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RESEARCH ARTICLE

# Awareness Level, Knowledge and Attitude towards Breast Cancer between Medical and Non-Medical University Students in Makkah Region: A Cross Sectional Study

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## Abstract

**Background:** Breast cancer is the most common cancer among Saudi Arabian females followed by cancer of thyroid and colorectum.

**Objective:** To assess the awareness level, knowledge and attitude of female medical students and non medical university students in the Makkah region.

## Keywords

Breast Cancer, Mammography

## Introduction

The worldwide cancer incidence and mortality has rapidly increased in the last decade. The cancer burden globally estimated to have crossed 18.1 million new cases and 9.6 million deaths in 2018. As per the report of GLOBOCAN 2018, the worldwide incidence of breast cancer is 2.08 million and deaths due to breast cancer are 6.3 lakhs. With these figures, breast cancer is the most common cancer diagnosed among women worldwide accounting for 24.2% of all cancers diagnosed in women [1].

As per WHO country profile for cancers, 4300 deaths were reported in Saudi Arabia till 2014 and 18.7% were due to breast cancer in females [2]. In 2014, there were 1826 reported incidents of breast cancer accounting for 30.7% of all cancer cases in Saudi females [3]. Breast cancer is the most common cancer among Saudi Arabian females followed by cancer of thyroid and colorectum [3]. As per the Saudi cancer registry of 2014, the highest number of breast cancer cases in females were reported from the eastern region [3,4]. Only 36.1% cases presented early as a localized disease where as 40.0% presented with regional disease and 17.3% presented as metastatic disease. In 6.6% of cases the stage was unknown. Whereas only 6% of cases reported to present with distant metastasis in the United States of America as per the surveillance epidemiology and end results database report [5]. The most important prognostic factor for breast cancer is the stage of presentation [6,7]. Several risk factors are associated with the development of breast cancer. Increasing age, positive family history, early menarche, late menopause, physical inactivity, obesity, previous benign disease (atypical hyplasia), cancer in other breast, high intake of saturated fat diet, excessive consumption of alcohol, exposure to ionizing radiations, oral contraceptive use, hormone replacement therapy, mutation to BRCA1 and BRCA2 genes and tobacco smoking [8-15]. Breast feeding for more than 12 months decreases the risk of breast cancer [16]. Breast cancer in the early stage is usually asymptomatic. It presents with diverse signs and symptoms and differs from person to person. These include pain and swelling of the breast, redness of the skin over the breast or nipple, nipple discharge, nipple erosion, painless lump in the breast [17]. Early detection of breast cancer is essential

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to reduce the mortality. National awareness campaign for breast cancer has been introduced in Saudi Arabia in order to raise the knowledge level about breast cancer among women [18]. The ministry of health (MOH), Saudi Arabia, recommends that all women aged 50-69 years should undergo mammographic screening once a year, and once in 2 years for women aged 40-50 years. Women with positive family history should undergo mammographic screening 10 years earlier than the age of breast cancer patient in the family [18].

The incidence of breast cancer is much less in developing countries in contrast to developed countries but the mortality rate is high due to late presentation. The cure rate in patients with disease in early stage can between 84-98% where as in cases with metastasis, this rate falls to as low as 24.3. The factors that might contribute to the late presentation of breast cancer in Saudi female population include lack of knowledge and awareness about cancer screening; breast self examination (BSE), and clinical breast examination [19]. Women's knowledge and awareness about breast cancer may contribute significantly to medical help seeking behaviors and knowledge deficiency may lead to delayed presentation with advanced stages when little or no benefit is derived from any form of therapy [20,21]. The hindrances in seeking access to screening and early detection included wrong health practices, social barriers, fear, social stigma associated with the disease, lack of knowledge, and level of education [22]. Various studies have been conducted in Saudi Arabia amongst general population for the assessment of knowledge about breast cancer and screening with methods [23-27]. A few studies were conducted among educated class which reported a good knowledge about breast self examination [28-30]. Most of these previous studies were conducted in general female population or university students not belonging to the medical stream. We undertook this study to assess the awareness level, knowledge and attitude of female medical students and non medical university students in the Makkah region. A comparative analysis was also done between medical and non medical students.

## Methods

A cross sectional study using a closed ended questionnaire was conducted. 250 medical students and 250 non-medical students from universities of Makkah region were the participants. All participants were asked to complete a questionnaire based on their knowledge about breast cancer. Data analysis and comparison was performed using graphpad prism (version 7.0), a statistics and scientific 2D graphing software (California, USA). Chi-square test was used for testing relation between categorical variable (overall knowledge level and BSE attitude and practice). In all tests, p value of ≤ 0.05 was taken as significant.

### Materials and methods

This study was conducted using a cross sectional closed-ended questionnaire over a period of 2 months from December 2017 to January 2018. The participants were female university students aged 18-26 years from the Makkah region. A total of 500 students participated in the study out of which 250 were from medical colleges and 250 from non-medical colleges belonging to Umm al Qura University, Makkah, King Abdul Aziz University, Jeddah and Taif University, Taif. The questionnaire was approved by the committee of ethical scientific research at the faculty of applied medical sciences, Umm al Qura University. The privacy of the participants was maintained by the nameless questionnaire. The closed ended questionnaire was developed online using Google forms link and provided in both English and Arabic language. All participants in this study were informed that they can refuse to be a part of this study at anytime following their participation. The questionnaire was distributed via social media applications such as twitter and whatsapp. Hard copies of the questionnaire were also distributed among the participants. The questionnaire consisted of 29 questions divided into five sections, which included participants knowledge about breast cancer, breast cancer risk factors, causes of breast cancer, signs and symptoms of breast cancer and screening methods for the identification of breast cancer like breast self examination and mammography. A section about socio-demographic information about participant was also included in the questionnaire. To validate the questionnaire, a pilot study involving 20 participants, randomly selected from different universities of Makkah region was performed. The results of the pilot study do not necessitate any modifications in the questionnaire. All pilot study participants were excluded from the study subjects. Each correct response was awarded a score of one mark, while an incorrect answer or 'don't know' response was given a zero. A total score for each participant was calculated by summing the number of correct answers. Regarding the level of knowledge, it was calculated by summing scores of all knowledge questions. The results were divided into 2 main categories. Good knowledge (score ≥ 50%) and fair level of knowledge (≤ 50% score) out of maximum. Data analysis was performed using graphpad prism (version 7.0), a statistics and scientific 2D graphing software (California, USA). The graphs were generated using the same software. Descriptive statistics, which includes mean and standard deviation, was used to describe numerical data. On the other hand, percentage was used for categorical data. Chi-square test was used for testing relation between categorical variable (overall knowledge level and BSE attitude and practice). In all tests, p value of ≤ 0.05 was taken as significant.

## Results

Five hundred participants were included in this study. They were equally divided into two groups,

medical and non-medical students. Each group had the same number of participants (n = 250/group). Ages of the participants ranged from 18-28 years with a mean of 21 ± 1.3 years. For both medical and non-medical groups, the majority participants were from Makkah (92% and 84% respectively). The most common source of information reported by all students is the awareness campaigns (67%) followed by media such as TV and/or radio (48%). For non-medical students, the awareness campaign seemed to be the highest source providing information about breast cancer by 46% among all other sources, while it was only 21% for the medical students. About 42% of medical students gained their information about breast cancer from the university education. However, only 4% of the non-medical students agreed that university education provides them with information about breast cancer. The majority of the medical students (76%) and non-medical students (67%) knew that breast cancer is one of the most common cancers in the Saudi community. About half of the medical and non-medical students (58% and 52% respectively) were aware of the role of the Saudi Ministry of Health in raising the awareness about breast cancer. Only small proportion (18%) of both medical and non-medical university students has reported a positive family history of breast cancer in Makkah region.

About a half of the participants involved in this study believed that long term use of a tight bra or deodorants might cause breast cancer. The current study also showed that a misconception about breast cancer like evil eye has a role in causation. On the other hand, the majority of medical students and about nearly half of non-medical students believe that breast cancer could be genetically inherited. Regarding participants knowledge about risk factors of breast cancer, it can be seen that similar number of both medical and non-medical students agreed that refraining from breast feeding, smoking, consuming high amount of drinks that contain high level of caffeine, eating meat and saturated fats, lack of exercise and obesity, and late menopause increases the risk of developing breast cancer. In addition, most of medical students believe females are not the only ones to be affected and the risk increases with the increase with age (74% and 71% respectively), in comparison to the few non-medical students with a similar view. The results also showed that 56% of the medical students knew that using combined hormone such as (estrogen and progesterone) can influence the risk of breast cancer compared to only 34% of the non-medical students. Moreover, about 23% of the medical students were aware that menarche at early age increases the risk of developing breast cancer whereas only 10% of the non-medical students showed a similar belief (Table 1).

It can be seen that, there was a significant difference between medical and non-medical students with respect to the signs and symptoms about breast cancer. Medical students demonstrate a better knowledge compared to non-medical students. Misconceptions about breast cancer were more common in the non-medical students in contrast to the medical students group. General awareness about the prevalence of breast cancer in Saudi Arabia and its familial nature was almost similar in both groups (Table 2).

With regard to the participants' knowledge about BSE (Breast Self Examination) and mammography, the data showed that the majority of both medical and non-medical students were aware of the fact that BSE helps in the early detection of breast cancer. The participants in both groups of this study also had good knowledge about how to practice BSE. However, only 61% medical and 50% non-medical students performed BSE. On the other hand, only small proportion (24%) of the participants knew that periodic mammography

**Table 1:** Students response about source of information and risk factor knowledge about breast cancer.

| | Medical students Number (Percent) | Non-medical students Number (Percent) | Overall Number |
|---|---|---|---|
| Source of information about breast cancer | | | |
| Awareness campaign | 53 (21%) | 115 (46%) | 168 |
| University education | 106 (42%) | 10 (4%) | 116 |
| Media (TV, Radio) | 53 (21%) | 67 (27%) | 120 |
| Family and friends | 11 (4%) | 12 (5%) | 23 |
| Medical journals and websites | 35 (14%) | 46 (18%) | 81 |
| Knowledge about risk factors | | | |
| Refrain from breast feeding | 200 (80%) | 199 (80%) | 399 |
| Hormonal contraceptive use | 141 (56%) | 85 (34%) | 126 |
| Smoking | 186 (74%) | 175 (70%) | 361 |
| Drinks with caffeine | 55 (22%) | 54 (22%) | 109 |
| Meat and saturated fats | 137 (55%) | 126 (50%) | 263 |
| Lack of exercise and obesity | 157 (63%) | 150 (60%) | 307 |
| Late menopause | 43 (17%) | 32 (13%) | 75 |
| Early menarche | 58 (23%) | 25 (10%) | 83 |
| Aging | 178 (71%) | 122 (49%) | 300 |
| Affects only female sex | 186 (74%) | 132 (53%) | 318 |

**Table 2:** Responses about signs and symptoms and general awareness of breast cancer.

| | Medical students Number (Percent) | Non-medical students Number (Percent) | Overall students Number |
|---|---|---|---|
| Knowledge level about signs and symptoms | | | |
| Redness of skin/nipple | 143 (57%) | 80 (32%) | 223 |
| Lump in the breast/armpit | 200 (80%) | 151 (60%) | 351 |
| Nipple discharge | 181 (72%) | 123 (49%) | 204 |
| Pain in breast/nipple | 154 (62%) | 101 (40%) | 255 |
| Change in breast size/nipple | 189 (76%) | 131 (52%) | 320 |
| General awareness level about breast cancer | | | |
| Role of MOH | 144 (58%) | 129 (53%) | 273 |
| Prevalence of breast cancer in KSA | 191 (76%) | 168 (67%) | 359 |
| Family history | 44 (18%) | 46 (18%) | 90 |
| Awareness about facts and misconceptions | | | |
| Deodorant usage and tight Bra | 126 (50%) | 135 (54%) | 261 |
| Evil eye/evil spirit | 46 (18%) | 56 (22%) | 102 |
| Genetically inherited | 183 (73%) | 113 (45%) | 296 |

**Table 3:** Knowledge about BSE and reasons for poor BSE practice.

| | Medical students Number (Percent) | Non-medical students Number (Percent) | Overall students Number |
|---|---|---|---|
| Knowledge about Breast self-examination (BSE) and Mammography | | | |
| BSE practice | 194 (78%) | 163 (65%) | 357 |
| BSE helps in early detection of BC | 243 (97%) | 245 (98%) | 488 |
| Ever performed BSE | 152 (61%) | 125 (50%) | 277 |
| Ever screened by mammogram | 7 (3%) | 8 (3%) | 15 |
| Periodic mammography for early detection of BC | 60 (24%) | 58 (23%) | 118 |
| Reasons for poor BSE practice | | | |
| Don't know how to perform | 26 (27%) | 32 (26%) | 58 |
| No need to perform BSE | 54 (57%) | 53 (43%) | 107 |
| Discomfort | 13 (14%) | 23 (19%) | 36 |
| shyness | 9 (10%) | 17 (14%) | 26 |
| Fear | 17 (18%) | 24 (19%) | 41 |

**Table 4:** Overall knowledge and practice of BSE.

| | Medical students Number (Percent) | Non-medical students Number (Percent) |
|---|---|---|
| Knowledge about breast cancer risk factors | 134 (53.5%) | 110 (44.1%) |
| Knowledge about breast cancer signs and symptoms | 173 (69.4%) | 117 (46.6%) |
| Overall knowledge | 154 (61%) | 112 (45%) |
| Attitude towards BSE | 218 (87.5%) | 202 (81.5%) |
| Practice of BSE | 152 (61%) | 125 (50%) |
| Correlation between overall knowledge and attitude towards BSE | P = 0.004 | 0.008 |
| Correlation between overall knowledge and practice of BSE | P = 0.002 | P = 0.006 |

is an important tool for early screening of breast cancer, and only 3% of students involved in this study confirmed having screened by mammogram. Among the proportion of participants who revealed that they have never performed BSE, about 57% of medical and 43% of non-medical students reported that there is no need to perform BSE. A good number of participants from both groups revealed that they do not know how to perform BSE, while very few in both groups reported discomfort as a reason behind the poor practice of BSE. Fear and shyness were the other reasons for not performing BSE reported by both medical and non-medical students respectively (Table 3). The data presented in Tables 1, Table 2 and Table 3 shows the level of knowledge of medical and non-medical students about breast cancer risk factors, signs and symptoms, general awareness and knowledge about BSE practice and mammography. The summing scores of all knowledge questions yield good knowledge for medical students (61%) and fair knowledge for non-medical students (45%). The current results also suggest significant correlations between overall knowledge of all students and their attitude towards BSE and practice of BSE ($p \leq 0.05$) shown in Table 4.

## Discussion

This study was conducted to assess the awareness level, knowledge and attitude of medical and non-

medical female university students towards breast cancer in Makkah region. The results of this study revealed that university education, which was the highest source of information about breast cancer for medical student, was the lowest for non-medical students accounting for 42% and 4% respectively. This is mainly due to the nature of the non-medical courses and modules, which provides no or very little medical lectures about breast cancer and other health issues.

On the other hand, the non-medical students substitute this lack of education through breast cancer awareness campaigns they attended, which are organized annually to enhance women and general public's knowledge about breast cancer by lectures, info-graphics, videos and other materials. The current results also showed that only 21% of medical participant's attended breast cancer awareness campaigns in contrast to the good number of non-medical students (46%). This could be justified by the common content of provided materials at these campaigns, which resemble to a much extent that of university curriculum. In addition, medical students often refer to medical journals/website (14%) and media (TV/radio) (21%) to educate themselves about breast cancer. Although these sources are easy and could be quickly approached to gain information about breast cancer, they are not of much appeal to young non-medical students like the awareness campaigns. This could be due to lack of the entertaining factor and/or the language barrier, as medical sites are mostly provided in English. Studies have shown an association between socio-demographic characteristics such as age, marital status, income and women's likelihood of undergoing a mammography [25]. In total, 48% of all participants involved in this study agreed that media (TV/radio) is one of the effective sources to improve the knowledge about breast cancer. Similarly, a previous study by Nemengani, et al. [9] indicated that 46.3% of female medical students in Taif university agreed that media is the popular source of information that improved their knowledge and awareness about breast cancer. A study conducted in Makkah region showed that women were not satisfied with the sources of information and awareness programs, since these programs were not conducted on a regular basis and throughout the year [4]. Whereas in another study conducted in Madinah, Saudi Arabia, the main source of information about breast cancer were TV and Radio and very few participants indicated that they received information from doctors [7,26].

The results of this study also showed that more than half of the participants (52%) were aware about the important role of the Saudi MOH regarding breast cancer. In addition, the majority of the participants (76% medical and 67% non-medical students) knew that breast cancer is one of the most common cancers in Saudi community, which support the significant role of the Saudi MOH and awareness campaign in raising the awareness level of the community towards breast cancer. Although Makkah region had a higher incidence rate of breast cancer compared to some regions in Saudi Arabia, only 18% of these study participants reported a positive family history of breast cancer. In another study, increased awareness was noted in participants whose relatives or family member is suffering from breast cancer [31]. This could be attributed to the small number of subjects (500 participants) involved in the present study, and the fact that the current study samples were young university students who represents only small proportion of the population of Makkah region. Regarding the participants' knowledge about causes of breast cancer, the current study revealed that more than two thirds (73%) of medical students and about 45% of non-medical students agreed that breast cancer is genetically inherited. This could be attributed to the level of knowledge and quality of education they received during their study at Saudi universities, awareness campaigns and other sources of education about breast cancer. Although the current study present good level of knowledge about breast cancer causes among female university students in Makkah region, yet more than half of study participants (54% non-medical and 50% medical students) strongly believed that long term use of tight bra or deodorants could also give rise to breast cancer. Moreover, about 20% of the present study sample had a faith in supernatural evil eye, evil spirit or evil forces and their ability to cause breast cancer. These findings were surprising especially for medical students as they are well educated and expected to reject such myths or wrong beliefs about breast cancer. However, this could be explained by the current effect of the social media on young Saudi society. For example people tend to believe and circulate broadcasts that contain medical content without checking its authenticity. In addition, misleading medical information that is not based on scientific evidence is very easy to spread via social media and affect many people in a wrong way. Moreover, some individuals from different cultural background (educated and uneducated) in the Saudi society are more likely to believe that supernatural evil forces might influence the disease as a result of their stress, fear, or anxiety. The data presented in this study demonstrated that female university students in Makkah region had good knowledge about breast cancer risk factors. The most known risk factors among medical and non-medical students were refraining from breast feeding (80%), smoking (70-74%), eating meat and saturated fats (50-55%), lack of exercise and obesity (60-63%) and drinks with caffeine (22%). On the other hand, there was a difference between medical and non-medical participants knowledge about other risk factors of breast cancer such as combined hormone treatment (estrogen and progesterone) as 56% of medical students compared to only 34% of the non-medical knew that hormonal treatment increases the risk of developing breast cancer. Similarly, the current results showed that the students responses to-

wards being a female increases the risks of breast cancer was by 74% medical students and by 53% non-medical students. The increase with age risk factor scored 71% by medical students and 49% by non-medical students. Late menopause also scored 17% by medical and 13% by non-medical students. Moreover, 23% of medical and only 10% of non-medical students knew that menarche at early age increases the risk of breast cancer. The respondents among medical students in the current study towards late menopause and menarche at early age as risk factors of breast cancer were lower compared to those reported in another study [9]. The differences in the current findings and previous one could be attributed to the content of breast cancer awareness campaigns provided to the public, which concentrate more on general health problems, than associated risk factors. With regard to the signs and symptoms of the breast cancer, the present study showed that medical participants involved in this study had higher level of knowledge compared to non-medical students. Furthermore, all participants' knowledge about signs and symptoms of breast cancer that reported in this study was better than those of previous studies. Nemenqani, et al. [9] study on female medical students of Taif university reported that 48% agreed that the presence of a lump under the armpit might be a sign of breast cancer, 50% approved that it may present as a nipple discharge, and 41.5% accepted that changes in the size of breast or nipple, while in our study, the respective proportion of respondents were 80%, 72%, and 76% respectively. This higher knowledge of our students can be justified by the improved education curriculum and the variance in the study subjects and size. Furthermore, knowledge about other signs and symptoms of the breast cancer was inadequate, as only 32% of non-medical students knew that it might present as a redness of the skin of breast or nipple compared to 57% of medical participants. The redness of the skin of breast or nipple was little recognized as symptoms of breast cancer could be due to that many diseases such as allergies causes redness of the skin, thus, students consider it non-significant.

Regarding students' attitude towards early detection of breast cancer, BSE practice and mammography, most of the current participants (98%) knew that BSE helps in early detection of breast cancer. However, only 61% of medical students and 50% of non-medical students performed BSE correctly. Poor BSE practice has also been reported in a study by Kashgari and Ibrahim as only 12% of Saudi female in Jeddah practiced BSE [32]. The current finding was also in agreement with Ravichandran, et al. [33] which noted that only 23% of Saudi women in Riyadh had actually performed BSE.

The present study revealed some reasons behind poor BSE practice among female university students in Makkah region such as fear, shyness, discomfort, unnecessary need to do it and/or the ignorance of the right way to perform BSE. These reasons together with the social and cultural manners of Saudi society could explain the poor BSE practice among Saudi young women. The present results also showed that our participants had limited knowledge about mammography among both medical and non-medical students. About 24% of students knew that mammography is important for early detection of breast cancer. However, only a very small number of students (3%) confirmed screening by mammogram. This can be justified by different reasons such as religious guidelines that prohibit the women from revealing her body to male doctors and the difficulty to find a female doctor as there are limited number of female therapists in the country. Another possible reason is the objection that women might face from their guardians towards breast screening. Despite the free availability of mammography and breast cancer screening, there are low rates of BSE in Saudi Arabia [25]. However, these obstacles should not prevent the female population from the screening facilities and early diagnosis program offered by the government to reduce the mortality and incidents of breast cancer. Another study by Al-Wassia, et al. [25] reported a low knowledge and practice about mammography as a screening tool. Whereas in developed countries like Australia and Scotland mammography rates of 75% and 83% were reported respectively [25]. Regarding the overall knowledge among study participants, the good overall knowledge was observed among medical students (61%), while fair knowledge was seen among non-medical students (45%). The significant statistical difference that found between breast cancer overall knowledge of medical students and BSE attitude and practice ($p \leq 0.05$) reflects the importance of applying BSE to reduce the risks of developing breast cancer among young medical female students. Amongst the educated participants, like university students from India, China and Malaysia, the students had inadequate knowledge about breast cancer, but their awareness about BSE was good [30]. There is evidence which suggests that the knowledge levels improve significantly after conducting workshops on BSE [31]. In similar surveys conducted in developed countries among participants from universities offering medical and health related programs have shown a significant scores regarding risk factor knowledge about breast cancer [29]. Breast cancer awareness studies conducted in Abha and other areas revealed low level of awareness regarding mammography and breast self-examination. They pointed out the insufficient knowledge of women and the low practice of clinical breast examination, breast self-examination and mammography [7,27].

## Conclusion

Female medical university students in Makkah region have good level of awareness and knowledge about breast cancer in compare to the fair knowledge level of non-medical students. However, more intensive and continuous educational programs are required to

enhance and support the knowledge, awareness level and attitude of both medical and non-medical students about breast cancer. More awareness strategies need to be applied in order to raise the knowledge about BSE, mammography knowledge, and other preventive practice among young female population in Makkah region. Along with this, there should be general health education programs directed towards achieving the needs to be launched immediately. Early detection of breast cancer is very important as it has a favorable outcome. More National breast cancer awareness programs should be launched and there should be proper utilization of media and education channels.

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