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Knowledge and Awareness of Nursing Students Regarding Breast Cancer: A Cross-Sectional Study

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A B S T R A C T

Background: Breast cancer is a widespread and significant health issue, being the most common cancer among women worldwide and a leading cause of cancer-related fatalities. Nurses are essential in the fight against breast cancer. They play critical roles in promoting awareness, educating patients, and encouraging screening. Beyond this, nurses are vital in providing direct patient care, advocating for individuals, and conducting community outreach. Their support also extends to survivorship care, significantly improving the quality of life for those affected by the disease.

Methods: A descriptive cross-sectional research design was conducted among 200 nursing students from Riyadh Elm University using a validated 14-item questionnaire measuring knowledge and awareness. The instrument demonstrated good reliability (Cronbach's α=0.745). Data were analyzed via SPSS v23, employing descriptive statistics and Chi-square tests ($p \leqslant 0.05$).

Results: Nursing students were moderately knowledgeable on breast cancer (64.93%) and moderately aware on breast cancer (61.14%). However, the respondents has low knowledge in prevention with only 49.5% that falls below the 60% threshold for low knowledge and less aware on the prognosis of the disease having 46.5% only. Chi-square tests revealed a significant differences in knowledge across age (p=0.001), and gender (p=0.010). However, a no significant trend on nursing level to higher knowledge (p=0.163).

Conclusion: The nursing students possess a moderate overall understanding of breast cancer where prevention is notably lacking needing targeted educational intervention. There are substantial gaps in their awareness regarding the prevalence, incidence, prognosis, and treatment modalities of the disease. Age and gender are significant factors influencing knowledge about breast cancer. Specifically, young adults aged 20-21 tend to have the highest level of understanding, and there's a noticeable gap where females generally possess more knowledge than males.

Keywords: awareness, breast cancer, early detection, knowledge, nursing students, patient education, risk factors

1. Introduction

Breast cancer, a common malignancy affecting both women and men, is the most prevalent cancer among women globally and a major cause of cancer-related deaths (Benjamin et al., 2017). Originating in the breast's ducts or lobules, it can metastasize via the lymphatic system or bloodstream if not caught early, highlighting the importance of prompt detection through screening methods like mammograms and clinical exams (Chapman et al., 2018). Nurses are integral to promoting breast cancer awareness, education, and screening, playing critical roles in patient care, advocacy, and community outreach. They are frontline educators on risk factors, symptoms, and preventive practices, significantly enhancing early detection and treatment success (Chan et al., 2020). Moreover, nurses provide crucial support in survivorship care, improving quality of life for those affected. This study aims to assess the knowledge and awareness of nurses regarding breast cancer, which is vital for reducing risk and improving patient outcomes.

Breast cancer remains a formidable global health challenge, representing the most frequently diagnosed cancer among women worldwide and a leading cause of cancer-related mortality (WHO, 2022). Despite significant advancements in medical treatments, early detection and timely intervention continue to be the cornerstone of improved patient outcomes and reduced mortality rates (American Cancer Society, 2025). The stark reality of its increasing incidence, even in regions like Saudi Arabia where it is the most common cancer among women, underscores the critical need for heightened awareness and effective public health strategies (Alsayer et.al., 2024).

Nurses, as the largest segment of the healthcare workforce, play a pivotal and multifaceted role in the fight against breast cancer. Their responsibilities extend far beyond clinical care, encompassing crucial areas such as patient education, promotion of screening practices, early detection, and providing

comprehensive emotional and psychological support to patients and their families (St Vincent's Private Hospitals, 2025; Al-hamad et.al.,2024). Nurses are often the first point of contact for individuals seeking health advice and are uniquely positioned to disseminate vital information about breast cancer risk factors, signs and symptoms, and the importance of regular self-examinations and clinical screenings. Their direct interaction with the community makes them instrumental in shaping public health behaviors and dispelling common misconceptions that may hinder early diagnosis.

Given this indispensable role, it is imperative that nursing students, as the future generation of healthcare providers, possess a robust and comprehensive understanding of breast cancer. Their foundational knowledge and awareness acquired during their academic training will directly influence their ability to effectively educate and empower patients, advocate for preventive measures, and contribute to timely diagnoses in their professional careers. A lack of adequate knowledge among nursing students could translate into missed opportunities for early detection and suboptimal patient education, ultimately impacting public health outcomes.

Existing literature highlights varying levels of breast cancer knowledge among healthcare students, including those in nursing programs, across different regions. While some studies indicate a general awareness of breast cancer symptoms, there can be significant gaps regarding specific risk factors, non-lump symptoms, and the correct practice of self-examination (Mehmood, 2025; Al-Hamad, et.,al., 2024). For instance, research conducted in Saudi Arabia has revealed that while nursing students may exhibit moderate to high levels of general breast cancer knowledge, specific deficiencies in areas like breast self-examination (BSE) practice and awareness of certain risk factors persist (Abolfotouh, 2012; Al-Hamad, 2024). These findings underscore the continuous need for targeted educational interventions within nursing curricula to enhance competency and confidence in breast cancer education.

Therefore, this research aims to assess the current knowledge and awareness of nursing students regarding breast cancer. By identifying potential knowledge gaps and areas requiring further emphasis in their education, this study seeks to contribute to the development of more effective and targeted educational programs. Ultimately, a well-informed and aware nursing student population is crucial for strengthening breast cancer prevention and control efforts, leading to improved early detection rates and better health outcomes for communities. This study will provide valuable insights into the preparedness of future nurses to tackle the challenges posed by breast cancer.

1.1 Research Objectives

This study aims to assess the level of knowledge and awareness among nursing students regarding breast cancer. Specifically, it sought to answer the following objectives:

1. To identify the background information of the nursing students in terms of

    1.1. Age

    1.2. Gender

    1.3 Nursing level

2. To assess the level of knowledge among nursing students about breast cancer

3. To determine the level of awareness among nursing students regarding breast cancer

1.2 Hypotheses

H_1: There is no significant relationship between knowledge and awareness of nursing students regarding breast cancer.

H_2: There is no significant difference in the level of knowledge and awareness regarding breast cancer among nursing students

when grouped according to demographic profile.

2. Materials and Methods

Study Design

This study utilized quantitative-descriptive, cross-sectional research design as to assess the level of knowledge and awareness about breast cancer among nursing students at Riyadh Elm University in Riyadh City. This study uses a cross-sectional design to collect data from the student population. This approach is well-suited for the research because it allows for the measurement of students' knowledge in relation to their demographic characteristics at a single point in time.

Data Gathering Methods

In order for the researchers to conduct research, the researcher formulated a questionnaire to collect the needed information. The questionnaire composed of 3 sections with multiple choice questions in order to measure the knowledge and awareness. The first section contains the background information such as age, gender, academic level in college. The last two sections cover the 2 categories namely level of knowledge and their awareness regarding breast cancer. The scoring method follows 0 to 14 wherein 0 to 2 having not knowledgeable (NK) and 12 to 14 as having highly knowledgeable.

To ensure the validity of the questionnaire, it underwent both face and content validity checks by three experts. Additionally, it was pilot tested with 10 nursing students who weren't part of the main study. This pre-test aimed to identify any mistakes, errors, or unclear aspects of the questionnaire before its full deployment.

For reliability, the study utilized Cronbach's Alpha Coefficient for the Breast Knowledge and Awareness MCQ Instrument to assess its internal consistency. The calculated Cronbach's Alpha value was 0.745. This indicates that the survey instrument demonstrated good internal consistency, meaning its questions cohesively measure breast cancer knowledge and awareness. This value is also above the commonly accepted reliability threshold of 0.7.

Sample Characteristics

This study utilized a purposive-convenience sampling in selecting the total sample of the study. This study consists of 200 nursing students who participate in this study. Those nursing students from level 4 to level 8 were invited to participate in the study. The number of total sample of this study was computed using the The Steven K. Thompson equation in order to estimate the appropriate sample size for this study (Thompson, 2012). Given a total of 521 admitted nursing students at REU, the researchers aim for a 95% confidence level with a 5% margin of error and a 50% probability, plus an additional 20 participants. The eligibility of this study in choosing the sample includes: Inclusion- regular nursing students enrolled in Riyadh Elm University. Under Level 4,5,6,7,8 at any age, gender. Exclusion- The nursing students under level 1,2,3 as they were not exposed to adult health courses and those unwilling to participate on this study.

Survey Administration

First and foremost, the researchers made certain that all required documents and official approval letters were obtained and properly submitted. This often involves navigating institutional review boards (IRBs) or ethics committees, which scrutinize research proposals to safeguard participant rights and welfare. Obtaining these approvals is not merely a bureaucratic hurdle; it's a critical step that demonstrates adherence to ethical guidelines and legal requirements. Moreover, this study was conducted on March 31, 2024 to May 31, 2024 upon obtaining approval from the university research center. The researchers administered the research instrument using an online tool specifically the Google form with respondent's consent that was sent to them in order to achieve the purpose of this study.

Ethical Consideration

In terms of ethical considerations, the study ensures the anonymity and confidentiality of participant data and requires informed consent from all participants.

Statistical Analysis

The statistical analysis was performed using SPSS version 23.0, applying techniques such as frequency and percentage distributions for nominal categorical data, and weighted arithmetic mean for ordered categorical data. Hypotheses testing involved the chi-square test, with a significance level set at $p \leq 0.05$.

3. Results and Discussion

Table 1 Demographic Characteristics of the Study Participants (N = 200)

Variables	Category	Frequency	Percentage
Age	Less than 20 years	7	3.5%
	20-21years	97	48.5%
	22-23 years	28	14%
	24-25 years	13	6.5%
	Above 25 years old	54	27%
Gender	Female	167	83.5%
	Male	31	15.5%
Nursing Level	Level 4	39	19.5%
	Level 5	34	17%
	Level 6	15	7.5%
	Level 7	20	10%
	Level 8	92	46%

Table 1 outlines the demographic information of the 199 participants who were nursing students in the study. Most of the respondents were aged between 20 and 21 years (48.5%), followed by those aged 25 and above (27%), showing a composition of traditionally aged students and older ones, presumably those taking up nursing as a second degree or later in life. Fewer of the participants were below the age of 20 years (3.5%), indicating fewer early entrants. From a gender perspective, the majority of the sample was female (83.5%), which aligns with trends in the nursing field all over the world, with women making up the majority of health workers. Male respondents accounted for 15.5% of the total number of respondents. In terms of academic level, close to half of the subjects were at Level 8 (46%), which reflects that most were in their final year and therefore would have had high exposure to clinical training and nursing education. According to the WHO (2020), women represent approximately 90% of the global nursing workforce. The 83.5% female respondents in the study reflect this broader global pattern. Gender-related perspectives can also influence attitudes and awareness about breast health, which is relevant to this study. This was followed by Level 4 (19.5%) and Level 5 (17%), with the lowest number of students in Level 6 (7.5%). The spread across the levels of academics indicates that the sample consists of both junior and senior nursing students, giving a balanced picture for knowledge and awareness assessment concerning breast cancer. McKenna & Brooks (2021) found that a growing proportion of nursing students are mature-aged entrants who bring life experience but may require targeted academic and psychosocial support. The presence of students aged 25 and in their study reflects this trend in nursing education. In addition, Al-Dossary et al. (2017) found that students in later years of nursing education scored significantly higher in health knowledge assessments, including those involving chronic and life-threatening diseases. This supports the claim that Level 8 students likely have enhanced knowledge and awareness regarding breast cancer due to more extensive clinical and classroom exposure.

Table 2: Level of Knowledge of the Nursing Students Regarding Breast Cancer (N = 200)

Knowledge regarding Breast Cancer	**Correct**	**(n) %**	**Incorrect**	**(n) %**
Knowledge on the definition	171	85.5	29	14.5
Knowledge level on the causes	129	64.5	71	35.5
Knowledge level on the clinical manifestation	138	69	62	31
Knowledge about the risk factors	127	63.5	73	36.5
Knowledge about the screening methods	124	62	76	38
Knowledge about the prevention	99	49.5	101	50.5
Knowledge about the treatment and management	121	60.5	79	39.5
Overall Knowledge	**909**	**64.93%**	**491**	**35.07%**

Interpretations: High Knowledge: ≥ 80% correct; Moderate Knowledge: 60% - 79.9% correct; Low Knowledge: < 60% correct

Table 2 presents the extent of knowledge among the nursing students on different factors of breast cancer. The total knowledge score was 64.93%, which is classified under moderate knowledge according to the interpretation scale of the study. The highest degree of correct answers was found in the factor of breast cancer definition, with 85.5% of students getting it right, showing a high degree of comprehension in terms of knowing what breast cancer is. Knowledge, though, decreased in all other categories. The students demonstrated modest knowledge in areas like causes (64.5%), clinical presentations (69%), risk factors (63.5%), screening tests (62%), and treatment and management (60.5%). According to Ceber et al. (2010) reported that Turkish nursing students had high knowledge in defining breast cancer but showed moderate to low understanding in specific areas like risk factors and prevention. This supports the finding that definitions are often well-covered in the curriculum, while deeper clinical and preventive knowledge can lag behind. Interestingly, the lowest knowledge rate was recorded in the prevention area, with an average 49.5% of the students responding correctly. This implies a large gap in the knowledge of proactive actions and lifestyle habits that would lower the risk for breast cancer. The students had a good understanding of basic breast cancer ideas, but the results indicate that education and curriculum emphasis must be enhanced to cover prevention methods and screening routines, which are essential in early diagnosis and public health promotion. According to Azubuike et al. (2013) observed that students demonstrated better awareness of breast cancer symptoms (such as lumps or nipple discharge) but lacked deeper understanding of screening methods and underlying causes. Their average knowledge scores were consistent with the reported 60–69% range.

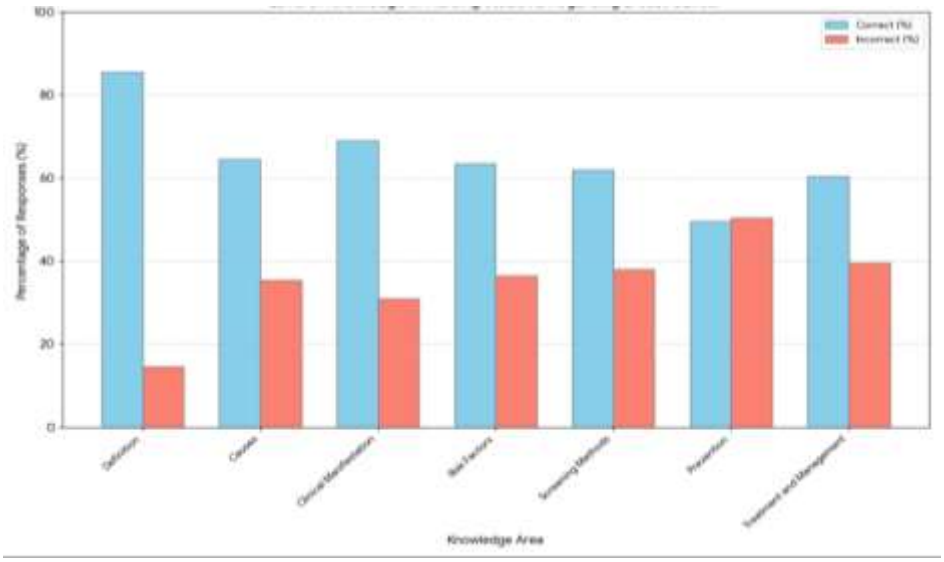

Figure 1: Knowledge level of the nursing students regarding breast cancer

The figure 1 above illustrates the percentage of correct and incorrect responses for each specific knowledge area, giving a clear visual representation of where students demonstrate stronger or weaker understanding. It is observed that nursing students demonstrate the highest level of knowledge in "Definition," with over 85% correct responses and less than 15% incorrect responses. This suggests a strong understanding of what breast cancer is. Meanwhile, the areas of prevention, this is the only area where incorrect responses (just over 50%) outweigh correct responses (just under 50%). This indicates a significant knowledge gap among nursing students regarding breast cancer prevention strategies. Overall, the findings suggest that while nursing students have a good foundational understanding of breast cancer definition, there are significant areas, particularly prevention, where their knowledge needs to be strengthened.

Table 3: Level of Awareness of the Nursing Students Regarding Breast Cancer (N = 200)

Awareness regarding Breast Cancer	**Correct**	**%**	**Incorrect**	**%**
The prevalence and incidence of breast cancer	96	48%	104	52%
The perceived susceptibility and severity	121	60.5%	79	39.5%
The early detection practices	145	72.5%	55	27.5%
The techniques and frequency of BSE	134	67%	66	33%
The common symptoms of breast cancer	158	79%	42	21%
The disease prognosis of breast cancer	93	46.5%	107	53.5%
The treatment modalities for breast cancer	109	54.5%	91	45.5%
Overall Knowledge	**856**	**61.14%**	**544**	**38.86%**

Interpretations: High Awareness: ≥ 80% correct; Moderate Awareness: 60% - 79.9% correct; Low Awareness: < 60% correct

Table 3 presents the level of awareness among nursing students regarding various aspects of breast cancer. The overall awareness score was 61.14%, which indicates a moderate level of awareness based on the study's criteria. Among the specific domains, the highest awareness was observed in the recognition of common symptoms of breast cancer, with 79% of students responding correctly. This was followed by awareness of early detection practices (72.5%) and the techniques and frequency of breast self-examination (BSE) (67%), suggesting that students are relatively well-informed in areas that relate to identifying and monitoring breast cancer signs. However, lower awareness was seen in several critical areas. Only 60.5% of students correctly identified perceived susceptibility and severity, while less than half demonstrated awareness of the prevalence and incidence (48%) and disease prognosis (46.5%) of breast cancer. Awareness of treatment modalities was also suboptimal at 54.5%. These findings highlight that while students have moderate understanding of practical aspects such as symptoms and detection, there are notable gaps in their broader awareness of epidemiology, long-term outcomes, and treatment strategies. These gaps suggest a need for targeted educational reinforcement in these areas to better prepare future nurses in delivering comprehensive breast cancer education and support to patients. According to Birhane et al. (2021) reported that while students had moderate awareness of symptoms and early detection, fewer than 60% knew about treatment options like surgery, chemotherapy, and radiation, which matches the findings and underscores the need to enhance nursing education in this area.

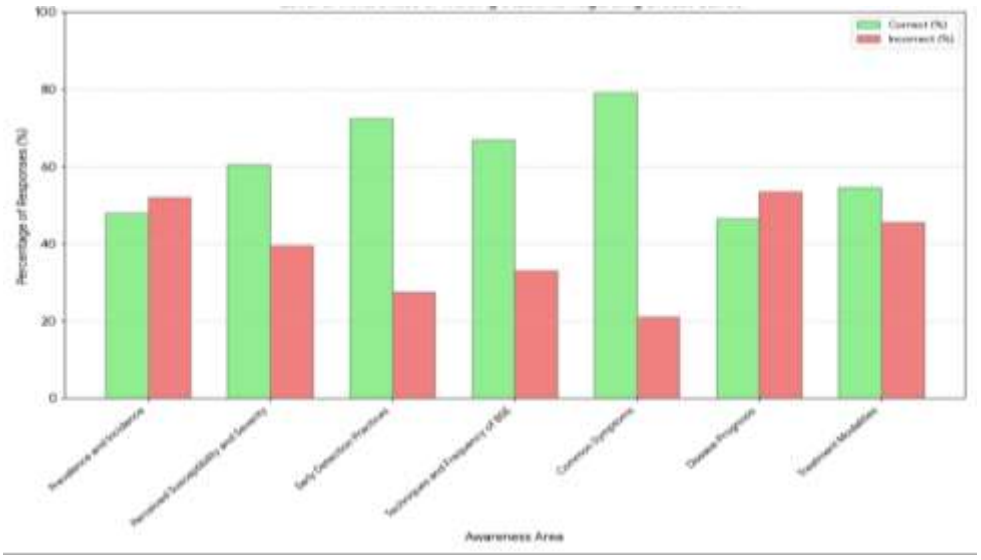

Figure 2: Awareness level of Nursing Students Regarding Breast Cancer

The figure 2 illustrates the percentage of correct and incorrect responses from nursing students across various awareness areas related to breast cancer. This represents the "Awareness Area," which includes prevalence and incidence, perceived susceptibility and severity, early detection practices, techniques and frequency of BSE (Breast Self-Examination), common symptoms, disease prognosis, and treatment modalities. Based on the results, the common symptoms show the highest awareness from the nursing students, with approximately 80% correct responses and only about 20% incorrect. This suggests a good understanding of what signs and symptoms to look for. Overall, the analysis highlights specific areas where educational interventions for nursing students could be most beneficial. While their awareness of symptoms and detection methods is commendable, there's a clear need to improve their understanding of epidemiological aspects (prevalence, incidence), disease progression (prognosis), and the various treatment options available for breast cancer.

Table 4: Relationship between Knowledge and Awareness of Nursing Students Regarding Breast Cancer

Variables	**N**	**X^2**	**p-value**	**Level of significance**	**Results**	**Interpretation**
Knowledge vs Awareness	200	4.8032	0.005	0.05	Reject the null hypothesis (H_1)	Statistically significant

There is a statistically significant positive correlation between the levels of knowledge and awareness among nursing students for breast cancer. This indicates that as the students' knowledge on breast cancer improves, their disease awareness also improves. The result of the chi-square test ($X^2 = 4.8032$) gave a p-value of 0.005, which is smaller than the established level of significance (0.05). Thus, we reject the null hypothesis that assumed there is a correlation between awareness and knowledge. This finding suggests that students who have better knowledge of breast cancer—e.g., its causes, risk factors, signs and symptoms, and preventive strategies are more likely to know about the disease in actual clinical and practical settings. Therefore, educational interventions aimed at improving knowledge will also have a corresponding effect on awareness.

Table 5: Chi-Square Test Analysis of Knowledge and Awareness Levels regarding Breast Cancer across Demographic Profile

Variables	**Category**	**N**	***X^2***	**Significance level**	***p*-value**	**Results**	**Interpretation**
Age	Less than 20 years	7	3.114	0.05	0.001	Reject the null hypothesis (H_2)	Statistically significant
	20-21years	97					
	22-23 years	28					
	24-25 years	13					
	Above 25 years old	54					
Gender	Female	167	5.617	0.05	0.010	Reject the null hypothesis (H_2)	Statistically significant
	Male	31					

Nursing Level	Level 4	39	1.1702	0.05	0.163	Accept the null hypothesis (H_2)	Not statistically significant
	Level 5	34					
	Level 6	15					
	Level 7	20					
	Level 8	92					

The table 5 shows the analysis of knowledge levels regarding breast cancer across demographic profile using chi-square test. According to age, since the p-value (0.001) is much less than the significance level (0.05), there is a statistically significant association between age and knowledge/awareness levels regarding breast cancer. This suggests that breast cancer knowledge varies significantly across different age groups in this sample. Several studies have reported that older individuals, especially women, tend to have higher knowledge about breast cancer. This is often attributed to increased exposure to public health campaigns, greater personal relevance as they age, and more frequent interactions with healthcare providers for screening and general health check-ups. In the study of Al-Amer et al. (2017) about young women in Jordan, it was revealed that even within a young cohort, age could influence knowledge, with older participants generally having more awareness. For Abolfotouh et al. (2015) who focus on health sciences students in Saudi Arabia, their study demonstrated varying levels of knowledge across different age groups, suggesting that even among those with health education, age remains a factor.

In terms of gender, since the p-value (0.010) is less than the significance level (0.05), there is a statistically significant association between gender and knowledge/awareness levels regarding breast cancer. This indicates that breast cancer knowledge differs significantly between males and females. Numerous studies across diverse geographical regions and populations have robustly demonstrated that gender is a significant determinant of breast cancer knowledge/awareness. This difference is consistently statistically significant, indicating that it is not merely due to chance but reflects actual variations in knowledge levels between males and females. For instance, a systematic review by Omani et al. (2021), which synthesized findings from studies on university students in the Arabian Gulf found that female students consistently outperformed their male counterparts in breast cancer knowledge assessments. This pattern is not limited to student populations. Elshami et al. (2020), in a study among health workers in Saudi Arabia, also observed a statistically significant difference, with female health workers showing higher knowledge levels regarding breast cancer screening compared to males, even within a professionally informed group.

Lastly, the nursing academic levels of this study shows that since the p-value (0.163) is greater than the significance level (0.05), there is no statistically significant association between nursing level and knowledge/awareness levels regarding breast cancer. This means that there is no significant difference in breast cancer knowledge among individuals at different nursing levels. While some studies might expect knowledge to incrementally increase with higher educational attainment or professional experience, the absence of a significant difference in nursing levels is not without precedent in the literature. Studies examining the knowledge of nursing students often highlight that critical health information is part of the basic curriculum. For instance, Abolfotouh et al. (2015), in their study among health sciences students (including nursing students), demonstrate that while overall knowledge levels varied, the fundamental concepts of breast cancer are broadly covered, suggesting that a baseline competence is expected. If the knowledge assessment primarily targets these foundational elements, significant differences across levels might not emerge. Similarly, Al-Amer et al. (2013), though focusing on general university students, implicitly supports that formal education provides a core set of knowledge that could be consistently present across individuals who have completed specific educational modules on health.

Discussion

This study aimed to assess the nursing students' knowledge and awareness regarding breast cancer. Many studies, particularly those focusing on broader age ranges, often report an increase in breast cancer knowledge with age, especially as women approach screening ages (e.g., in their 40s and beyond), due to increase exposure to health information and personal relevance (Al-Amer et al., 2017; Parsa et al., 2013). This is largely because older age groups are more likely to engage with formal healthcare systems and receive targeted awareness messages. Similarly, the present study revealed a statistically significant association between age and knowledge levels regarding breast cancer ($\chi2=3.114$, $p=0.001$). This indicates that breast cancer knowledge varies significantly across different age groups. Interestingly, the findings suggest a peak in knowledge among the 20-21 years old age group, with both younger (less than 20 years) and older (22-23, 24-25, and above 25 years old) participants demonstrating comparatively moderate levels of knowledge.

However, the observed peak in the 20-21 age groups aligns with literature suggesting that university students or young adults often demonstrate higher levels of health literacy on specific topics due to recent educational exposure. For instance, undergraduate nursing students are actively engaged in health-related curricula where breast cancer awareness, risk factors, and screening methods are often integral components (Abolfotouh et al., 2015; Al-Dubai et al., 2012). Their active learning environment and direct access to current medical information could contribute to a higher, more consolidated knowledge base compared to individuals outside of such a focused academic setting.

Moreover, the current study found a statistically significant association between gender and knowledge levels regarding breast cancer ($\chi2=5.617$, $p=0.010$). This indicates that breast cancer knowledge differs significantly between males and females in the study sample. Specifically, consistent with prevailing trends in breast cancer awareness studies, females demonstrated higher levels of knowledge, while males exhibited moderate knowledge. This finding is highly congruent with a vast body of international and regional literature. Numerous studies have consistently reported that females possess

greater awareness and understanding of breast cancer compared to males (e.g., Omani et al., 2021; Al-Dossary et al., 2010; Elshami et al., 2020). This enduring difference can be attributed to some well-documented factors such as personal relevance and perceived risk where breast cancer is overwhelmingly a disease affecting women, making it an issue of direct and significant personal relevance to them. This inherent risk typically drives women to more actively seek, process, and retain information about the disease, including risk factors, symptoms, and screening methods (Abas et al., 2013). Conversely, men, due to the rarity of male breast cancer, often perceive their personal risk as negligible, leading to lower engagement with breast health information. Also, the Healthcare-seeking behaviours wherein women generally engage more frequently with healthcare services, particularly for routine check-ups, gynecological screenings, and reproductive health concerns. These interactions provide more frequent opportunities for healthcare professionals to educate women on breast health. Men, on the other hand, tend to access healthcare less frequently for preventive purposes, thus reducing their exposure to such educational opportunities (Omani et al., 2021).

The male possess a moderate level of knowledge is particularly noteworthy, distinguishing it from studies that might report very low or negligible knowledge among men. This moderate level suggests that while males may not be as informed as females, there is a foundational level of awareness. This potentially stem from indirect exposure as men often have female relatives (mothers, wives, sisters, daughters) who have experienced or are at risk of breast cancer, leading to indirect exposure to information through family discussions or personal observation.

Lastly, it was found that no statistically significance between nursing level and knowledge levels regarding breast cancer (χ 2 =1.1702, p=0.163). This indicates that there is no significant difference in breast cancer knowledge/awareness among individuals across different nursing levels (Level 4, Level 5, Level 6, Level 7, and Level 8) within the sampled population. This finding suggests that breast cancer knowledge may be uniformly acquired or maintained across different stages of nursing training, rather than incrementally increasing with each defined "level." While some studies have shown that nursing students with more experience or higher nursing levels can possess higher levels of health knowledge (as their education progresses), many others, particularly in specific contexts, also report no significant difference, suggesting a foundational knowledge base that is consistently maintained (Elshami et al., 2020; Al-Mufty & Al-Azawi, 2019). The current finding aligns with the notion that a core competency in breast cancer knowledge is established early and sustained, irrespective of higher levels within the nursing hierarchy, at least as measured by this study.

4. Conclusion

It is concluded that age and gender play significant roles in shaping breast cancer knowledge, with a peak among early young adults (20-21 years) and a clear disparity favouring females. While a consistent baseline of knowledge appears to exist across different nursing levels, the findings highlight critical areas for targeted public health interventions to enhance breast cancer awareness across all age groups and to specifically bridge the knowledge gap that persists among males.

Recommendations

Based on the study's findings, the following recommendations are proposed to enhance breast cancer awareness and knowledge:

1. Designing a Breast Cancer Awareness Program for different age groups that focus on basic facts, the importance of early awareness, and dispelling myths, even if perceived personal risk is low.

2. Tailored a Male Inclusive Breast Cancer Education Strategies that will incorporate to men's' health education to enhance their men's health initiative.

3. Similar study should be conducted in a greater number of nursing student's population to generalize the findings of the study.

4. Reinforcement of Breast Cancer Knowledge across All Nursing Levels which can be done thru continuing topics discussion, integration into clinical practice in daily clinical interactions.

5. Conduct qualitative studies to understand the reasons of having knowledge peaks in the 20-21 group and moderates in others and explore sources of information, perceived barriers to knowledge acquisition, and attitudes towards breast cancer in each age segment.

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Author Contribution

All authors contributed to the study conception and design. Material reparation, data gathering and analysis were performed by all authors. All authors read and approved the final manuscript.

Conflict of interest

No authors of this paper have any conflicts of interest to declare.

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