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Original Research Article

A cross-sectional study on breast cancer awareness among female students in Al-Rayan colleges in Al Medina Al Munawara

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ABSTRACT

Background: This study aims to evaluate breast cancer awareness among AL-Rayan colleges female students in Al Medina Al Munawara
Methods: A cross-sectional study was conducted among 291 female students from Al-Rayan medical colleges in Al Medina Al Munawara, Saudi Arabia. Data was collected through an Arabic version of the modified breast cancer awareness measure (Breast CAM) version 2 which is a validated and reliable then administered online and distributed via social media platforms. Analysis was done by IBM SPSS version 28 and involved descriptive statistics, including frequency distributions and percentiles, while factors associated with awareness levels were analyzed using Kruskal-Wallis test and Mann-Whitney test
Results: The participants' mean awareness level was 17.2±7.5 out of 31, out of the total participants 52.6% had a poor awareness level. Out of the participants surveyed, only 42.6%, accurately understood the recommended frequency of conducting self-examinations each month, as secondary prevention only 33% of participants were aware of the best time to start mammography. Only a limited percentage of participants (37.8% and 47.1% respectively) demonstrated knowledge of early menopause and late menopause as potential contributing factors. There was a significant relationship between awareness level and age (p=0.001) and academic year (p=0.001).
Conclusions: The findings highlight the importance of continued efforts to educate and raise awareness about breast cancer and its early detection methods among young women. the study demonstrated varying levels of understanding among participants. The overall knowledge assessment indicated that a considerable proportion of participants had moderate knowledge of breast cancer.

Keywords: Prevention, Risk factors, Screening, Knowledge, Cancer education, Al Medina Al Munawara

INTRODUCTION

Breast cancer is one of the most common cancers in women worldwide, in 2020 the world health organization (WHO) determined there were about 2.3 million women diagnosed with breast cancer and 685,000 deaths globally.[1] According to the Saudi cancer registry of the king Faisal specialist hospital and research center, around 930 new cases of breast cancer are diagnosed each year in Saudi Arabia.[2] In 2010, out of 5,378 cancer diagnoses in Saudi Arabia, 1,473 (27.4%) were in the breast, making it the most common newly diagnosed cancer among

women.[3] The primary and secondary prevention of breast cancer may help to decrease morbidity and mortality.[4] Regarding risk factors, the most important risk factor for having breast cancer is being a woman, and 5-10% of cases have a genetic predisposition to breast cancer. A first-degree family (sister, mother, or daughter) who has breast cancer doubles the risk. Other risk factors that may contribute to breast cancer include increased age, obesity, hormonal variables, radiation exposure, hazardous alcohol consumption, cigarette use, and race/ethnicity.[5] Morbidity and mortality of breast cancer could be reduced by primary prevention like lifestyle modifications and avoiding exposure to established risk factors (such as losing weight, exercise, etc.). Also, Secondary prevention promotes the early diagnosis of cancers or abnormalities predisposing to tumors which includes screening procedures (such as mammography, ultrasonography, magnetic resonance imaging, breast self-examination (BSE), as well as contemporary and more precise imaging technologies).[6]

Looking at the previous literature, in 2018 A cross-sectional study was conducted in Riyadh, Saudi Arabia to analyze women's current knowledge and habits about breast self-examination and mammography screening. The findings revealed that 54% were aware of breast cancer and breast self-examination, and only 62% knew how to perform a self-examination.[7] Similarly, another study conducted among females in Al-Qassim region in 2018, showed Only one in four females had undergone a clinical breast examination and a mammogram, and only 317 (61.1%) had good knowledge, compared to 202 (38.9%) who had poor knowledge.[8] Interestingly, Alqarni et al 2023 conducted A cross-sectional among females in Jeddah city and found that most of the participants were aware of breast cancer (94.9%) but 92% of the participants had low knowledge. Approximately 37% of the participants in the study believed that the reason for performing breast self-exams was based on the recommendation of a healthcare professional and only a few participants practiced routine examinations (37.3%).[9] So based on the previous literature, we are looking in our research to address important gaps in knowledge and practices and meet the need for increased awareness and practice of self-examination to reduce the stigma surrounding breast cancer. We aim to assess their knowledge of risk factors, signs and symptoms, prevention strategies, and the significance of early detection through screening and self-examination.

Objectives

Primary objective

Primary objectives were to assess the knowledge of AL-Rayan colleges female students in Al Medina Al Munawara regarding breast cancer risk factors, signs and symptoms, prevention strategies, and the significance of early detection through screening and the self-examination.

Secondary objectives

Secondary objectives were to assess and evaluate the awareness and understanding of breast cancer risk factors among AL-Rayan colleges female students in Al Medina Al Munawara. Additionally, the study aims to explore their knowledge of the signs and symptoms of breast cancer. Finally, the research intends to explore the sociodemographic factors associated with the overall awareness level of breast cancer among these students.

METHODS

Study design and study settings

The study is a cross-sectional survey based includes 291 students from Al-Rayan medical colleges: in Al Medina Al Munawara, Saudi Arabia. The study started from December 2022 to April 2023.

Study population and sampling procedure

The study's population consisted of 291 female students from different Academic years and health disciplines in AL-Rayan colleges in Al Medina Al Munawara, Saudi Arabia. A convenience sample was recruited for this study’s purposes. The questionnaires have been sent using different social media platforms (WhatsApp, LinkedIn, Facebook, and Instagram).

Inclusion criteria

This research study will target female undergraduate students aged 18 years or older, who are enrolled at AL-Rayan colleges in Al Medina Al Munawara, and who are willing to participate in the study and provide informed consent.

Exclusion criteria

Firstly, male students will be excluded from participation as the study specifically targets female participants. Additionally, individuals below the age of 18 will not be included in the study. Lastly, participants who expressed their willingness to take part in the study and provided informed consent.

Sample size

Out of 1112 students enrolled at AL-Rayan colleges in Al Medina Al Munawara, the study sample was determined by the Raosoft calculator. keeping a response distribution of 50%, margin of error of 5%, and confidence level of 95%, the calculated sample size was 286.

Data collection

All data was collected using a validated and reliable online questionnaire from the previous study which is an Arabic version of the modified breast cancer awareness

measure (Breast CAM) version 2 (Cancer research United Kingdom, King's college London and university college London, 2009), then administered through a Google online survey and consisted of 36 items.[3] The first part includes specific demographic questions made up the first section involved age, education level, major discipline, residential location, and marital status. The second section addressed questions about the ideal time to get a breast examination. While the third section address breast cancer symptoms and signs. The fourth domain which includes the risk factors was further divided into three sub-domains The first sub-domain includes risk factors related to the history of breast cancer and benign diseases, exposure to radiation, and use of medication, the second sub-domain comprised of hormonal risk factors, and the third sub-domain include the risk factors related to physical activities and lifestyle.

Data analysis

Once the data was extracted, it was reviewed, coded, and input into IBM SPSS version 28 for statistical analysis. All statistical tests used were two-tailed, and a $p<0.05$ was considered to be statistically significant. To determine participants' level of awareness regarding Breast cancer, an overall score was calculated by adding up the scores for each item. for each participant, each question regarding breast cancer screening tools and timing was given one point for a correct response as shown in the table, While the rest of the questions were given one point for a correct response (Yes) and zero points for an incorrect answer (No). Participants who scored less than 60% of the maximum score were classified as having a poor awareness level, while those who scored 60% or more were classified as having a good awareness level. Descriptive analysis was performed using frequency and percent distributions for all variables, including participants' demographic information, discipline, and residence Also to Investigate the Screening, signs, symptoms, and risk factors of breast cancer. Additionally, participants' knowledge and awareness regarding breast cancer were tabulated, and their overall awareness levels were graphed. To assess factors associated with participants' awareness level about breast cancer, Kruskal-Wallis Test and Mann-Whitney Test was used, Statistical collinearity was performed using the Shapiro-Wilk test and the Kolmogorov-Smirnov test. The awareness score was deemed abnormal distribution. Therefore, the non-parametric tests were applied.

Ethical considerations

This study was conducted in accordance with the ethical guidelines set forth by the declaration of Helsinki. The study protocol was ethically approved by the institutional review board (IRB) AL-Rayan colleges in Al Medina Al Munawara, Saudi Arabia. The study posed no minimal risk to the study participants Additionally, the study did not involve any invasive procedures. Accordingly, after the objective of the study was explained, informed consent was obtained from all participants. Moreover, confidentiality of the participant's personal and medical information will be strictly maintained throughout the study using anonymous identifiers and by keeping the data locked.

RESULT

The data reveals that 188 participants, which accounts for the majority at 64.6%, fell within the age range of 18 to 22 years. Regarding marital status most participants 259 (89.0%) were single. When considering the major discipline, it was found that the highest percentage of participants, 171 (58.8%), were studying Medicine, followed by pharmacy with 37 (12.7%), nursing with 55 (18.9%), and Anesthesia with 24 (8.2%). In terms of academic level, 109 (37.5%) participants were in levels 1-4, 112 (38.5%) were in levels 5-8, and 70 (24.1%) were in levels 9-12. Most participants, 276 (94.8%), resided within Al-Madina Al-Munawarah (Table 1).

Table 1: Sociodemographic data of study participants.

Variables	N	Percentages (%)
Age (in years)		
18-22	188	64.6
23-25	77	26.5
26 and older	26	8.9
Marital status		
Single	259	89
Married	32	11
Major discipline		
Medicine	171	58.8
Pharmacy	37	12.7
Nursing	55	18.9
Anesthesia	24	8.2
Laboratory	4	1.4
Academic level		
Levels 1-4	109	37.5
Levels 5-8	112	38.5
Level 9-12	70	24.1
Place of residency		
In Al-Madina Al-Munawarah	276	94.8
Outside Al-Madina Al-Munawarah	15	5.2

Awareness level of breast cancer screening tools and timing

Generally, the participants' awareness level regarding breast cancer screening tools and timing was found with a mean score of 2.3, and a standard deviation of 1.2, out of 5 scores. When considering the best time to start breast self-examination, the majority of participants (203, 69.8%) believed it should begin after 20 years of age. Regarding the breast exam conducted by a doctor, 96 (33.0%) believed it should start after 20 years. When

considering starting mammography, only 96 (33.0%) after 40 years. In terms of the best time to perform breast self-exam within menstrual cycle, most believed it should be done after 1 week (162, 55.7%). As for frequency of breast cancer self-examination, only 124 (42.6%) believed it should be done every month (Table 2).

Table 2: Awareness level of breast cancer screening tools and timing.

Variables (In years)	N	Percentages (%)
When is the best time to start breast self-examination?		
After 20*	203	69.8
After 30	63	21.6
After 40	25	8.6
When is best time to start breast exam by doctor?		
After 20*	96	33
After 30	127	43.6
After 40	68	23.4
When is the best time to start mammography?		
After 20	85	29.2
After 30	110	37.8
After 40*	96	33
When is the best time to do a breast self-examination in the menstrual cycle? (In weeks)		
After 1*	162	55.7
After 2	92	31.6
After 3	37	12.7
How often should a breast cancer self-examination be performed? (Months)		
Every month*	124	42.6
Every 3	85	29.2
Every 6	82	28.2

*Correct answer

Awareness level regarding signs and symptoms of breast cancer

The mean awareness level regarding signs and symptoms of breast cancer among the participants is 5.4, with a standard deviation of 3.2 out of 9 scores, among the participants, it was observed that 42.6% (124 individuals) were unaware that pulling the nipple inward could be a sign of breast cancer. Similarly, 45.4% (132 individuals) were unaware of a wound around the nipple being a potential sign of breast cancer. In terms of the redness of the breast skin, 44.3% (129 individuals) did not possess the knowledge to recognize it as a possible indication of breast cancer (Table 3).

Awareness level regarding potential hormonal risk factors of breast cancer

The results indicate that the mean awareness level is 3.39±2.3, out of 7 scores. The result showed regarding the use of oral contraceptive pills for more than 5 years, 135 (46.4%) participants were unaware that it could be a potential risk factor for breast cancer. Similarly, in terms of hormone therapy after menopause, 117 (40.2%). When considering the age of menstruation, only 37.8% (110 participants) were aware that starting menstruation before the age of 12 could be a potential risk factor for breast cancer, while only 47.1% (137 participants) recognized that late menopause (after the age of 55) could also be a potential risk factor for breast cancer. Interestingly, 117 (59.8%) participants were unaware that giving birth for the first time after age 30 could be a potential risk factor for breast cancer (Table 4).

Awareness level regarding inherited and acquired risk factors of breast cancer

Regarding awareness of inherited and acquired risk factors shows a mean score of 2.3±1.7, out of 4 scores. Concerning the history of breast cancer in a first-degree relative, 179 (61.5%) participants were aware that it could be a potential risk factor for breast cancer. Similarly, in terms of the history of benign breast disease, 162 (55.7%) participants were aware that it could be a potential risk factor for breast cancer. When considering high radiation to the chest or breast in childhood or adolescence (radiation therapy), 128 (44.0%) participants were unaware that it could be a potential risk factor for breast (Table 5).

Table 3: Awareness level of breast cancer screening tools and timing.

Variables	N	Percentages (%)
Painless and palpable breast lump		
No	113	38.8
Yes*	178	61.2
Painless mass under the armpit		
No	113	38.8
Yes*	178	61.2
Bleeding or discharge from the nipple		
No	106	36.4
Yes*	185	63.6
Pulling of the nipple inward		
No	124	42.6
Yes*	167	57.4
Wound around the nipple		
No	159	54.6
Yes*	132	45.4
Redness of the breast skin		
No	129	44.3
Yes*	162	55.7
Abrupt changes in the size of the breast		
No	90	30.9
Yes*	201	69.1
Abrupt changes in the shape of the breast		
No	88	30.2
Yes*	203	69.8
Puckering or dimpling in breast skin		
No	112	38.5
Yes*	179	61.5

*Correct answer

Table 4: Awareness level regarding potential hormonal risk factors of breast cancer.

Variables	N	Percentages (%)
Use oral contraceptive pills for more than 5 years		
No	135	46.4
Yes	156	53.6
Hormone therapy after menopause		
No	117	40.2
Yes	174	59.8
Started menstruating before age 12 years		
No	181	62.2
Yes	110	37.8
Late menopause (after age 55 years)		
No	154	52.9
Yes	137	47.1
Giving birth for the first time after age 30 years		
No	174	59.8
Yes	117	40.2
Not having a childbirth experience		
No	156	53.6
Yes	135	46.4
Lack of breastfeeding		
No	135	46.4
Yes	156	53.6

Table 5: Awareness level regarding inherited and acquired risk factors of breast cancer.

Variables	N	Percentages (%)
History of breast cancer in the first-degree relative		
No	112	38.5
Yes	179	61.5
History of benign breast disease		
No	129	44.3
Yes	162	55.7
High radiation to the chest or breast in childhood or adolescence (radiation therapy)		
No	128	44
Yes	163	56
Having a personal history of breast cancer		
No	112	38.5
Yes	179	61.5

Awareness level regarding association between poor physical activities and unhealthy lifestyle and breast cancer

Results indicate that mean awareness level is 3.6±1.9, out of 6 scores. Regarding overweight and obesity (BMI>25), 133 (45.7%) participants were unaware that it could be associated with increased risk of breast cancer. In Contrast, in terms of smoking or alcohol consumption in past/present, 188 (64.6%) participants were aware that it could be associated with increased risk of breast cancer. When considering stress as a potential risk factor, 166 (57%) participants were aware that it could be associated with increased risk of breast cancer. Additionally, 175 (60.1%) participants aware that high consumption of fatty food could be associated with an increased risk of breast cancer, while 162 (55.7%) participants aware that low consumption of vegetables and fruits could be associated with increased risk of breast cancer (Table 6).

Table 6: Awareness level regarding the association between poor physical activities and unhealthy lifestyle and breast cancer.

Variables	N	Percentages (%)
Overweight and obesity (BMI >25) (Kg/m^2)		
No	133	45.7
Yes	158	54.3
Smoking or alcohol consumption in past or present		
No	103	35.4
Yes	188	64.6
Stress		
No	125	43
Yes	166	57
High consumption of fatty food		
No	116	39.9
Yes	175	60.1
Low consumption of vegetables and fruits		
No	129	44.3
Yes	162	55.7
Low physical activity		
No	80	27.5
Yes	211	72.5

Overall awareness level of breast cancer among Al-Rayan colleges female students in al medina Al Munawara

The overall awareness level of the participants was evaluated on a scale of 0 to 31, with 0 being lowest score possible. The analysis revealed that the mean awareness level was 17.2, with a standard deviation of 7.5, Out of the total participants, 52.6% (153 students) were having a poor awareness level. On the other hand, 47.4% (138 students) were having a good awareness level (Figure 1).

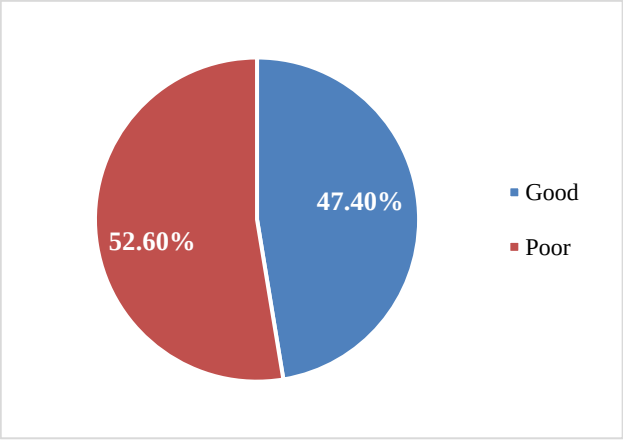

Figure 1: Overall awareness level of breast cancer among AL-Rayan colleges female students in Al Medina Al Munawara.

Sociodemographic factors associated with the overall awareness level of breast cancer

The data shows that participants in the age group of 18-22 years have a lower awareness level compared to those in the age groups of 23-25 years and 26 years and older (p≤0.001). Regarding, the major discipline also exhibits a significant association with the awareness level of breast cancer, as indicated by a p<0.001. Furthermore, academic level shows a significant association with the overall awareness level of breast cancer, with a p<0.001. Participants in higher academic levels (levels 5-8 and 9-12) demonstrate a higher level of awareness compared to those in lower academic levels (levels 1-4). On the other hand, marital status and place of residency do not appear to have a significant association with the overall awareness level of breast cancer (Table 8).

Table 8: Sociodemographic factors associated with the overall awareness level of breast cancer.

Variables	Overall awareness level of breast cancer				P value
	Poor		Good		
	N	%	N	%	
Age [b] (In years)					
18-22	114	74.5	74	53.6	<0.001 [a]
23-25	27	17.6	50	36.2	
26 and older	12	7.8	14	10.1	
Marital status [c]					
Single	135	88.2	124	89.9	0.660
Married	18	11.8	14	10.1	
Major discipline [b]					
Medicine	69	45.1	102	73.9	<0.001 [a]
Pharmacy	33	21.6	4	2.9	
Nursing	32	20.9	23	16.7	
Anesthesia	15	9.8	9	6.5	
Laboratory	4	2.6	0	0	
Academic level [b]					
Levels 1-4	73	47.7	36	26.1	<0.001[a]
Levels 5-8	60	39.2	52	37.7	
Level 9-12	20	13.1	50	36.2	
Place of residency [c]					
Al-Madina Al-Munawarah	144	94.1	132	95.7	0.555
Outside Al-Madina Al-Munawarah	9	5.9	6	4.3	

a=Implies significance, b=Kruskal-Wallis test, c=Mann-Whitney test.

DISCUSSION

Breast cancer is a significant public health concern worldwide, and raising awareness about its early detection and prevention is crucial. This cross-sectional study aims to assess the level of breast cancer awareness among female students in AL-Rayan colleges in Al Medina Al Munawara. It is crucial to evaluate the present awareness and application of BSE in diverse groups with recent national attempts to do so through massive campaigns in many different Saudi cities.[10,11]

In the current study, approximately 69.8% of the participants indicated that the optimal age to begin performing breast self-exams (BSE) was after the age of 20. Moreover, 55.7% of respondents mentioned that the first week of their menstrual cycle was the ideal time for the examination. Additionally, 42.6% of participants believed that BSE should be conducted on a monthly basis. Furthermore, 33% of the respondents expressed a preference for having a healthcare professional examine them after reaching the age of 20. Similar findings were reported by another survey among Female Students from Najran University, their work demonstrated that the majority of responders were informed about BSE (75%) of people are aware of breast self-examination.[12] Furthermore, only (33%) of survey participants were aware that mammograms should be started as a screening technique after the age of 40 years for the early identification of breast cancer, which indicates that understanding of this topic is insufficient. Interestingly this percentage is higher than those reported from Kuwait (22.9%) by Saeed et al and higher in Saudi Arabia (44.2%) by Al-Wassia et al.[13,14] Despite being a quick, easy, and cost-free procedure, BSE is not frequently used and varies from country to country. Lack of time, low self-confidence in one's ability to conduct the method correctly, worry of finding a lump, and shame related to breast manipulation.[15] Adult women have engaged in BSE to a reasonable extent, but most of them tend to ignore true BSE either owing to a lack of knowledge or a failure to recognize the significance of the test. Studies indicate that the mammography examination was the least important breast assessment, nonetheless, many ladies claimed it was pricey, while others claimed it was an inconvenient examination.[16,17] This emphasizes how crucial it is to raise awareness about BSE as a low-cost screening test before mammography.

Regarding awareness of breast cancer warning signs and symptoms, Abrupt changes in the shape of the breast were the most frequently identified sign of breast cancer by participants (69.8%). Also, they were aware of other breast cancer warning signs such as bleeding or discharge from the nipple (63.6%), painless and palpable breast lump (61.2), painless mass around the armpit (61.2%) changes in the size of breast or nipple (69.1%) pulling in the nipple (57.4%), redness of the breast skin (55.7%) and puckering or dimpling in breast skin (61.5%). In addition, knowledge of other signs of breast cancer was limited as only a few students knew about the chance of occurring wound around the nipple (45.4%). Our results are in agreement with the study of Saudi women in Jeddah indicate inadequate knowledge of signs.[3] The most common breast cancer sign recognized by the participants was a breast lump (50.5%). Other breast cancer symptoms recognized by participants included bleeding or discharge from the nipple (47.0%), dimpling of the

breast skin (38.5%), changes in the size of the breast or nipple (37.5%), and pulling in the nipple (36%).

Regarding knowledge level of potential hormonal risk factors, the most identifiable risk factor of breast cancer was using hormonal therapy after menopause (59.8%), recognizing a lack of breastfeeding, and using oral contraceptives for more than five years as risk factors were similar (53.6%). On the opposite, the knowledge level of the risk factors revealed a concerning trend in terms of Realizing starting menstruation before the age of 12 is a risk factor (37.8%) and also late menopause (after age 55) (47.1%) Additionally, (59.8%) of participants were not aware that giving birth for the first time after age 30 could be a potential risk factor for breast cancer, also not having a childbirth experience (53.6%). Similar to our findings with a lower awareness level, participants recognized several potential risk factors such as hormonal replacement therapy (35.5%), having children later on in life or not at all (23%), Early menarche (17%), late menopause (18.5%).[3] Also, Prusty et al found that participants reported Early menstruation (5.6%), late menopause (10%), hormone therapy (13%), and late pregnancy (15%), were the risk factors for breast cancer, in conclusion, women in the area have little knowledge of breast cancer risk factors and warning indicators.[18]

In addition, awareness level of inherited and acquired risk factors was concerning the history of breast cancer in a first-degree relative and having a personal history of breast cancer, (61.5%) of participants were aware that it could be potential risk factors for breast cancer, in terms of the history of benign breast disease, (55.7%) of participants were aware that it could be a potential risk factor for breast cancer. When considering high radiation to the chest or breast in childhood or adolescence (radiation therapy) (56.0%) of participants were aware that it could be a potential risk factor for breast cancer. On the other hand, in a study conducted by Al-Ismaili et al participants had a higher and better level of knowledge whereas declared that exposure to high doses of radiation (80.5%), family history of Breast cancer (71.5%), and personal history of Breast cancer (68.8%).[19]

Participants' level of awareness regarding the association between poor physical activities, unhealthy lifestyles, being overweight, and obesity (BMI >25), more than half of participants were aware that it could be associated with an increased risk of breast cancer (54.3%), Similarly, in terms of smoking or alcohol consumption in the past or present, (64.6%) of participants were aware that it could be associated with an increased risk of breast cancer while looking to another study 76.3% of participants didn't agree.[20] When considering stress as a potential risk factor, 166 (57%) participants were aware that it could be a risk factor for breast cancer. Additionally, (60.1%, and 55.7% respectively) of participants were aware that high consumption of fatty food and low consumption of vegetables and fruits could be associated with an increased risk of breast cancer, but different studies` results were varied whereas (76% and 3% respectively) of participants were aware of Low fiber diet and Fatty food consumption as risk factors.[21] Additionally in another study (63.7%) didn't agree or have been uncertain about that, while a great proportion of participants were aware that low physical activity could be associated with an increased risk of breast cancer (72.5%).[22] While Lake of physical exercise (15.5%).[3]

In general, the findings from our study show that the knowledge assessment for breast cancer screening, signs and symptoms, and hormonal risk factors presented a minimum knowledge score with a mean score of 17.2±7.5. The results partially agreed with Abbas and Baig, who stated that noticed that the highest percentage of participants fall into the moderate knowledge group (65.6%).[23] In a similar view, the findings of our study show that 52.6% of women have poor knowledge about Breast cancer while only 47.4% have good knowledge about breast cancer. This outcome was consistent with the study of Habib et al that examined "awareness and knowledge of breast cancer among university students.[15]" They discovered that 34% of the 301 students who were participating had inadequate knowledge. Ahmed et al.[24] Support the results of this study. Their investigation evaluated the Breast cancer awareness level among Saudi medical students and discovered that 33.4% of the 254 students had an inadequate understanding. Low knowledge of Breast cancer was found in 29.3% of Saudi Arabian females in the country's eastern region, and 23.6% of those in the country's central region.[17,25] However, in their respective studies, Al-Suroj et al. Al Shareef and colleagues revealed that the prevalence of inadequate understanding of Breast cancer was greater (69.3% and 67%, respectively).[25,26] Further indicating a higher incidence of inadequate knowledge. Furthermore, researchers have made a significant discovery on weak knowledge abroad. As Liu et al a study in China showed that the country had the highest frequency of low knowledge (81.4%).[27] Contrary to popular belief, Hadi et al paper stated that 20.4% of female university students had bad knowledge, which was considered to be the lowest proportion of poor knowledge ever found in a study.[28]

This study shows that the factors associated with knowledge about breast cancer, in our study the factors considered significant predictors of high knowledge toward breast cancer were studying medicine, being at a high academic level, and advanced Age with a significant $p<0.001$, while marital status and place of residency were not predictors of high knowledge toward breast cancer. This can be explained by the limited number of married students in the colleges. Similar findings were reported by another study in Gondar Town, Northwest Ethiopia, 2021.[29] Their study found that the age of the women and women's educational level were significantly associated with knowledge of breast cancer. Also, Major discipline was significantly associated with knowledge about breast cancer, our study found that those studying medicine had

a significantly higher knowledge score compared to those studying all the other specialties. The academic level was also significantly associated with knowledge about breast cancer, where it was observed that the higher the academic level the higher the knowledge score. We have found that those in academic levels 5-8, and 9-12 had significantly higher knowledge scores compared to those in the 1-4 academic levels. Moreover, it revealed that marital status and place of residency were not significantly associated with knowledge of breast cancer. Similarly, the findings were reported by another study done among women in general population of Saudi Arabia, their study demonstrated no statistically significant association between marital status and knowledge and practice of BSE and mammography.[30]

Limitations

During our study, we encountered several challenges and limitations that warrant consideration in the interpretation of our findings. Firstly, the sample size was limited in scope, potentially impacting the generalizability and validity of our results. Given the cross-sectional nature of our study, which focused on female university students within a specific private college in Al-Madinah, caution must be exercised when attempting to extrapolate these findings to the wider population of young Saudi females or female university students across the nation. Furthermore, the homogeneity of the study subjects adds a layer of specificity to the results. Secondly, we acknowledge the potential presence of information bias due to the method of data collection, which relied on online questionnaires. This approach may have hindered the clarification of certain queries for participants, potentially leading to inaccuracies in responses. The context of the study's geographic restriction to Al-Madinah city further limits the generalizability of the outcomes to the entirety of Saudi Arabia. Given these limitations, we emphasize the necessity for future studies to consider a larger, more diverse sample size and employ face-to-face questionnaires. These modifications could enhance the comprehensiveness of assessing breast cancer awareness while mitigating potential biases arising from the current constraints.

CONCLUSION

The study showcased the need for targeted education on the correct timing and frequency of BSE, as well as dispelling misconceptions surrounding mammography as a screening tool. These findings are consistent with previous research within the region and emphasize the importance of comprehensive educational campaigns to address gaps in knowledge and promote proactive healthcare practices. Despite the relatively moderate awareness levels regarding certain breast cancer warning signs and symptoms, the study demonstrated varying levels of understanding among participants. Abrupt changes in breast shape were commonly recognized, while other signs such as nipple changes and skin abnormalities were less frequently identified. This suggests the necessity for focused efforts to enhance awareness about the diverse array of symptoms associated with breast cancer. The study also assessed participants' knowledge of risk factors for breast cancer, including hormonal, lifestyle, and genetic factors. While some risk factors were not well understood by participants, there were notable gaps in knowledge regarding factors such as early menstruation, late menopause, and the impact of physical inactivity. These findings underline the importance of comprehensive education that covers a wide range of potential risk factors to empower young women with accurate information for informed decision-making. The overall knowledge assessment indicated that a considerable proportion of participants had moderate or poor knowledge of breast cancer. The study shed light on demographic factors that influenced knowledge levels, with students at higher academic levels and those pursuing medicine demonstrating better understanding. This highlights the significance of tailoring educational strategies to target specific groups, especially in non-medical disciplines, to ensure comprehensive breast cancer awareness across all segments of the student population.

Recommendations

Recommendations include designing thorough educational campaigns that encompass early detection methods, symptom recognition, and risk factor understanding, with a focus on correcting misconceptions about breast self-examination (BSE) and mammography. Integrating breast health education into curricula, employing peer educators and interactive workshops, and collaborating with healthcare professionals are suggested strategies to ensure accurate and relatable information reaches students across diverse academic disciplines. Tailoring strategies for varying demographics, promoting healthy lifestyles, utilizing digital platforms, and fostering community engagement are vital for sustained impact. By embracing these recommendations, educational institutions and healthcare stakeholders can empower young women with essential knowledge, ultimately contributing to better breast health outcomes through proactive awareness and informed decision-making.

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