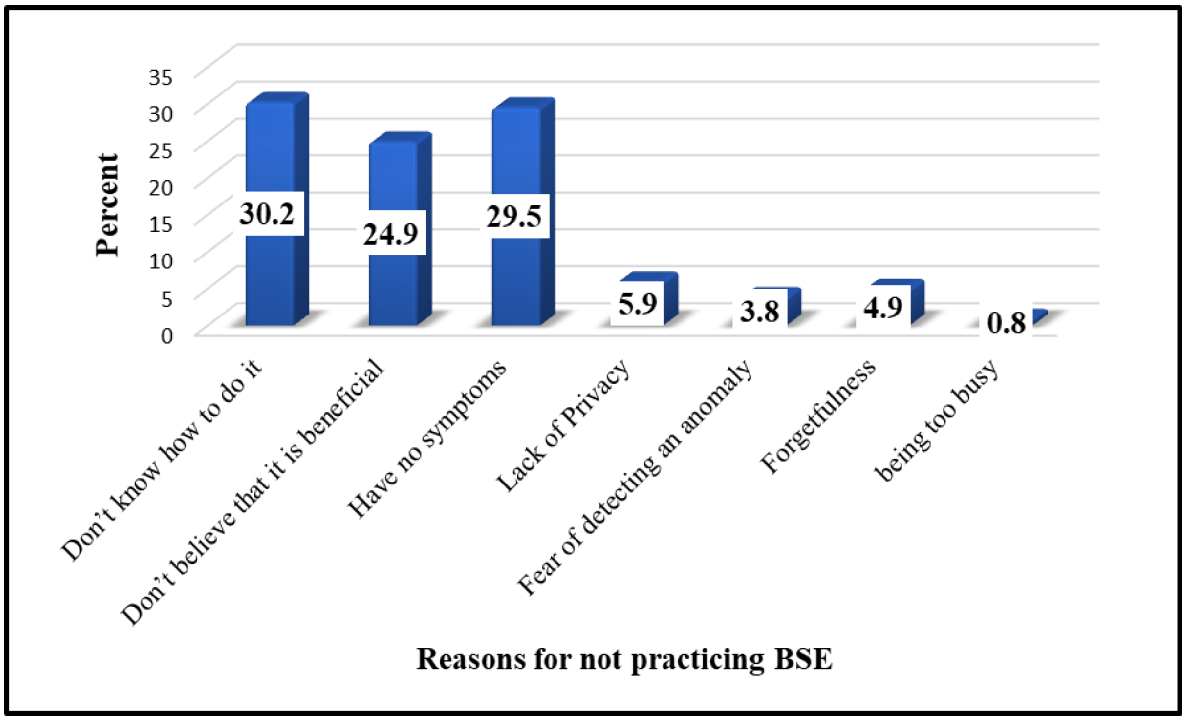


Figure 2 Reasons for not practising breast self-examination (BSE) among women of reproductive age in the North Shoa Zone, Central Ethiopia, 2022.

that the BSE procedures can be beneficial for self-examination. (Women 10, Groups 1–5)

Theme 2: perceived benefits of treatment

Category 1: alternative use of treatment

Most participants reported they preferred traditional medicine to contemporary medicine.

> Women prefer traditional healers to experience quick relief and recovery from their problems. It temporarily provides some relief but does not provide a cure. (Women 24, Groups 1–5)
>
> God (Rabbi) sends diseases to a human being; we believe no one can understand what God brings to a human being. Women who contract these diseases go to 'Tsebel,' or holy water. (Women 11 Groups 1–4)
>
> According to our tradition, a woman's breasts could become infected due to 'Michi' if her infant eats fatty food and then suckles breast milk. This time, we experience breast pain and itching. For this, we apply some leaves known as 'demakese', a traditional medication for treating 'michi'. (Women 4, Group 2)

Theme 3: barriers to BSE practice

Category 1: low knowledge of BSE practice

The women who had never performed BSE responded that they were unsure of how to do it properly. Additionally, they were uncertain of what to look for and whether the bulk they identified was normal or not.

> I heard about BSE and accepted it as important for the early detection of BC, but I did not know the right time to perform it or its technique. (Women 24, Groups 1–3)
>
> BSE is thoroughly squeezing off the breast with the hand in a sitting position at the time of bathing, but not the axilla because of BC risk. (Women 4, Groups 1–2)

Category 2: misconception about BC and BSE practice

The discussion made it clear that there are misconceptions regarding BC and BSE practices. The women, who had never conducted BSE, responded by claiming they had no symptoms and no history of a breast lump. They did not consider it important, and they were afraid to discuss the use of BSE.

> I have never had breast disease. My breasts do not hurt at all. I do not believe I require a breast examination. (Women 12, Groups 1–3)
>
> BSE practice, to me, doesn't seem necessary (laugh). As you can see, I am an adult who is married, has children, and has breastfed each of them. I haven't experienced any changes or issues with discharge, and I haven't experienced any pain over this entire period. A healthcare professional should handle this if it's necessary. (Women 9, Groups 1–3)

Theme 4: enablers of BSE practice

Category 1: good knowledge of BSE practice

The discussion revealed that 22 women out of the 46 participants had engaged in BSE at least once in the previous 6 months.

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I heard about BSE and accepted it because it's important to the early detection of BC. I also know the right time and technique for performing it. (Women 8, Groups 1–5)

I do it every month, because I've heard from healthcare professionals that early discovery of BC increases the likelihood of survival. BSE is squeezing off the breast thoroughly with a hand while standing in front of a mirror. (Women 14, Groups 1–5)

Most participants in this discussion know well that BSE can aid in identifying breast problems, since their relatives and friends discovered their BC through self-examination.

My friend discovered her BC by touching her own body. Unfortunately, her tumor has grown bigger. If it had been found earlier, everything could have been different. I believe every woman should conduct BSE. (Women 13, Groups 1–4)

Category 2: perceived susceptibility

Most participants believed that the cause of BC was hereditary or related to a supernatural force, and a few connected it to breast enlargement during childhood. The majority of the women in this discussion expressed that they perceived the risk of BC. The participants' perceptions of their risk of BC varied, though. Most of them thought that their risks were related to a family history of BC.

My mother had BC and underwent a mastectomy for one of her breasts last year, so I was anxious about getting BC. In addition, I occasionally experience pain in my breasts, which is another reason I want to examine them each month. (Women 3, Groups 1–4)

Factors associated with BSE practice

Bivariate and multivariable logistic regression analyses were done to assess the determinants of BSE practice. Based on binary logistic regression variables, included in the model were age, family history of BC, knowledge of BSE and constructs of HBM perceived susceptibility, perceived severity, perceived barriers, perceived benefit, the perceived threat of BC and self-efficacy were candidate variables for the multivariable logistic regression model for analysis.

The multivariable logistic regression analysis result showed that at age 15–24, knowledge of BSE practice, a family history of BC, perceived susceptibility, perceived benefit and self-efficacy were statistically significant with BSE practice (at p value <0.05). The odds of BSE practice among women of younger age[15–24] were four times (AOR=3.9, 95% CI 2.2 to 6.8) higher compared with those women who were older than 35 years.

Women who had a family history of BC were seven times (AOR=6.9, 95% CI 4.7 to 10.3) more likely to practise BSE than women who had no family history of BC. This evidence is confirmed by the findings of the qualitative study.

My mother had BC and underwent a mastectomy for one of her breasts last year, so I was anxious about getting BC. In addition, I occasionally experience pain in my breasts, which is another reason I want to examine them each month. (Women 3, Groups 1–4)

Participants knowing BSE practice were three times more likely to practise BSE (AOR=3, 95% CI 1.9 to 4.3) compared with those not knowledgeable. This evidence is supported by the findings of the qualitative study.

I do it every month, because I've heard from healthcare professionals that early discovery of BC increases the likelihood of survival. BSE is squeezing off the breast thoroughly with a hand while standing in front of a mirror. (Women 14, Groups 1–5)

Regarding the perception, women who had high perceived susceptibility to develop BC were 1.7 times (AOR=1.7, 95% CI 1.1 to 2.5) more likely to practise BSE than women who had low perceived susceptibility. Women who had high perceived benefits of BSE were 1.5 more likely to practise BSE as compared with women who had low perceived benefits of BSE (AOR=1.5; 95% CI 1.1 to 2.3). This is further corroborated by the qualitative results.

My friend discovered her BC by touching her own body. Unfortunately, her tumour has grown bigger. If it had been found earlier, everything could have been different. I believe every woman should conduct BSE. (Women 13, Groups 1–4)

Women who had high perceived self-efficacy to do BSE were 1.5 times more likely to practise BSE as compared with women who had low perceived self-efficacy to do BSE (AOR=1.5; 95% CI 1.2 to 2.5) (table 3). This evidence is supported by the findings of the qualitative study.

I heard about BSE and accepted it because it's important to the early detection of BC. I also know the right time and technique for performing it. (Women 8, Groups 1–5)

Model fitness result

The Hosmer and Lemeshow test indicated a good fit (p=0.8) and accounted for 72.3 to 82.3% of the variation in the practice of BSE is explained by the combination of the six independent variables in the model, namely, the age of women, knowledge of BSE practice, a family history of BC, perceived susceptibility, perceived benefit and self-efficacy. At all levels, the model passed the test of overall significance. Therefore, the variables in the equation can, in the light of the empirical findings, be considered to be good predictors of BSE practice among women of reproductive age in North Shoa.

DISCUSSION

The HBM is an important approach to understanding health-seeking behaviour or the reasons why people are

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Table 3 Bivariable and multivariable logistic regression analysis results of BSE practice among study participants (n=1055), 2022

Variable	BSE practice		COR (95% CI)	AOR (95% CI)
	Yes (%)	No (%)		
Age (in years)				
15–24	67 (34.9%)	608 (68.8%)	7.0 (4.4 to 11.4)	3.9 (2.2 to 6.8)**
25–34	83 (43.2%)	222 (25.1%)	2.1 (1.3 to 3.3)	1.4 (0.8 to 2.3)
35–49	42 (21.9%)	84 (6.1%)	1	1
Family history of BC				
Yes	101 (52.6%)	99 (11.2%)	8.8 (6.2 to 12.5)	6.9 (4.7 to 10.3)**
No	91 (47.6%)	785 (88.8%)	1	1
Knowledge				
Knowledgeable	85 (44.3%)	522 (56.4%)	0.6 (1.3 to 2.5)	3.0 (1.9 to 4.3)**
Not knowledgeable	107 (55.7)	362 (43.6%)	1	1
Perceived susceptibility				
High	136 (70.8%)	421 (47.6%)	2.7 (1.9 to 3.7)	2.7 (1.9 to 3.7)
Low	56 (29.2%)	463 (52.4%)	1	1
Perceived barrier				
Low	143 (74.5%)	386 (43.7%)	0.7 (1.9 to 3.7)	0.8 (0.5 to 1.2)
High	49 (25.5%)	498 (56.3%)	1	1
Perceived severity				
High	174 (90.6%)	543 (61.4%)	6.1 (3.7 to 10)	1.3 (0.8 to 1.9)
Low	18 (9.4%)	341 (38.6%)	1	1
Cues to action				
High	161 (83.9%)	489 (55.3%)	4.2 (2.8 to 6.3)	1.3 (0.8 to 1.9)
Low	31 (16.1%)	395 (44.7%)	1	1
Self-efficacy				
High	152 (79.2%)	484 (54.8%)	3.1 (2.2 to 4.6)	1.5 (1.2 to 2.5)**
Low	40 (20.8%)	400 (45.2%)	1	1
Perceived benefit				
High	167 (86.9%)	466 (52.7%)	5.9 (3.9 to 9.3)	1.5 (1.1 to 2.3)*
Low	25 (13.1%)	418 (47.3%)	1	
Perceived threat of BC				
High	145 (75.5%)	478 (54.1%)	2.6 (1.8 to 3.7)	1.6 (0.9 to 2.7)
Low	47 (24.5%)	406 (45.9%)	1	1

***Statistically significant at p value <0.001; **p<0.01; *p<0.05.
1, reference; AOR, adjusted odds ratio; BC, breast cancer; BSE, breast self-examination; COR, crude odds ratio .

not using health services. This study was, therefore, aimed to look at the BSE practice and associated factors among women of reproductive age in the North Shoa Zone using HBM. The model described nearly 46% of the variance of BSE practice among women of reproductive age. In the study population, it is a reasonably good predictor of BSE practice.

The overall prevalence of BSE practice was 18.2 (95% CI 15.7 to 20.5) in the current study, which is comparable to research done among women of reproductive age in Jimma town, Ethiopia, and other countries like Cameron and South Khorasan, where the results showed 15% in Jimma town, 16.8% in South Khorasan and 15% in Cameron.[15 17 37] However, this study was found to be lower when compared with other studies carried out in Ethiopia, which showed 51.4% in Adama and 48.5% in Gondar town.[10 38] The possible justification might be the educational level difference and information availability. Only 20% of participants in the current study had a college degree or above, compared with 46.4% in Adama and 29.8% in Gondar. As most studies indicated, there will be a tendency towards BSE use as long as the level of education is high. This might be due to the fact that women with higher education may be exposed to more

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health information and knowledge about BC, which may affect their intent to practise BSE.

It was also lower than studies conducted in Iran, Ghana and Nigeria.[14 39 40] This might be a result of variations in local awareness, information accessibility or media availability, and the BSE screening programme in the study area. The current finding suggests that clinical BSE usage is extremely low, and as a result, the majority of the women did not benefit from BSE to detect abnormalities prior to an advanced stage of BC.

Regarding the factors, this study found that women of younger age,[15–24] having a family history of BC, knowledge of BSE, having perceived susceptibility, perceived benefit and self-efficacy are independent predictors of BSE practice.

According to this study, younger women (15–24 years) had a four times higher likelihood of practising BSE than those over 35 years of age. This finding was comparable to studies carried out in Jimma, Southwest Ethiopia, Rwanda and Egypt.[17 20 41] However, research done in the Bale zone, Southern Ethiopia and Indonesia[11 16] contradicted it. The discrepancy could be the result of variations in the study area and population makeup. In the Indonesian study, the majority of the population was over 40, and in the Bale zone, the majority was over 25–34. In the current study, however, 62.7% of the population is between the ages of 15 and 24, including those who are younger.

The fact that younger women are more active in social activities and media, such as Television, Facebook and YouTube, could be one explanation for this disparity. More young women than elderly women are currently enrolled in formal education. As a result, younger women are more likely than older women to be exposed to health-related information. This was supported by qualitative findings, as the age of women has an impact on the performance of BSE. The discussion revealed that young women pay more attention to their body image and exhibit better health-seeking behaviours than older women do, implying that being young increases their willingness to engage in BSE.

The likelihood of practising BSE was seven times higher in respondents with a family history of BC than in respondents without a family history. It agreed with research from Ethiopia's Jimma and Adama towns and from South Khorasan, Egypt and Saudi Arabia.[10 13 17 37 41] It might be as a result of the women's perception that, if they have a family history of the disease, they are at risk of developing the disease themselves. It was supported by findings from qualitative research. During the discussion, the majority of the participants agreed that BC is inherited. As a result, women who have a family history of BC are more likely to take part in BSE, despite the fact that some participants stated that BC was not a risk for them because it was not in their ancestry.

In this study, women of reproductive age who had a good knowledge of BSE practice and BC risk perception practised BSE three times as frequently as their counterparts did. It is consistent with the studies conducted in Modjo Town, Ethiopia, Iran and Rwanda among women of reproductive age.[28 37 39] This suggests that people are more likely to practise preventative activity when they have sufficient information about a disease condition and its effects. This conclusion was also supported by qualitative results. As was evident from the discussions, the majority of the women who do not use BSE confessed their lack of knowledge and comprehension of the method. Therefore, one possibility is that they do not practice BSE primarily because of their insufficient understanding of it.

According to this study, women who perceived they were at a higher risk of developing BC had a roughly twofold higher likelihood of engaging in BSE than their counterparts. This result was consistent with findings from other research carried out in Adwa Town, Ethiopia, Lebanon and Saudi Arabia.[13 19 42] The possible justification to this could be that women who perceive as being susceptibility to BC would think that BSE has the potential to detect breast lumps earlier and hence have more favourable outcomes. Another possibility is that respondents' increased perception of threat as a result of their anticipated susceptibility to developing BC may lead to increased BSE practice. This is further corroborated by qualitative findings gained from the discussions, which showed that women who believed they were susceptible to the disease performed BSE to a greater extent. Most of them thought that having a family history of BC, having enlarged breasts as children and anonymous supernatural power were factors that increased their risk.

Women who thought BSE was crucial for early BC detection were around two times as likely to practise BSE than their counterparts. This result was consistent with research done in Ethiopia's Hosanna Town and the United Arab Emirates' Ajman.[21 22] Possible explanation for this is that women who are more aware of the advantages of BSE, such as those associated with performing it consistently (monthly), may be better able to spot changes (like lumps) before medical professionals are more inclined to perform BSE. In line with the aforementioned concept, the qualitative portion of the study also revealed that women were more likely to do BSE if they thought it was crucial for early diagnosis and treatment.

In this study, the odds of performing BSE among women who perceived self-confidence to perform BSE were nearly two times higher when compared with their counterparts. This finding was consistent with the study conducted in North Ethiopia, Adwa, and other countries like Indonesia and Yemen.[11 12 19] It showed that one's ability to act successfully has an impact on their behaviour. Therefore, educating women will enhance the practice. The self-efficacy of the women for breast screening is extremely low, as understood from the discussion, particularly among those who do not practise BSE because they lack the necessary knowledge, are unable to locate the lump, or are unsure of whether the mass they detected is normal or not.

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Strengths and limitations of the study

The fact that this study used both quantitative and qualitative research methods to gather its data was one of its major strengths. Additionally, the study is conducted among a general population that may be representative of Ethiopia's rural and urban communities. Moreover, the use of the updated champions of HBM is crucial to understanding health-seeking behaviour or the reasons why people are not using health services.

Despite the aforementioned strengths, the study was cross-sectional, so a cause-and-effect relationship could not be established to identify a precise predictor. Additionally, the study excluded older women, for whom BC concerns may be greater, and only included those of reproductive age.

Implications for policy, practice and research

Establishing national policies and guidelines outlining the BSE standard of care and specifying the duties of providers in providing BSE guidance is essential. BSE education should be integrated into existing health programmes, such as antenatal care, postnatal care and family planning services. This will provide opportunities to educate women about BSE during routine healthcare visits. Healthcare providers should be trained on how to train women to do BSE and the delivery of accurate and dependable BSE information.

Policy interventions should emphasise the development of BSE educational materials in local languages that are tailored to the target population's unique cultural setting. This will guarantee that women from every background can obtain and comprehend the material. Comprehensive public awareness campaigns must be launched to challenge cultural beliefs that inhibit BSE, promote social norms that encourage BSE practice and give women the information they need about BSE. Further research is needed to develop effective interventions for promoting BSE practice and improving early detection of BC. This includes research on the effectiveness of different educational approaches, the role of social and cultural factors, and the development of novel diagnostic techniques.

CONCLUSION

This study showed that the practice of BSE among women of reproductive age in the area is considerably low. In this study, perceived susceptibility, benefit and self-efficacy from HBM constructs are identified as independent predictors of BSE practice, along with a woman's age, family history of BC and knowledge of BSE practice. Additionally, the qualitative study identified the barriers to BSE practice, including a lack of information about BSE practice and BC, and also misconceptions about both. Therefore, BSE should be promoted by enhancing women's knowledge of BSE practice and perceptions of BSE practice and BC through the delivery of pertinent health education at all levels. The management of the health system, including the regional health bureau, the North Shoa zonal health office and other cancer associations, must make an effort to solve this issue. Healthcare professionals should engage in the community to address the obstacles women face in practising BSE. A more thorough, community-based study on BC screening practices on a national scale is recommended to develop an awareness-raising campaign.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval The studies involving human participants were reviewed and approved by Ethical Review Board of Salale University with reference number: IRB/878/14. The study was presented to the North Shoa Zonal health office to grant official permission to undertake research activities in the selected district's kebeles. Written informed 31 consent was obtained from every study subject before the data collection and Minor assent or parental permission for the study subject less than 18 years old. The participant's right to discontinue or leave the study was also secured. This study was performed in line with the principles of the Declaration of Helsinki. The entire information collected from the study participants was handled confidentially by omitting their identifiers.

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