

Original Article

Running Title: Breast Self-Examination Practice among Female Undergraduate Students

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Breast Self-Examination Practice among Female Undergraduate Students in Debre Tabor University, North Central Ethiopia: Based on Health Belief Model

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Abstract

Background: We conducted the present study to assess the practice of breast self-examination (BSE) among Debre Tabor University female undergraduate students, north central Ethiopia using health belief model (HBM).

Method: The current institution based cross-sectional study was carried out among a total of 341 students. Simple random sampling technique was employed to select the study participants. We also used self-administered pretested questionnaires and constructs of health belief model for collecting data. Binary and multivariable logistic regression were utilized to identify BSE-associated factors. Statistical significance was stated at p value < 0.05 .

Results: Approximately 45% of the participants had a fair level of knowledge about breast cancer, but only 17% were actually performing BSE practice. The odds of practicing BSE were found to be higher among the participants who had information about BSE practice (AOR=7.21, 95% CI: (2.46, 21.15)), perceived susceptibility (AOR=14.18, 95% CI:(4.00, 50.48)), self-efficacy (AOR=3.07, 95% CI: (1.09, 8.70)), cue to action (AOR=3.68,95% CI: (1.17, 11.56)), and net benefit (AOR=7.75, 95% CI: (1.56, 38.55)) compared with counterparts. Whereas the odds of practicing BSE were found to be lower among those who had poor knowledge of BC (AOR=0.08, 95% CI: (0.03, 0.23)) compared with counterparts.

Conclusion: In this study, knowledge regarding breast cancer and BSE practice was observed to be low. Knowledge about breast cancer, having information on BSE, perceived susceptibility, self-confidence, and cue to action were found to be independent predictors of BSE practice. Providing targeted information about BSE is the best method of changing the behavioral intention of university students about breast cancer and BSE practice.

Keywords: Practice, Breast self-examination, Breast cancer, Health belief model, Ethiopia

Introduction

Cancer, as global public health issue, is one of the major non-communicable diseases and the second leading cause of death in high-income countries and 3rd leading cause of death in low and middle-income countries.¹ Breast cancer is known to be one of the major malignant tumors that starts in the cells of the breast and affects women mostly.² Worldwide, breast cancer accounts for almost 1 in 4 cancer cases among women and the leading cause of cancer death in over 100 countries. It ranks third in terms of incidence, but second in terms of mortality.³ It is the most frequently diagnosed malignancy among women next to lung cancer. It alone accounts for 25% of all cancer cases and 15% of all cancer deaths among females.⁴

Even though a higher prevalence is observed in developed countries, the mortality due to breast cancer is higher in developing ones. Almost 50% of breast cancer cases and 58% of deaths occur in developing countries (LMICs).⁵ Studies have also shown that the highest age-standardized breast cancer mortality rate is recorded in Africa, specifically in Sub-Saharan Africa.^{4, 6}

Like other Sub-Saharan African countries, the numbers of new breast cancer cases are increasing alarmingly in Ethiopia. It has an estimated age standardized incidence rate of 43 cases per 100000 women and has become the most prevalent cancer in this country with an increasing trend and advanced stage presentations.^{7, 8} According to the Addis Ababa city cancer registry report, breast cancer accounts for 33% of all cancer cases in women.⁹

About 30–50% of cancers could be prevented by avoiding risk factors and implementing evidence-based prevention strategies through early detection of cancer and management of patients who develop cancer.¹ Similarly, early detection of breast cancer plays a key role in the survival of

breast cancer patients.¹⁰ According to evidence, patients diagnosed at early stages have demonstrated better survival than those diagnosed at late stages.¹¹ However, breast cancer awareness and knowledge of the benefits associated with early detection and diagnosis are poor in most Sub-Saharan African countries and consequently, advanced stage presentation remains a common feature in the region.¹²⁻¹⁴

Several studies have reported that knowledge and practice of BSE and clinical breast examination increase the likelihood of presenting at early stages with a high chance of being cured.^{15, 16} However, studies in Africa have indicated that the practice of BSE is low among university students. In Cameroon, only 3% performed BSE and 9% know how to perform BSE. Similarly, 19% of studied cases performed BSE in Nigeria. Lack of knowledge about BSE is mentioned as a significant barrier to practicing it.^{17, 18} Despite sufficient knowledge about the importance of BSE, only 23% of medical students performed BSE in Haramaya University.²⁰ BSE is the best tool to diagnose breast cancer early in low income countries like Ethiopia where access to mammography is limited.¹⁹

In Ethiopia, the attention of the government and health care systems were towards communicable diseases rather than cancer in previous years, but currently, in Ethiopia, there is a plan to control the increasing patterns of breast cancer through screening and early detection programs, such as mammography, clinical, and BSE.²⁰ However, there is the lack of evidence concerning the level of BSE practice among university students in this country. Studies in this regard are generally very scarce. In addition, predicting student's behavioral intention for performing BSE is of great importance for a country like Ethiopia, where there is poor health care delivery system. Thus, understanding students'

beliefs on BSE practice is crucial for evidence-based behavioral intervention among university students. Therefore, we aimed to assess the practice of BSE among Debre Tabor University female students using HBM.

Methods

Study setting and period

The present institution-based cross-sectional study was carried out at Debre Tabor University (DTU) in December 2018. This university is one of the higher education institutions in Ethiopia located in the Northcentral part of the country, 667 km from the capital. It is established in 2008 in Debre Tabor town, South Gondar administrative zone of Amhara regional state at the foot of Guna Mountain. The University has unique and different features by implementing integrative Hybrid Innovative Curriculum, particularly in medical and health sciences disciplines.²¹ There are five faculties and one college in the university. At the time of the study, there were more than 12,000 students following their education in a regular program.

Study population and inclusion criteria

Our study population comprised all the regular undergraduate female students. Female students below the age of 18, health science students, and students who lived outside the university were excluded. Health science students were excluded from the study since they have some basic information about breast cancer and BSE in their courses.

Sample size and sampling procedure

The sample size of the study was determined considering the following assumptions: taking a prevalence of BSE practice from a study conducted at Debre Berhan University 28.3%²², a 5% margin of error, a confidence level of 95% and considering non-response rate of 10%, the representative sample of

participants was determined (n=342) using a single population proportion formula for a cross-sectional survey in Epi info version 7.2. Therefore, our final sample size was 342 students. A simple random sampling technique was utilized to select the study participants. After determining proportional allocation of the sample to the population size, the sampling frame of female students in each faculty was prepared and they were selected from the frame using simple random sampling method.

Data collection procedures and quality assurance

The data was collected with structured self-administered questionnaire developed by reviewing different literatures.^{17, 22, 23} The questionnaire was first prepared in English, then translated to Amharic, and finally translated back into English.

The components of the questionnaire were socio-demographic characteristics, perceived severity, susceptibility, benefits, cues to action, barriers, and self-efficacy for performing BSE. The questionnaire was given to the participants so that fill it in a private setting after taking their consent. Four health officers and three masters of public health professionals participated in the facilitation and supervision of the data collection process, respectively.

To maintain the quality of the data, the questionnaires were prepared in a simple and easily understandable language. A two-day training was performed for the facilitators on the data collection process. The questionnaires were pretested in 5% of the sample population and the necessary modifications were done. The pretested data were not included in the final analysis. Strict supervision and monitoring was done during data collection.

Measurements

For the constructs of HBM, five item responses were prepared for each construct (strongly agree score's 5 points) to strongly

disagree (scores “1” point). Perceived susceptibility of breast cancer consisted of three items scored from 3 to 15. Seriousness of breast cancer comprised six items scored from 6 to 30. Benefits consisted of four items scored from 4 to 20. BSE barriers included eight items scored from 8 to 40. BSE self-efficacy consisted of nine items scored from 9 to 45, and cues to action comprised five items with ‘Yes or No’ questions. For all the constructs of HBM, higher scores indicated having high perception towards performing BSE; whereas, higher score of barriers indicated high barrier to perform BSE. Regarding perceived net benefit, we employed the sum score of perceived benefit minus that of perceived barriers.²⁴ The reliability coefficient for each HBM constructs was calculated using Cronbach’s alpha. The reliability coefficient was 0.813, 0.831, 0.770, 0.850, and 0.860 for susceptibility, seriousness, benefit, barrier, and self-efficacy, respectively.

BSE practice was assessed via “Yes” or “No” type questions. The subjects who responded “Yes” for a question like “have you ever performed BSE for screening cancer?” were considered as those practicing BSE.

Data Processing and Analysis Procedures

The data were entered in EpiData version 3.1 and cleaned and analyzed with SPSS version 23. Descriptive statistics were computed using frequency and other statistical summary measures. A chi-square test on top of bivariable and multivariable logistic regression analysis were used to identify the factors associated with BSE practice. The crude and adjusted odds ratios (OR) were used to identify the significance, strength, and direction of association at 95% confidence intervals (CI). A p-value of <0.05 was employed to decide whether the association was significant.

Ethical consideration

An ethical approval was obtained from the Research Ethics Committee of Debre Tabor University under a reference number of R.No: CHS/5173/2019. Oral informed consent was obtained from the students prior to the study, after a brief explanation about the purpose of the study. Participation in the study was fully voluntary and all the information collected from the participants were kept confidential.

Result

Socio-demographic characteristics of the study participants

The mean age of the subjects was $21.18 \pm$ SD 1.51 years. More than 80% of the study participants were orthodox Christian religion followers. With regards to department distribution, more than half, 191 (55.8%) of the study participants, were from natural sciences and the rest, 151 (44.2%), were from social sciences stream.

More than half of the study participants, 192 (56.1%), were familiar with breast cancer. The main source of information about breast cancer in 93 participants (48.4 %) was mass media followed by family/friends in 77 (40.1%) of them, and health professionals in 73 (38.0%) (Table 1).

Health belief model

Table 2 represents the summary of health belief scale categorized into three sub scales. More than half 190 (55.6%) of the participants believed that they are susceptible to breast cancer. Meanwhile, 115 (33.6%) of them believed that they are not susceptible to breast cancer. More than half, 216 (62.3%) of the participants, believed that breast cancer is not serious and 17 (5.0%) were unsure about the seriousness of breast cancer. Nearly half of the study participants, 160 (46.7%), did not believe that BSE is beneficial and 94 (27.5%) acknowledged the advantage of BSE. One hundred fifty-four (45.0%) of the

participants had the confidence to perform BSE. More than half of the participants, 188 (55.0%), believed that barriers prevented them from performing BSE. 70% of the study participants had the motive to perform BSE (see table 2).

Differences in health beliefs among study participants

More than three quarters (79.9%) of the study participants who practices BSE agreed that they are susceptible to breast cancer. On the other hand, only half of the non-practicing subjects agreed on their susceptibility to breast cancer. One hundred seventy-two (60.6%) of the practicing and 16 (27.6%) of the non-practicing ones believed that barriers prevented them from practicing BSE. (Table 3)

Factors associated with practice of breast self-examination

Information about breast cancer, knowledge, perceived susceptibility, self-efficacy, cues to action, and net benefit were found to be statistically significant with the practice of BSE in the final model. The multivariable analysis revealed that the odd of practicing BSE was found to be seven times higher among the participants who had information about BSE (AOR= 7.21, 95% CI: (2.46, 21.15)). There was a significant association between breast cancer knowledge and BSE. The odds of practicing BSE was found to be low among those who had poor knowledge (AOR= 0.08, 95% CI: (0.03, 0.23)) compared with counterparts. Meanwhile, the odds of practicing BSE was found to be higher among the participants with perceived susceptibility (AOR=14.18, 95% CI: (4.00, 50.48)), self-efficacy (AOR=3.07, 95% CI: (1.09, 8.70)), cues to action (AOR= 3.68, 95%, CI: (1.17, 11.56)), and net benefit of BSE (AOR=7.75, (1.56, 38.55)) (see table 4).

Discussion

In this study, 17% of the students were found to practice BSE despite 40% of those who had information about it. The finding of the present study is consistent with the previous researches,²⁵⁻²⁷ but the proportion of BSE practice among students was lower than the studies conducted among female health science students in Ethiopia (23%), Nigeria (25%), and Uganda (43.6%).^{22, 23, 28, 29} The difference could be ascribed to the level of awareness about breast cancer and screening. Moreover, the differences might be due to health sciences students who could have more information about breast cancer were excluded in this study unlike previous studies.

In this work, the participants with information about BSE were 7.21 times more likely to practice BSE compared with counterparts (AOR=7.21, 95% CI; (2.46, 21.5)). This implied that information about BSE is a precursor for practice. Therefore, IEC through different channels is very important for increasing the screening practice of breast cancer. Similarly, those with poor knowledge on breast cancer were less likely to practice BSE than the counterparts (AR=0.08, 95 % CI ;(0.03, 0.23)). This finding is consistent with that of previous studies.²⁹⁻³¹ This is explained through the fact that knowledge on breast cancer is precondition for screening and early diagnosis. This is supported by studies conducted in different countries³²⁻³⁴. In our study, only a third of the participants were knowledgeable about breast cancer risk factors and clinical picture. This shows that the students have poor knowledge about BC as well as screening practice. Therefore, the government should take some measures regarding university students since they are a better medium for IEC while they are back to the community during vocation or after graduation when they are employed at different institutions. Behavioral change in

communication among university students through continuous training, peer education, and health education in universities are pivotal strategies for early detection and management of breast cancer. Furthermore, it is recommended to incorporate reproductive health (family health) course to other non-health faculty students.

In the present research, in the HBM constructs, perceived susceptibility, self-efficacy, and cue to action were the predictors of BSE practice whereas perceived benefit, barrier, and seriousness were not found to be significantly associated with BSE practice. In this study, the participants who confirmed their susceptibility to breast cancer were 14.18 times more likely to practice BSE than the counterparts (AOR=14.18, 95% CI (4.00, 50.48)). Our finding also revealed that about 80% of the BSE performers agreed on susceptibility to breast cancer whereas among BSE non-performers, only 50% supported future breast cancer susceptibility. This could explain that those who perceived they are susceptible believe that BSE would help to detect breast cancer early and improve the outcome. This finding is in accordance with that of other studies.^{24, 27, 35}

The bi-variable analysis revealed that the odds of practicing BSE was three times higher among the participants who agreed on perceived severity (COR=3.04, 95% CI:(1.69, 5.47)). However the association disappeared when adjusted for confounders. This implied that the perceived degree of threats on breast cancer would improve an individual screening practice. Therefore, giving health education about threats of breast cancer for university students as well as the community at large could improve the beliefs on screening practice, which is a cost-effective strategy for reducing breast cancer incidence and prevalence in low-income countries. This result is supported by

a study conducted in Ethiopia among female teachers.²⁴

Perceived benefit also illustrated to have a significant association with BSE practice based on bivariate analysis. Those participants who agreed on perceived benefit of BSE were 2.4 times more likely to practice BSE compared to their counterparts (COR=2.4, 95%CI: (1.28, 4.50)) though the association vanished when adjusted for confounders. Those with better understanding about perceived benefit of screening were more likely to practice BSE. This finding is consistent with that of previous studies.^{24, 26, 36, 37}

Herein, self-efficacy was also significantly associated with BSE practice. The odds of performing BSE was found to be three times higher among self-confident participants (AOR= 3.07, 95%CI :(1.09, 8.70)). This finding is consistent with previously indicated results.^{27, 30, 36, 38}

This indicated that one's confidence to successfully perform an action significantly affect their behavioral practice. Therefore, providing information or training to the students would affect the practice. Similarly, in the present study those participants with a motivation towards performing BSE were 3.68 times more likely to practice BSE than the counterparts (AOR=3.68,95% CI:(1.17, 11.56)), which is consistent with previous studies.^{35, 38} This implies that motivating an individual will have an intention to perform particular behavior. Therefore, cues are a good strategy to activate or stimulate BSE practice. Thus, a reminder of BSE using different methods would improve their practice.

The net benefit was also significantly associated with practicing BSE (AOR=7.75, 95%CI: (1.56, 38.55)). This implied that the students have an intention to develop BSE behavior in the future. Therefore, giving information about breast cancer and BSE will improve screening practice and early

diagnosis of breast cancer. This finding was in agreement with the constructs of HBM in which those participants with a high score of perceived susceptibility, perceived severity, perceived benefit, self-efficacy, and cue to action and a low score of perceived barriers were more likely to practice BSE.^{39,40}

The study had certain limitations. Initially, it included only female educated university students; this makes it very difficult to generalize the results to a large group of population where literacy rate and rural community are very low. Secondly, since the data was collected via self-administer questionnaire, the respondents may have recalled bias on BSE performance (Since BSE practice was assessed by the pervious performance of the respondents, they may not remember their pervious performance), unconscious response, and dishonest answer. In addition, the HBM constructs is rather descriptive than explanatory; accordingly, it is better to integrate with other models which contains environmental context and strategies for changing human behavior.

Conclusion

In conclusion, the practice of BSE was low. The knowledge on breast cancer, having information on BSE, perceived susceptibility, self-confidence, and cue to action were found to be the independent predictors of BSE practice. Providing information to the students through different channels is very important to improve the knowledge in this regard and practice of BSE. It is highly recommended that the government of Ethiopia consider incorporating reproductive and family health courses to other non-health faculty students.

Availability of data and materials

The datasets utilized in this work were provided by the corresponding author and could be accessible through reasonable request.

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Conflict of Interest

None declared.

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Table 1. Socio-demographic characteristics of female students of Debre Tabor University, North central Ethiopia

Variable	Frequency	Percent
Age in years:		
18-19 years	27	7.9
20-24 years	305	89.2
25-29 years	10	2.9
Religion :		
Orthodox	280	81.9
Muslim	35	10.2
Protestant	27	7.9
Marital status:		
Single	279	81.6
Married	50	14.6
Separated	13	3.8
Department :		
Social science	151	44.2
Natural science	191	55.8
Year of study:		
Second	136	39.8
Third and above	206	60.2
Information about breast cancer:		
Yes	192	56.1
No	150	43.9
Source of information:		
Mass media	93	48.4
Books/magazine	51	26.6
Health facility	47	24.5
Health professional	73	38.0
Family/friends	77	40.1

Table 2. Responses of Debre Tabor University female students to HBM scale, Northcentral Ethiopia, 2019

Scales	Agree		Neutral		Disagree	
	Frequency	percent	frequency	Percent	Frequency	Percent
Susceptibility	190	55.6	37	10.8	115	33.6
Seriousness	109	31.9	17	5.0	216	62.3
Benefit of BSE	94	27.5	37	10.8	160	46.8
Barriers of BSE	188	55.0	18	5.3	136	39.8
Self-efficacy	154	45.0	20	5.8	168	49.1
Health motivation	Yes N (%)				No N (%)	
	239 (69.9)				103 (30.1)	

BSE: Breast self-examination

Table 3. Differences in health-associated beliefs with regards to practice of BSE among female Debre Tabor University, Northcentral Ethiopia, 2019

Scales	No BSE practice	BSE practice	X ² -value	P value
Susceptibility:				
Agree	144 (50.7)	46 (79.3)	17.06	0.000
Unsure	32 (11.3)	5 (8.6)		
Disagree	108 (38.0)	7 (12.1)		
Seriousness:				
	78 (27.5)	31 (53.4)	15.0	0.001
Agree	15 (5.3)	2 (3.4)		
Unsure	191 (67.3)	25 (43.1)		
Disagree				
Benefit:				
	67 (28.2)	27 (50.9)	11.09	0.004
Agree	34 (14.3)	3 (5.7)		
Unsure	137 (57.6)	23 (43.4)		
Disagree				
Barrier:				
	172 (60.6)	16 (27.6)	22.79	0.000
Agree	15 (5.3)	3 (5.3)		
Unsure	97 (34.2)	39 (67.2)		
Disagree				
Self-efficacy:				
	115 (40.5)	39 (67.2)	14.30	0.001
Agree	17 (6.0)	3 (5.2)		
Unsure	152 (53.5)	16 (27.6)		
Disagree				
Cues to action:				
	191 (67.3)	48 (82.8)	5.50	0.019
Yes	93 (32.7)	10 (17.2)		
No				
Net benefit				
	9 (3.2)	19 (32.8)	56.10	0.000
Positive	275 (96.8)	39 (67.2)		
Negative				

BSE: Breast self-examination

Table 4. Multivariable analysis of the factors affecting BSE practice among female students in Debre Tabor University, Northcentral Ethiopia, 2019

Variables	Practice of BSE		COR (95% CI)	AOR (95% CI)
	No N (%)	Yes N (%)		
Department:				
Social	117 (41.2)	34 (58.6)	2.02 (1.14, 3.59)	1.88 (0.69, 5.15)
Natural	167 (58.8)	24 (41.4)	1	1
Information on BSE:				
Yes	77 (27.1)	33 (56.9)	3.55(1.98, 6.35)	7.21 (2.46, 21.15)*
No	207 (72.9)	25 (43.1)	1	1
Knowledge on BCA:				
Poor	181 (63.7)	7 (12.1)	0.08 (0.03, 0.18)	0.08 (0.03, 0.23)*
good	103 (36.6)	51 (87.9)	1	1
Susceptibility:				
Agree	144 (50.7)	46 (79.3)	4.93 (2.14, 11.34)	14.18 (4.00, 50.48)*
Unsure	32 (11.3)	5 (8.6)	2.41(0.72, 8.11)	1.55 (0.22, 10.93)
Disagree	108 (38.0)	7 (12.1)	1	1
Seriousness:				
Agree	78 (27.5)	31 (53.4)	3.04(1.69, 5.47)	2.51 (0.97, 6.52)
Unsure	15 (5.3)	2 (3.4)	1.02 (0.22, 4.72)	0.34 (0.02, 6.10)
Disagree	191 (67.3)	25 (43.1)	1	1
Benefit:				
Agree	67 (28.2)	27 (50.9)	2.40 (1.28, 4.50)	0.81 (0.27, 2.40)
Unsure	34 (14.3)	3 (5.7)	0.53 (0.15, 1.85)	0.17 (0.02, 1.50)
Disagree	137 (57.6)	23 (43.4)	1	1
Barrier:				
Agree	172 (60.6)	16 (27.6)	0.23 (0.12, 0.44)	0.49 (0.17, 1.39)
Unsure	15 (5.3)	3 (5.3)	0.50 (0.14, 1.81)	2.09 (0.25, 17.19)
Disagree	97 (34.2)	39 (67.2)	1	1
Self-efficacy:				
Agree	115 (40.5)	39 (67.2)	3.22 (1.72, 6.05)	3.07 (1.09, 8.70)*
Unsure	17 (6.0)	3 (5.2)	1.68 (0.44, 6.35)	2.16 (0.37, 12.57)
Disagree	152 (53.5)	16 (27.6)	1	1
Cues to action:				
Yes	191 (67.3)	48 (82.8)	2.34 (1.13, 4.83)	3.68 (1.17, 11.56)*
No	93 (32.7)	10 (17.2)	1	1
Net benefit:				
Positive	9 (3.2)	19 (32.8)	14.89 (6.29, 35.22)	7.75 (1.56, 38.55)*
Negative	275 (96.8)	39 (67.2)	1	1

AOR: Adjusted Odds Ratio; BCA: Breast Cancer; BSE: Breast self-examination; COR: Crude Odds Ratio; CI: Confidence Interval; * significant in the final model