Original Article

Nursing Students' Knowledge and Practice Regarding Breast Self-Examination at the University of Technology 2025

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Abstract

Background: Breast self-examination is a simple, cost-effective method for early detection of breast cancer; that empowers women to detect early changes in their breasts. Nursing students are expected to have adequate knowledge and practice of breast self-examination to promote it in future clinical settings. **Methods:** an institution based cross-sectional study was carried out at the University of Technology – Faculty of Nursing in Khartoum State. 201 participants were selected through the stratified random sampling technique. Data was collected using a structured administered questionnaire, analyzed using the Statistical Package for Social Sciences version 21, and presented in tables, figures, and cross tabulation. **Results:** The study revealed that more than half (51.2%) were above 25 years of age, while 34.8% were between 24 and 25 years. Most participants were in their fifth academic year. Majority 82.6% of participants reported performing breast self-examination, only more than half knowing the correct steps, and 27.9% saying that they often forget to perform it. Fear of finding abnormalities was cited by 4.5% as a barrier. Only 4.5% of students demonstrated a

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"very good" level, while 2.5% had "good" knowledge. The majority showed "fair" (74.1%) knowledge. There was a statistically significant association between knowledge level and both age (P=0.00) and receiving education about breast self-examination (P=0.00). **Conclusion:** This study revealed that although knowledge of breast self-examination was remarkably high among nursing students, correct and regular practice remained low. The findings highlight the urgent need for integrating practical BSE sessions into nursing curricula to bridge the gap between knowledge and practice.

Keywords: Nursing students, knowledge, practice, breast self-examination, Sudan

Introduction

Breast cancer remains the most common cancer among women worldwide, accounting for 2.3 million new cases annually and representing a major public health challenge (1). In low- and middle-income countries, late diagnosis and limited screening programs contribute to high mortality rates (2). In Africa, breast cancer incidence is rising, with most cases detected at advanced stages (3). In Sudan, recent studies show that breast cancer is the leading malignancy among women, with delayed presentation being a major obstacle to effective treatment (4.5). Globally, the integration of BSE into awareness campaigns has been widely advocated as part of comprehensive cancer prevention programs. The World Health Organization (WHO) emphasizes that early detection through accessible methods such as BSE can significantly reduce mortality in countries where organized screening programs are limited (6.7). In many developing nations, BSE remains the most practical and feasible option for early detection, given its affordability and independence from advanced medical infrastructure (8). In sub-Saharan Africa, BSE is particularly relevant due to limited access to mammography and late presentation of breast cancer cases (9). However, despite awareness campaigns, research shows that knowledge and practice of BSE remain inadequate. Despite numerous awareness campaigns, research consistently demonstrates that knowledge and practice of breast self-examination (BSE) remain inadequate across different settings. For instance, while Bener et al. (2019) and Albesan et al. (2022) both reported relatively high awareness among university students, the actual practice of BSE was markedly low, indicating that awareness alone does not necessarily translate into behavioral change. This pattern appears to persist across regions; in Sudan, where breast cancer remains the most common malignancy among women, similar discrepancies have been documented. Studies from Omdurman Islamic University and the University of Khartoum revealed that although the majority of students possessed adequate knowledge of BSE, regular practice was limited, often hindered by factors such as lack of confidence, cultural perceptions, and limited emphasis on practical training

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(10–14). These findings suggest that theoretical knowledge alone is insufficient to encourage sustained practice. As future healthcare providers, nursing students play a central role in promoting BSE within their communities. Their knowledge, skills, and confidence in performing BSE are critical not only for their personal health but also for their ability to educate and motivate patients (15-17). The main objective of this paper is to examine nurses' students' knowledge regarding breast self-examination.

Methods:

An institution based cross-sectional design was adopted. This study was carried out at the University of Technology – Faculty of Nursing in Khartoum State. The targeted population was nursing students from the 3rd, 4th, and 5th batches enrolled in the Faculty of Nursing Sciences, from all Sudanese tribes, ethnic groups, and socioeconomic groups. The sample included 201 students, and they were selected from each batch by the stratified random sampling technique. The total population was first divided into strata based on academic year. Then, a random selection of participants was made from each stratum proportionally to its size in population. The data were collected by using a standardized administered questionnaire, contain three sections. The first section included the background variable, the second included knowledge, and the third included practice. Using Liker scale (4 points: Very good, Good, Fair, and poor) to assess the knowledge of respondents. A pretest was conducted to ensure the clarity and validity of questionnaire. The data were analyzed using the statistical package of social science (SPSS), version 21, and a significance test was checked by chi-square test, and the results were accepted when the p-value was $\leq 0.05\%$. An ethical approval was obtained from the Institutional Review Board at the University of Technology, and verbal informed consent was obtained from each participant prior to data collection. Confidentiality and anonymity were ensured by using codes instead of names, and all collected data were used strictly for research purposes. Participants had the right to refuse or withdraw from the study at any time without facing any academic or personal consequences.

Results

Table1: Demographic characteristics of study participants n=201

Age	**Frequency**	**Percentage**
18-20	4	2%
21-23	24	11.9%
24-25	70	34.8%
> 25	103	51.2%
Total	201	100%
Academic year		
3rd	53	26.2%
4th year	48	23.9%
5th year	100	49.8%
Where have you heard about BSE?		
Yes, from university.	178	88.6%
Yes ,from media.	15	7.5%
Yes ,from friends.	5	2.5%
Others	3	1.5%
Formal training about BSE		
Yes	180	89.6%
No	21	10.4%
The source from which participants received education		
University	166	82.6%
Health workshops	18	9%
Media	12	6%
Friends or family	5	2.5%

Table 2: performance regarding breast-self-examination n=201

Items	Frequency	Percentage	Mean
Perform BSE.			
Yes, regularly	166	82.6%	
Yes ,but not regularly	24	11.9%	1.23
No	11	5.5%	
How do you perform BSE?			
Once a month.	54	26.9%	
Less than once a month	26	12.9%	2.36
More than once a month	116	57.7%	
once a year	5	2.5%	
The main reasons for not practicing			
I don't know how to practice	112	55.7%	
I forget	56	27.9%	
I don't think it is important	8	4%	1.81
I am afraid to find something abnormal	9	4.5%	
Others	16	8%	

Table 3: Distribution of participants according to their knowledge of breast self-examination. n=201

Item knowledge	Frequency	Percentage
At what age should women begin performing BSE		
Very good	136	67.7%
Fair	65	32.3%
The main purpose of BSE.		
Very good	179	89.1%
Fair	22	10.9%
How often should BSE be performed?		
Very good	172	85.6%
Fair	29	14.4%
The best time to perform BSE.		
Very good	167	83.1%
Fair	34	16.9%
The common methods for early detection of breast cancer		
Very good	7	3.5%
Good	2	1%
Fair	148	73.6%
Poor	44	21.9%
Advantages of early detection of breast cancer		
Very good	10	5%
Good	3	1.5%
Fair	10	5%
Poor	178	88.6%
Part should be checked during BSE.		
Very good	112	55.2
Good	45	22.4%
Fair	35	17.4%
Poor	10	5%

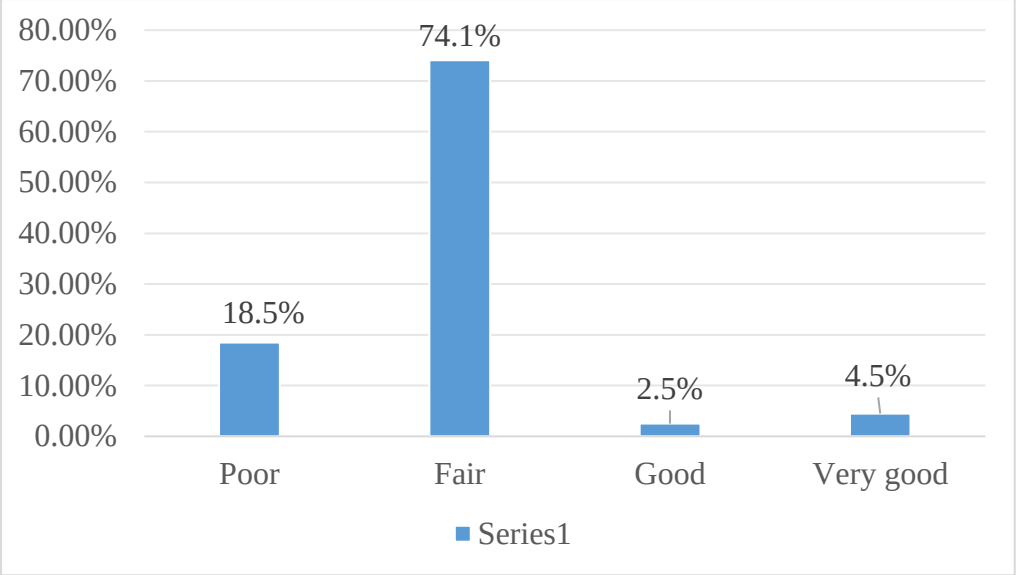

Figure 1: Distribution of study participants according to their overall knowledge about breast self- examination. n=201

Table 4: The associations between level of knowledge and demographic data. n=201

Socio-demographic* level of knowledge		**Mean**	**Std**	**Correlation**	**P.Value**
Age in years	18-20 21-23 24-25 > 25	3.35	0.768	0.217	0.00
The academic year	3rd 4th 5th	2.23	0.843	0.075	0.28
Received education about BSE	University From health workshops From media From friends or family	1.28	0.689	0.209	0.00

Discussion

The demographic characteristics of the participants revealed that the majority were young adults aged between 20 and 25 years, with a predominance of females, as expected in a nursing student population. Almost all students had heard about BSE, suggesting that awareness campaigns and curricular exposure are effective in reaching nursing students. The high level of awareness may be attributed to university-based lectures, workshops, and social media influence. However, awareness does not necessarily translate into correct practice. Similar findings were reported by Mohamed et al. 2021 at Omdurman Islamic University, where 96% of nursing students had heard about BSE (12). In Saudi Arabia, Albeshan et al.2022 also reported high awareness but low practice rates (10). These findings reflect a common pattern in developing countries, where educational exposure creates awareness but often fails to foster sustained behavioral change.

Despite high awareness, only about one-quarter of students practiced BSE correctly on a monthly basis. This gap may be due to lack of confidence, insufficient hands-on training, or misconceptions about the importance of regular practice. Elgaili et al.2020 in Khartoum reported similar low monthly practice rates (21%) among female university students (11). By contrast, studies in India reported higher correct practice (over 40%), possibly reflecting differences in curriculum and awareness programs. In Sudan and other sub-Saharan African countries, cultural factors, limited emphasis on preventive care, and the absence of structured practical training contribute to low BSE adherence.

Most students knew the correct timing (5–7 days after menstruation) and frequency (monthly) for performing BSE. This suggests that theoretical knowledge is effectively communicated during coursework, but reinforcement through practice is missing. Similar results were observed by Bener et al 2019; where over 80% of students knew the correct timing, but fewer adhered to it consistently (9). While Sudanese nursing students demonstrate adequate theoretical knowledge, the lack of practical reinforcement limits its translation into regular health behavior.

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The majority (88.6%) of study participants failed to identify the benefits of early detection through BSE. This may reflect insufficient emphasis on linking BSE to improved prognosis, survival rates, and reduced treatment burden during their education. In contrast, Boulos and Ghali 2023 in Egypt found that most students were aware of the benefits of early detection (13). The discrepancy may result from differences in the integration of public health outcomes into nursing curricula. This highlights a critical gap in Sudan, where late presentation of breast cancer is common. If nursing students themselves fail to recognize the life-saving potential of BSE, community awareness and preventive practices will remain suboptimal.

The majority of students demonstrated only “fair” or “poor” knowledge levels, indicating substantial educational gaps. This may be due to reliance on theoretical lectures without adequate practical demonstrations or follow-up assessments. Similar gaps were reported in Saudi Arabia 2022, where only 4.2% of students showed sufficient knowledge (10). Conversely, Unal and Ozdemir 2023 showed that simulation-based training significantly improved BSE knowledge and confidence (14). In Sudan, these findings reinforce the urgent need for integrating interactive and skills-based training into nursing education to prepare future nurses as both practitioners and educators.

Older students and those exposed to formal BSE education had significantly better knowledge, whereas academic year showed no effect. This suggests that maturity and targeted exposure (e.g., workshops, lectures) may play a more important role than general academic progression. On the other hand, Yadav and Jaroli 2016 reported a positive link with academic year, which was not observed here (18). In Sudan, curricula may not progressively build knowledge about BSE across academic years, which explains why year of study was not a significant factor. Instead, external training and health campaigns appear more effective.

Conclusion

This study revealed that although awareness of breast self-examination (BSE) was generally present among nursing students, correct and regular practice remained low. While most participants demonstrated adequate theoretical knowledge of the timing and frequency of BSE, their understanding of its advantages for early detection and

survival outcomes was limited. Overall, the majority of students showed only fair or poor levels of knowledge. Importantly, exposure to formal education and training on BSE significantly influenced knowledge levels, whereas academic year progression did not. These findings underscore the gap between awareness and effective practice, highlighting the need for practical, skill-based educational interventions.

Recommendations

1.Integrate structured, skill-based training modules on Breast Self-Examination (BSE) into nursing curricula.

2.Organize regular workshops and simulation-based learning activities that focus on improving students' confidence, accuracy, and adherence to BSE techniques.

3.Train nursing students not only to perform BSE themselves but also to educate patients and communities, emphasizing the importance of early detection and its impact on breast cancer outcomes.

4. Conduct further research to identify barriers to regular BSE practice and to evaluate the effectiveness of different educational interventions in improving knowledge and practice among Sudanese nursing students.

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Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this manuscript.

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