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RESEARCH ARTICLE

Knowledge and Practice Regarding Breast Self-Examination among Reproductive Aged Women Attending at TMSS Medical College, Bogura, Bangladesh

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Abstract

Introduction: Female breast cancer is the second most common cancer globally, and in Bangladesh, it is the leading cause of cancer-related deaths among women. BSE may increase women's awareness of their own breast health; however, evidence for its impact on mortality reduction is limited, that every woman should practice for early detection. To assess the knowledge and practice of BSE among reproductive aged women attending in the outpatient department of a tertiary care hospital in Bogura, Bangladesh. **Materials and Methods:** A descriptive cross-sectional study was conducted among 207 women with the age bracket of 15-49 years of age, attending the outpatient department of TMSS Medical College and RCH, Bogura, Bangladesh. Data was collected by interviewer provided with pre-tested structured questionnaire by face to face interview. The knowledge level was measured by five point Likert scale. Data entry was performed in Excel, and descriptive analyses were conducted using SPSS. **Results:** Total number of respondents was 207. Among them, the overall knowledge level about BSE where individuals regularly check their own breasts to detect any unusual changes was 71% and 21.8% participants did not perform BSE correctly or regularly in relation to their knowledge of BSE. Regarding practice, 63.8% reported performing BSE at least once a month, whereas 21.7% did not practice BSE correctly or regularly. **Conclusion:** Result suggested that while a majority of women had an average level of knowledge regarding BSE, gaps remain in correct and regular practice. Therefore, targeted health education initiatives are crucial to improve the scenario.

Keywords: Breast cancer screening- Breast cancer knowledge- Breast self-examination-Reproductive aged- Women's health

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Introduction

Female breast cancer is the second leading cause of global cancer in 2022, with an estimated 2.3 million new cases, comprising 11.6% of all cancer cases [1]. The disease is the fourth leading cause of cancer mortality worldwide, with 666,000 deaths (6.9% of all cancer deaths) [1]. 76,000 women in South Asian countries, including Bangladesh, India, Nepal, Myanmar, Pakistan, and Tibet, lost their lives to breast cancer per year [1]. One of the most effective approaches for the early detection of breast cancer is screening. Among the various screening methods, breast self-examination (BSE), mammography, and magnetic resonance imaging (MRI) are widely recognized [2]. BSE, in particular, offers several advantages from both economic and practical perspectives. Unlike mammography and MRI, BSE can be performed at no cost, does not require specialized equipment, and is accessible anywhere and at any time, making it a feasible option for women in resource-limited settings. Additionally, regular practice of BSE can increase awareness of breast health and help individuals identify unusual changes promptly, potentially facilitating early diagnosis and treatment [2].

Until 2015, breast cancer has been the number one cancer of Bangladeshi women [3]. A massive burden of

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the healthcare systems which contributes to the deaths of 69% women in Bangladesh [3]. In 2018, according to International Agency for Research on Cancer (IARC), there were 12,764 new breast cancer cases in Bangladesh [3].

Despite that breast cancer mortality has been moderately reduced by current treatments, more than 650,000 estimated deaths due to breast cancer are expected annually worldwide [4]. The most reasonable explanation for this scenario is that breast cancers are heterogenous, showing variable morphologic and biological features and thus different clinical behavior and variable response to treatment.

Breast cancer risk factors include early menarche, late menopause, and obesity in postmenopausal women. Chemotherapeutic resistance mechanisms and delayed diagnosis are posing challenges against breast cancer management. Different reactions to the same treatment, biologic features, and stage are caused by genetic pathways. Physical activity and breastfeeding may have protective effects. Alcohol, some gene mutations, hormone therapy for menopause, and oral contraceptives may all increase the risk of breast cancer [5].

However, not all factors are equally responsible for the rise in breast cancer. Young people and those with high BMI are somewhat at risk of having breast cancer [6]. Breast cancer mortality is also significantly influenced by family history and chest radiotherapy. First degree relatives with breast cancer, and other malignancies, is more likely to have breast cancer [2]. Frequent exercise can help lower the risk of developing breast cancer [7].

As Bangladesh is a low-income country, over 27% of the population is undernourished and 60% of women lack literacy. In Bangladesh, one doctor serves 3,300 people in urban regions and over 15,000 in rural areas [8]. It raises serious concerns regarding the general health of Bangladesh's population. The dream of modern medical invention cannot be thwarted by Bangladesh's inadequate health care system [8]. Though, new technologies are being developed daily to lower the incidence of breast cancer, contemporary views of Bangladesh show that new technology are insufficient to prevent breast cancer, because of high illiteracy rates in women, are disregarded by both their husbands and society at large, and are not given much importance. Believing in superstitions like punishment for wrong doing and breast cancer are caused by an evil spirit also creates problems in early diagnosis [8].

Because cancer is less likely to be detected in time to be entirely eradicated or destroyed. If detected and treated early, the majority of breast cancers are curable. Literature showed breast cancer detection system in our earlier research [2].

Therefore, root level education for the rural and urban woman is paramount to prevent breast cancer. A cost-effective screening program is the key for early diagnosis of breast cancer. Raising awareness can help people learn the right information about the variables linked to breast cancer. Bangladesh's socioeconomic situation is poor, much like the country's population health service [9-11].

Mammograms are the preferred screening test for breast cancer. However, research showed that participants' awareness of mammograms was low, with just 48.6% of them being aware of this important screening procedure. Only 22.9% of respondents knew the right age to start mammography scans, which is crucial for early detection, making this lack of knowledge alarming [12]. Educational interventions are necessary to enhance awareness and encourage.

The study was designed to identify the level of knowledge and practice regarding breast self-breast examination among women of reproductive age attending at the outpatient department at TMSS Medical College and Rafatullah Community Hospital (TMC&RCH), Bogura, Bangladesh.

Materials and Methods

Study design

A Cross-sectional descriptive study was conducted among the reproductive aged women attending outpatient departments of the TMC&RCH, Bogura, Bangladesh.

Study duration and site

The study was carried out from July 2024 to December 2024. 207 Reproductive aged women (15 to 49 years) attending different outpatient departments of TMC&RCH were included in the study.

Sampling procedure

Non-probability Purposive sampling technique was used for collecting data from 15-49 years of age women attending at the outpatient department of TMC&RCH. This study used the following recognized sample size determination formula to estimate its sample size for survey,

$$n=(p\times q\times z^2)/d^2$$

Where, p is the indicator percentage, Z is the normal variate value at 95% confidence interval, d is the error margin, On the basis of 50% indicator percentage, Z value as 1.96 (at 95% confidence interval), 0.05 error margin. Assuming, the number of study participants having knowledge and practicing BSE is 50 %, at 95% confidence interval actual sample size of this study was 384, however, this study reached 207 due to time and financial constraint of an academic researcher. Exclusion criteria included unwilling participants, severely ill patients, women with intellectual disabilities, pregnant women during the study period, breast cancer patients, and all males. Data were collected through face-to-face interviews using a structured questionnaire, after explaining the study purpose and ethical considerations to each respondent.

Data collection tool development and procedure

Semi-structured survey questionnaire was used to collect data. We reviewed relevant literature and tools to develop the study questionnaire. The English version of the questionnaire was translated into Bangla and back

translated into English. The questionnaire was tested at the outpatient department another tertiary hospital hospital Shaheed Ziaur Rahman Medical College Hospital, Bogura among 20 patients to check the suitability of the tools.

After pretesting, necessary modifications and rephrasing were made to finalize the questionnaire. Research assistants were trained on ethical procedures and proper administration of the questionnaire.

Data entry and analysis

All questionnaires were checked manually after the interviews for missing data and inconsistencies. Internal consistency was checked among the interviewer. Data were entered into a Microsoft Excel and after cleaning all data, transferred into the Statistical Package for Social Sciences (SPSS) software version 23 (Armonk, New York, USA) for analysis. Data were verified through internal consistency checking and comparing with other findings. Assuming, 50 % respondents having BSE knowledge and practice, at 95% confidence interval actual estimated sample size of this study was 384. Continuous data were presented as mean ±standard deviation (SD) or median (inter quartile range) and categorical data were presented as number and percentage. Categorical data were analyzed by Pearson's chi square test, as appropriate. Univariate and multivariate models were performed to access factors associated with diabetes knowledge and healthcare service utilization for diabetes. A *P* value<0.05 was considered statistically significant.

Ethical consideration

The project was approved by the Institutional Review Board of Pundra University of Science & Technology (PUB). The approval number is PUB/MPH/240609. In addition, data collection permission was taken from the Director Hospital of TMSS Medical College & Rafatullah Community Hospital, Bogura, Bangladesh (TMSS/THS/RCH/Hos/Admin-24-554). Before data collection, all participants were briefed about the process of data collection and assured about confidentiality of their data. The Questionnaire made easily understandable for the participants. A written consent form was used to take permission from each of the participants of the study. All participants were given equal rights to ask any type of study related questions. All participants had the right to leave the study at any time. The aim and objectives of the study were well informed to all participants. the participants were informed that they did not get direct benefit from this study.

Results

The cross-sectional descriptive study was conducted among women aged 15 to 49 years attending the outpatient departments of TMSS Medical College and Rafatullah Community Hospital (RCH) in Bogura, Bangladesh. Data were collected through structured questionnaires administered via face-to-face interviews. A total of 207 respondents participated in the study. Regarding the socio-demographic profile, the majority of respondents identified as Muslim, accounting for 193 individuals (93%), followed by Hindu respondents at 13 (6%) and Christian respondents at 3 (1%). Age distribution of the respondents showed that 65 women (31.4%) were between 15 and 25 years, 94 women (45.4%) were in the range of 26 to 36 years, and 48 women (23.2%) were between 37 and 49 years old (Figure 1).

Among 207 respondents were recruited for this study. Educational qualification status reveals 37 (17.8%) respondents were belongs to class five, 36 (17.4%) respondents were belongs to SSC, 71 (37.3%) respondents were belongs to HSC, 63 (34.3%) respondents were belongs to graduate (Figure 2).

Among 207 respondents were recruited for this study. Marital status of the respondents reveals unmarried were 47 (23%), married were 157 (76%), Widow were 3 (1%) and separated (0%) (Figure 3).

Among 207 respondents were recruited for this study occupational distribution status reveal: Housewives were 108 (52%), students were 37 (18%), service holders were 54 (26%) and others were 8 (4%) (Figure 4).

Among all respondents majority (36.7%) "strongly agreed" that they felt breast self-examination (BSE) is a self-care practice where individuals regularly check their own breasts to detect any unusual changes. Although, majority of the respondents agreed that BSE should be performed monthly by reproductive age women. The respondents 33.3 % were "strongly agree" and 21.3 % "disagree" that Identify for changes such as skin dimpling, nipple discharge, or swelling. Majority of the respondents 29.5% were "uncertain" and 23.2% "disagree" that BSE

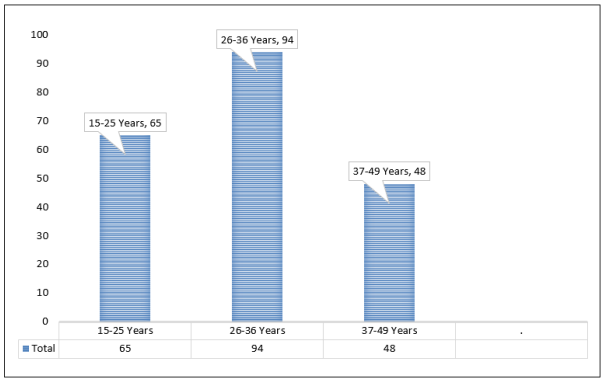

Figure 1. Age Distribution of the Respondents (n=207)

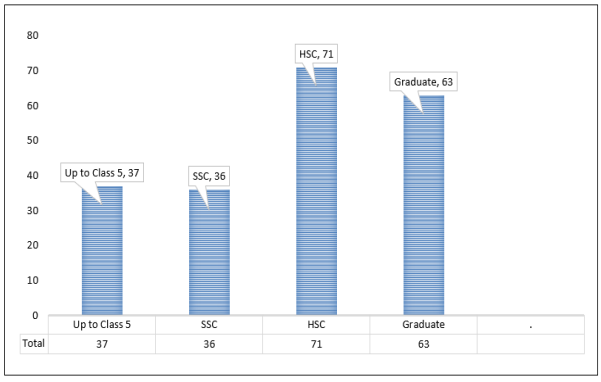

Figure 2. Educational Qualifications of the Respondents (n=207).

Table 1. Knowledge of Breast Self-examination (BSE) among Respondents

Items		Strongly Agree (SA) (%)	Agree (A) (%)	Uncertain (U) (%)	Disagree (DA) (%)	Strongly Disagree (SDA) (%)	Mean	SD (±)
1	Breast Self-Examination (BSE) is a self-care practice where individuals regularly check their own breasts to detect any unusual changes	76 (36.7)	71 (34.3)	15 (7.2)	45 (21.8)	0	2.14	1.138
2	Breast Self-Examination (BSE) is an effective method for detecting breast abnormalities early.	70 (33.8)	75 (36.2)	18 (8.7)	44 (21.3)	0	2.17	1.119
3	BSE should be performed monthly by reproductive age women	24 (11.6)	108 (52.2)	30 (14.5)	44 (21.2)	1 (0.5)	2.47	0.969
4	The best time to perform BSE is a few days after the menstrual period	14 (6.8)	73 (35.3)	74 (35.7)	45 (21.7)	1 (0.5)	2.74	0.892
5	BSE can help women become more familiar with their normal breast structure	69 (33.3)	73 (35.2)	21 (10.2)	44 (21.3)	0	2.19	1.12
6	Identify for changes such as skin dimpling, nipple discharge, or swelling	69 (33.3)	73 (35.2)	21 (10.2)	44 (21.3)	0	2.19	1.12
7	BSE visual inspection should be done in front of a mirror	15 (7.2)	119 (57.5)	24 (11.6)	49 (23.7)	0	2.52	0.934
8	BSE palpation should done in standing and sitting posture	19 (9.2)	113 (54.5)	26 (12.6)	49 (23.7)	0	2.51	0.955
9	BSE includes squeezing the nipples to check for discharge	22 (10.6)	76 (36.7)	61 (29.5)	48 (23.2)	0	2.65	0.953
	Total =36 112 = Poor knowledge 13-24= Average knowledge 2536 = Good knowledge						Obtained total 21.58 Mean =2.39	SD= 1.02

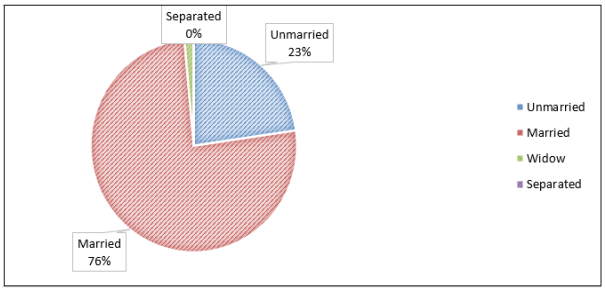

Figure 3. Marital Status of the Respondents (n=207).

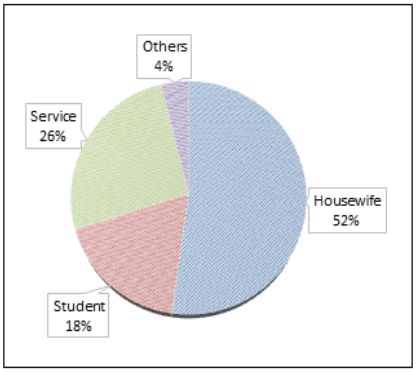

Figure 4. Occupation of respondents (n=207).

includes squeezing the nipples to check for discharge. Table 1 shows score of knowledge level about BSE of the respondents was 21.58 (Mean 2.39 and SD 1.02) (Table 1).

Table 2 showed the findings that among all of the respondents 11.2% were "uncertain" and 21.7% "disagree" that they felt perform Breast Self-Examination (BSE) at least once a month. Although majority of the respondents 9.7 % were "strongly agree" and 23.2 % "disagree" that they perform BSE using my fingers to feel for lumps or unusual thickening in the breast tissue. All respondents 24.6% "disagree" that palpation include the underarm area (armpit) while I performed BSE. 29.5% were "uncertain" and 23.2% "disagree" that squeeze the nipples to check for discharge.

The above table shows score of practice about BSE of the respondents was 22.8 (Mean 2.53 and SD 0.94). (Table 2).

Discussion

This study was undertaken to explore the level of knowledge and practice of breast self-examination (BSE) among reproductive-age women (15 to 49 years) attending various outpatient departments of TMSS Medical College, Bogura, Bangladesh. Breast self-examination is considered one of the most effective and cost-efficient methods for detecting any unusual changes in the normal breast structure. Proper knowledge and regular practice of BSE play a vital role in the early diagnosis of breast cancer, which can significantly improve health outcomes.

Although BSE is widely promoted as a simple and low-cost method to enhance awareness, major international guidelines suggest that current evidence is insufficient to demonstrate a reduction in mortality when BSE is used alone [13]. Instead, clinical breast exam and mammography are considered more reliable screening tools. This debate has been highlighted in systematic reviews [14]. The study highlighted that most reproductive-age women possessed a good level of knowledge about BSE but did not practice it consistently every month, as recommended. Although, research conducted in Palu, Indonesia, revealed a concerning trend among high school students, where a majority exhibited

Table 2. Attitude of Breast Self-examination (BSE) among Respondents (n=207)

Items		Strongly Agree (SA) (%)	Agree (A) (%)	Uncertain (U) (%)	Disagree (DA) (%)	Strongly Disagree (SDA) (%)	Mean	SD (±)
1	I perform Breast Self-Examination (BSE) at least once a month	28 (13.5)	111 (53.6)	23 (11.2)	45 (21.7)	0	2.41	0.976
2	I check my breasts for visible changes, such as skin dimpling or nipple retraction, during BSE	15 (7.2)	133 (64.3)	14 (6.8)	45 (21.7)	0	2.43	0.91
3	I do perform BSE using my fingers to feel for lumps or unusual thickening in the breast tissue	20 (9.7)	117 (56.5)	22 (10.6)	48 (23.2)	0	2.47	0.954
4	My palpation include the underarm area (armpit) while I performing BSE	23 (11.11)	103 (49.8)	32 (15.5)	49 (23.6)	0	2.52	0.975
5	I perform BSE at the correct time in my menstrual cycle (a few days after my period)	14 (6.7)	72 (34.8)	70 (33.8)	50 (24.2)	1 (0.5)	2.76	0.899
6	I do visual inspection in front of a mirror	15 (7.2)	119 (57.5)	24 (11.6)	49 (23.7)	0	2.52	0.934
7	I raise my arms over my head during BSE	22 (10.6)	104 (50.2)	30 (14.6)	51 (24.6)	0	2.53	0.979
8	I begin palpation in both standing and sitting posture	19 (9.2)	113 (54.5)	26 (12.6)	49 (23.7)	0	2.51	0.955
9	I squeeze the nipples to check for discharge	22 (10.6)	76 (36.7)	61 (29.5)	48 (23.2)	0	2.65	0.953
	Total =36; [112 = Poor Practice; 13-24= Average practice; 2536 = Good practice]						Obtained total 22.8 Mean =2.53	SD= 0.94

inadequate knowledge and negative attitudes towards BSE. Despite a high level of information exposure, only a small percentage of students engaged in regular BSE practices, highlighting a gap between knowledge and behavior. This discrepancy suggests that simply providing information is insufficient; it must be coupled with supportive environments that encourage proactive health behaviors. Most of the respondents of our study were adult and educated which is probably related with increased positive attitude's towards BSE.

In Saudi Arabia, a study involving women aged 20 to 60 years found that while a significant portion of participants demonstrated good knowledge and positive attitudes towards BSE, only 36.2% practiced it regularly [15]. This finding emphasizes the need for targeted health education programs that not only inform but also motivate women to adopt BSE as a regular practice. The association between knowledge and attitudes indicates that enhancing educational efforts could lead to improved BSE practices among women in this region.

Similarly, a study conducted in Meru County, Kenya, highlighted that a majority of women had poor knowledge and practice of BSE, with only 43% demonstrating adequate awareness [16].The results pointed to the necessity of structured health education interventions to improve both knowledge and practical skills related to BSE. Such programs could effectively bridge the gap between awareness and practice, ultimately leading to earlier detection of breast cancer. In conclusion, the literature consistently demonstrates that while knowledge and attitudes towards BSE are critical components in the fight against breast cancer, they must be translated into practice through effective health education and supportive interventions. Researchers should focus on developing comprehensive training programs that not only inform women about BSE but also empower them to incorporate it into their routine health practices. By addressing the barriers to BSE, healthcare providers can significantly contribute to reducing breast cancer mortality rates among reproductive-aged women.

A study conducted in Kuwait revealed that while 84% of women had heard of breast self-examination (BSE), only 43.1% demonstrated good overall knowledge regarding breast cancer symptoms, risk factors, and examination practices. In India, research has shown that various factors influence women's participation in breast cancer screening processes, including BSE and clinical breast examinations (CBE). The determinants of participation are multifaceted, ranging from personal beliefs to socio-economic factors [17]. Understanding these factors is vital for developing targeted interventions that can increase screening uptake and ultimately improve health outcomes for women [18]. Furthermore, examined the decision-making processes of women regarding screening mammography in underinformed populations. Their findings suggest that misinformation and lack of awareness significantly hinder women's willingness to engage in regular screening practices. This underscores the importance of comprehensive educational campaigns that not only inform women about the benefits of BSE but also dispel myths surrounding breast cancer. In conclusion, enhancing awareness of breast self-examination and other screening methods among reproductive-aged women is imperative.

Despite the importance of BSE, awareness and practice among Indian women are alarmingly low. A study conducted in india highlighted the need for comprehensive educational programs aimed at increasing awareness of breast cancer risk factors and promoting BSE among women, especially in rural areas where access to healthcare is limited [19]. Moreover, emphasize the necessity of culturally sensitive public health interventions tailored to specific ethnic groups, including Indian women. Their research reveals that while some women

express a willingness to learn and share information about breast health, many report inadequate knowledge regarding breast cancer and BSE. This lack of awareness is compounded by societal stigma and misconceptions surrounding breast cancer, which often deter women from seeking information or assistance. The study advocates for community-based educational initiatives that empower women with knowledge about breast health, thereby fostering a culture of proactive health management [20]. A cross-sectional study conducted in a rural teaching hospital highlighted that a staggering 81% of women lacked any knowledge about BC, with the belief that clinical breast examination (CBE) was the sole screening method [21].

Emphasize the disparity in knowledge between healthcare professionals and the general population, noting that while doctors are generally informed about BSE, only a fraction of women from the general population are aware of its importance and the correct methods for performing [22].This gap indicates a systemic issue in health education and outreach, particularly in resource-poor settings where formal screening programs are absent. Furthermore, found that socioeconomic factors, such as low family income and lack of awareness about BSE, are significant barriers to knowledge and practice [23].

The limited knowledge and inadequate practice of BSE observed in this region to be influenced by intersecting cultural, educational, socioeconomic and geographic barriers [24]. Addressing these factors through targeted, evidence-based, and context-sensitive health education interventions is critical to strengthening early detection efforts and reducing diagnostic delays, particularly among high-risk and underserved populations [24, 25]. Within the broader health system context of Bangladesh, where a national cancer registry remains absent [26] and previous research has reported BRCA1 exon 7 mutations among women with triple-negative breast cancer [27, 28] the need for accessible and sustainable early detection strategies is heightened. Therefore, the increasing emphasis on innovative diagnostic and treatment approaches further underscores the relevance of BSE as a practical, low-cost, and scalable method for promoting earlier diagnosis and improving survival outcomes in resource-limited settings.

In conclusion, this study demonstrated that although reproductive-age women possessed a moderate level of knowledge regarding BSE, the actual practice of BSE remained substantially low. Many respondents were aware of the importance of BSE and had basic knowledge of its purpose, yet they did not engage in the recommended monthly practice. This disconnect between awareness and action points to a need for enhanced educational interventions and supportive measures to encourage consistent practice.

Addressing these issues through targeted health education initiatives is crucial for improving early detection and outcomes for breast cancer in vulnerable populations.

Limitations

This study has several limitations. First, the small sample size may restrict the generalizability of the findings to broader populations. Second, the reliance on self-reported data introduces potential biases, including social desirability and recall inaccuracies. Without triangulation from external sources, the validity of some responses may be affected. Additionally, cultural and contextual factors specific to Bangladesh may influence participant perspectives, limiting applicability in other settings. The data was collected from a single institution, which may further constrain the diversity of insights and limit broader representation.

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Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed by SA, DMAR, and MKBS. The first draft of the manuscript was written by SA, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Data availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Conflict of interest

The authors have no relevant financial or nonfinancial interests to disclose.

Ethical Approval

Ethical approval for this study was obtained from the Institutional Review Board of the Pundra University of Science & Technology (PUB), approval number PUB/MPH/24-06. Additionally, permission for data collection was granted by the Director of TMSS Medical College & Rafatullah Community Hospital, Bogura, Bangladesh (TMSS/THS/RCH/Hos/Admin-24-554).

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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References

1. Ahmed K, Asaduzzaman S, Bashar MI, Hossain G, Bhuiyan T. Association Assessment among Risk Factors and Breast Cancer in a Low Income Country: Bangladesh. Asian Pacific journal of cancer prevention: APJCP. 2015;16(17):7507-7512. https://doi.org/10.7314/apjcp.2015.16.17.7507
2. Amoran OE, Toyobo OO. Predictors of breast self-examination as cancer prevention practice among women of reproductive age-group in a rural town in Nigeria. Nigerian Medical Journal: Journal of the Nigeria Medical Association. 2015;56(3):185-189. https://doi.org/10.4103/0300-1652.160362
3. Shamsi T. Burden of breast cancer in Bangladesh-current and future and financing treatment with link to willingness to pay. International Journal Of Community Medicine And Public Health. 2021 Oct 27;8(11):5525-5528. https://doi.org/10.18203/2394-6040.ijcmph20214295
4. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I, Jemal A. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: a cancer journal for clinicians. 2024;74(3):229-263. https://doi.org/10.3322/caac.21834
5. Key TJ, Verkasalo PK, Banks E. Epidemiology of breast cancer. The Lancet. Oncology. 2001 03;2(3):133-140. https://doi.org/10.1016/S1470-2045(00)00254-0
6. Wright CE, Harvie M, Howell A, Evans DG, Hulbert-Williams N, Donnelly LS. Beliefs about weight and breast cancer: an interview study with high risk women following a 12 month weight loss intervention. Hereditary Cancer in Clinical Practice. 2015;13(1):1. https://doi.org/10.1186/s13053-014-0023-9
7. Altay B, Avci IA, Rizalar S, Oz H, Meral D. Breast and cervical cancer knowledge and awareness among university students. Asian Pacific journal of cancer prevention: APJCP. 2015;16(5):1719-1724. https://doi.org/10.7314/apjcp.2015.16.5.1719
8. Morse EP, Maegga B, Joseph G, Miesfeldt S. Breast Cancer Knowledge, Beliefs, and Screening Practices among Women Seeking Care at District Hospitals in Dar es Salaam, Tanzania. Breast Cancer: Basic and Clinical Research. 2014;8:73-79. https://doi.org/10.4137/BCBCR.S13745
9. Mohaghegh P, Yavari P, Akbari ME, Abadi A, Ahmadi F, Shormeij Z. Relationships between Family Levels of Socioeconomic Status and Distribution of Breast Cancer Risk Factors. Iranian Journal of Cancer Prevention. 2015;8(1):53-59.
10. Kye SY, Park EY, Oh K, Park K. Perceptions of cancer risk and cause of cancer risk in korean adults. Cancer Research and Treatment. 2015 04;47(2):158-165. https://doi.org/10.4143/crt.2014.024
11. Ozkaraman A, Culha I, Fadiloglu ZC, Kosgeroglu N, Gokce S, Alparslan GB. Relationships between social support and social image concerns in Turkish women with breast cancer. Asian Pacific journal of cancer prevention: APJCP. 2015;16(5):1795-1802. https://doi.org/10.7314/apjcp.2015.16.5.1795
12. Akwo JD, Erim AE, Ikamaise VC, Archibong B, Ekpo EU. Transforming Screening Uptake in Low-resource and Underinformed Populations: A Preliminary Study of Factors Influencing Women's Decisions to Uptake Screening. Journal of Medical Imaging and Radiation Sciences. 2019 06;50(2):323-330.e2. https://doi.org/10.1016/j.jmir.2019.02.003
13- World Health Organization. Global breast cancer initiative implementation framework: assessing, strengthening and scaling-up of services for the early detection and management of breast cancer. World Health Organization; 2023 Mar 7..
14. Jones S. Regular self-examination or clinical examination for early detection of breast cancer. International Journal of Epidemiology. 2008 Dec;37(6):1219. https://doi.org/10.1093/ije/dyn218
15- Hamid HI, Mohamed FA, Dailah HG, Alnassry SM, Abdelgader AA, Taha AAAE, Higazy OA, et al. Breast self-examination knowledge, attitude, and practice among Jazan women, Kingdom of Saudi Arabia. African Journal of Reproductive Health. 2024 07 31;28(7):83-90. https://doi.org/10.29063/ajrh2024/v28i7.9
16. Suyanto J, Sianipar BK, Sofais DAR, Panduragan SL. Structured Training Program About Breast Self Examination Toward Awareness and Behavior Among Women in Bengkulu City, Indonesia. Public Health of Indonesia. 2024 09 24;10(3):383-390. https://doi.org/10.36685/phi.v10i3.833
17. Tripathy S, Mohapatra S, Preethika A. Breast cancer awareness among women of reproductive age- a questionnaire based study. European Journal of Obstetrics, Gynecology, and Reproductive Biology. 2024 07;298:153-157. https://doi.org/10.1016/j.ejogrb.2024.05.014
18. Grosse Frie K, Ramadas K, Anju GA, Mathew BS, Muwonge R, Sauvaget CS, Thara ST, Sankaranarayanan R. Determinants of participation in a breast cancer screening trial in trivandrum district, India. Asian Pacific journal of cancer prevention: APJCP. 2013;14(12):7301-7307. https://doi.org/10.7314/apjcp.2013.14.12.7301
19. Parle J, Gupta S. Breast cancer knowledge, attitude and self-examination practices of physiotherapy students in India: a cross-sectional study. International Journal Of Community Medicine And Public Health. 2020 08 28;7(9):3585-3593. https://doi.org/10.18203/2394-6040.ijcmph20203927
20. Baburajan C, Pushparani MS, Lawenya M, Lukose L, Johnson AR. Are rural women aware of breast cancer and do they practice breast self-examination? A cross-sectional study in a rural hospital in South India. Indian Journal of Cancer. 2022;59(3):354-359. https://doi.org/10.4103/ijc.IJC_799_19
21. Sadler GR, Dhanjal SK, Shah NB, Shah RB, Ko C, Anghel M, Harshburger R. Asian Indian women: knowledge, attitudes and behaviors toward breast cancer early detection. Public Health Nursing (Boston, Mass.). 2001;18(5):357-363. https://doi.org/10.1046/j.1525-1446.2001.00357.x
22. Polishwala S, Shagun N, Patankar S. The Assessment and Comparison of the Knowledge of Breast Self-Examination and Breast Carcinoma Among Health Care Workers and the General Population in an Urban Setting. Cureus. 2023 03;15(3):e36592. https://doi.org/10.7759/cureus.36592
23. Woldeselassie F, Jote S, Tewelde B, Redae GH. Assessment of Breast Self-Examination Knowledge, Attitude and Practice and Associated Factors Among Female Preparatory Students in Addis Ababa, Ethiopia: An Institutional Based Cross-Sectional Study. Health Science Reports. 2024 Dec;7(12):e70258. https://doi.org/10.1002/hsr2.70258
24. Hoq MI, Jahan S, Mahmud MH, Hasan MM, Jakaria M. Breast cancer screening awareness, practice, and perceived barriers: a community-based cross-sectional study among women in south-eastern Bangladesh. Health Science Reports. 2024 Jan;7(1):e1799.
25. Ahmed MS, Sayeed A, Mallick T, Syfuddin HM. Knowledge

and practices on breast cancer among Bangladeshi female university students: a cross-sectional study. Asian Pacific Journal of Cancer Care. 2020 Feb 10;5(1):19-25.
26. Rahman MM, Siddique MKB, Rahim MM. Cancer Registry in Bangladesh: Challenges and Opportunities. Int J Transl Med Res Public Health. 2024;8:e001. doi: 10.25259/IJTMRPH_522
27. Saha P, Burmon T, Benzir M, Mahal M, Shahnaj A, Rahman MH, Siddique MK. Mutation in Exon 7 of BRCA1 Gene in Bangladeshi Women with Triple Negative Breast Cancer. Asian Pacific Journal of Cancer Nursing. 2025 Aug 6:20250806-.
28. Mehta A, Vasudevan S, Sharma SK, Kumar D, Panigrahi M, Suryavanshi M, Gupta G. Germline BRCA1 and BRCA2 deleterious mutations and variants of unknown clinical significance associated with breast/ovarian cancer: a report from North India. Cancer management and research. 2018 Nov 30:6505-16.