



Knowledge, Attitude, Practice towards Breast Cancer and Breast Self-examination among Female Undergraduate Students in Karachi, Pakistan

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Authors' contributions

This work was carried out in collaboration among all authors. Authors SR, MI, AS and RA wrote the protocol and the first draft of the manuscript. They helped in filling the questionnaires and did literature search. Author SN helped in literature search and managed the analysis of the study. Author SM supervised and designed the study, read and approved the whole manuscript.

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ABSTRACT

Aims: The study was aimed at investigating knowledge, attitude and practice towards breast cancer and breast self-examination among female undergraduate students in Karachi, Pakistan.

Study Design: Cross Sectional study.

Place and Duration of Study: This study was conducted for a period of four months in different universities of Karachi, Pakistan.

Methodology: The study was done using a self-administered questionnaire. A total of 381 undergraduate students of medical and non-medical universities were included.

Results: The mean age of participants was 20.45 ± 3.67 years. 97% of the candidates had heard about breast cancer out of which only 65.4% were aware about its high prevalence rate in Karachi, Pakistan. A good proportion of candidates i.e. 78% of participants had good knowledge of breast

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self examination out of which only 43.8% knew how to perform it but just 24.9 % actually performed it.

20.5% of female population had made arrangements for breast screening once in their lifetime however many of the candidates (39.1%) never experienced any symptoms of breast pathology thus never felt the need to screen themselves.

Various signs and symptoms were considered as indications of breast cancer though lump as a sign was answered the most by 76.1% students. Out of the several risk factors of breast cancer 70.9% of candidates responded as family history the most common risk factor and early menstruation as a risk factor was 22.8% (the least).

44.4% of the aware candidates stated that they acquired this knowledge from social media. 21.5% had a positive family history. Mammography as a diagnostic modality was considered the most helpful by 61.4% population.

Conclusion: The study points out to the sufficient knowledge and attitude of breast cancer among female undergraduates in Karachi, Pakistan. However, they lacked the practice towards breast self examination. We expect that our results may provide useful data that could be used by the department of health in Karachi, Pakistan to formulate their health programs to increase the knowledge, attitude and practice towards breast cancer and breast self-examination.

Keywords: Karachi (Pakistan); breast cancer; knowledge; attitude; practice (KAP); Breast Self Examination (BSE); university students.

1. INTRODUCTION

Breast cancer is a female dominant cancer which has a good prognosis if identified in the initial stages hence surveillance is essential part of this disease especially for those individuals who have a prominent family history as they are more susceptible to the disease due to the hereditary nature of the malignancy [1].

It is well known that breast cancer is one of the highest occurring cancers of the world and many researches have already been conducted on it to highlight its significance [2].

Global estimates claimed that not less than a million women were diagnosed with breast cancer yearly and around 40,000 die from this disease [3].

Incidence of breast cancer is increasing in Pakistan like any other low and middle-income countries and one out of nine women living in Pakistan has life time risk of developing breast cancer which is one of the highest incidence in Asia [4,5].

Figures from the World Health Organization (WHO) have placed Pakistan on 9th position in the world ranking, as more than of 17,000 deaths occur per year in Pakistan from breast cancer with a death rate of 27.85/100,000 population [6].

Throughout the world, breast cancer rates are increasing rapidly and not even sparing the young ones [7-9]. Data from a tertiary care

hospital have shown that in Pakistani women breast cancer occurs in an age group at least 10 years earlier than the women in developed countries with late diagnosis when cancer progressed to a higher stage [10].

Early educational intervention has been proposed to partially offset the hazardous impacts of breast cancer when detected in late stages. Early detection is key in treatment of Breast Cancer and can make the disease easier to treat. A study was carried to determine the effectiveness of an educational intervention on improving knowledge, attitudes and practices among public health midwife in district of Gampaha in Sri Lanka. It was concluded that the educational intervention had a significant impact on improving KAP of PHMs for early detection of breast cancer. Thus it is important to have early intervention to prevent from having breast cancer [11].

The patient's prognosis of the Breast cancer mainly depends on the size and extent of the cancer due to which knowledge of early sign and symptom and utilization of early screening plays a very important role. However, many researches demonstrate lack of participation in the screening programs mainly due to lack of knowledge and awareness. A cross sectional survey among Arab women in United Arab Emirates showed inadequate uptake of screening modalities like Clinical Breast Examination and Mammography due to lack of knowledge about these screening facilities [12].

In most of the third world countries people lack the knowledge and awareness of breast cancer. Just like in Pakistan breast cancer is a major concern. According to a research carried out in Iran, women knowledge and practice regarding breast cancer and Breast Self-examination was found to be insufficient [13]. Another survey among the university students in Angola stated that there is lack of knowledge and awareness of breast cancer irrespective of medical or non-medical programs. The majority of the students were not aware of some of the early signs of breast cancer such as change in color or shape, any discharge from the nipple etc. However, they valued the need for monthly breast self-examination. Well most of the participants specified the need for increased breast cancer awareness among university students. The survey concluded that Health Programs in Angola and other African countries should reconstruct the health educational programs to increase the awareness and encourage screening and early detection [14].

According to a research carried out regarding self-examination of the breast, it was concluded that breast self-examination does not significantly reduce the breast cancer mortality but the awareness among women about breast cancer provides them with some knowledge regarding the breasts to fight breast diseases and to reduce morbidity but not to reduce mortality [15].

Another study which was a cross sectional study showed that all doctors (100%) and a greater part of the nurses (96%) had sufficient information about the multiple warning signs and symptoms of suspected breast cancer which led to the fact that there is a need for continuing medical education programs in regard to the awareness of breast cancer and the risk factors that contribute to the incidence of the disease [16].

A research carried out on breast cancer practices and awareness in women admitted to a tertiary care hospital of Lahore, Pakistan showed the results as follows. There were total of 189 patients. 161(84%) had heard about breast cancer. 35% were aware of 1 or 2 risk factors. 65% knew one major sign and symptom. 85% believed that early detection improved survival. 36.9% practiced breast self-examination. Conclusion was that the study revealed lack of awareness and screening practice in Lahore, Pakistan [17].

This brings us to the underlying rationale of our survey i.e. focusing on the young generation as they are the vulnerable population. Early detection makes the disease easier to treat and adequate knowledge is an important factor in improving the health care seeking behavior and practice of economical screening maneuvers like Breast Self-Examination. Research findings suggested that breast self-examination does not significantly reduce the breast cancer mortality but the awareness among women about breast provides them with the knowledge so they can detect changes in the breast early and seek medical help that has role in improving prognosis [15].

2. MATERIALS AND METHODS

2.1 Study Design

It was a cross-sectional study. It was a type of non-probability sampling that involved the sample being drawn from that part of the population that was easily accessible.

2.2 Study Duration

It was conducted for a period of four months.

2.3 Study Population

Female undergraduates of different universities in Karachi, Pakistan.

2.4 Sample Size

Sample size was calculated to be 381.

2.5 Study Setting

The study included different Universities in Karachi, Pakistan such as Jinnah Medical and Dental College, Dow University of Health Sciences, Bahria University, Greenwich University, Muhammad Ali Jinnah University and Iqra University.

Extensive research, reading and literature review was done on the topic "Breast Cancer" after which the questionnaire was developed. The questionnaire consisted of questions related to the objectives of the study that was knowledge, attitude and awareness about breast cancer its risk factors, spread and genetic involvement. There were three main description themes of the questionnaire that were knowledge, attitude and practice. Questionnaire also had an ethical consent attached along which had to be filled

before the questionnaire ensuring a voluntary agreement to participate in research. The survey begun with elaborative questionnaires which contained questions regarding knowledge, attitude and practice towards breast self examination. We categorized questions and assessed them on the basis of knowledge of signs and symptoms of breast cancer , risk factors , diagnostic modalities , prevalence rate and role of breast self examination in early detection of breast cancer. Statistical analysis was done in term of dealing with the collection, organization, analysis, interpretation and presentation of the data. Data was collected through questionnaires, organized and analyzed on SPSS.

3. RESULTS AND DISCUSSION

A total of 400 questionnaires were distributed out of which only 381 were recovered with a response rate of 95.3%. The basic demographic characteristics of the participants displayed in Table 1.

The mean age of the study participants was 20.45 ± 3.67 . About 218(57.2%) females out of a total of 381 were medical students while the rest 163(42.8%) belonged to non-medical field and 17 (4.6%) were married.

3.1 Knowledge of Breast Cancer and Breast Self-examination

Results showed that (Table 2) majority, (97%, n= 373) of the participants have heard of breast cancer and 21.5% (n=82) had a positive family history for the disease. High prevalence of Breast cancer in Karachi was acknowledged by 65.4% (n=249) of the candidates however, 27% (n=103) of them had absolutely no idea regarding the burden of disease. In this study 78% (n=297) of the participants were aware of the term breast self-examination and 43.8% (n=167) also knew the method to perform BSE. Around 68.2% (n=260) of the students believed in the fact that breast cancer can be detected at an early stage by performing breast self-examination.

There are several risk factors that predispose to breast cancer, knowledge of which help health professional to identify high risk individuals. Study statistics showed that 70.9% (n=270) of the students correctly identified family history as a risk factor for breast cancer. Also influence of genes (BRCA1/BRCA2) (68.5%, n=261) and hormone replacement therapy (49.3%, n=188) were popular risk factor followed by increasing

age (45.4%, n=173). Table 2 summarized responses to other risk factors as chosen by study participants.

Knowledge of early sign and symptoms were crucial in early detection of Breast cancer. Fortunately, the bulk of the students (76.1%, n=290) identified that that lump could be a warning sign of breast cancer, whereas, 64% (244) & 59.6% (227) labelled pain and nipple discharge respectively as important symptom of Breast cancer. The other symptoms identified were swelling under armpit (54.3%, n= 207), skin changes (48.6%, n=185) and weight loss (42.8%, n=163).

Most students chose mammography (61.4%, n=234) and Ultrasound (54.6, n=208) as diagnostic modalities for Breast cancer.

Regarding source of Information, it was found that social media had played the most crucial role in spreading information (44.4%, n= 170) among the candidates (Fig. 1). Other major sources of information chosen by the students were university and friends (14.2% n=51 each) however, mass media (TV, radio) (10.2%, n= 39) and print media (newspaper) (4.5%, n= 17) found to have limited role in Breast self-examination awareness.

3.2 Attitude and Practice toward Screening

Referring Table 3, the attitude of respondents if they encountered a lump in the breast, showed that majority 80.1% (n=305) agreed to consult a doctor, however, 22.6% (n=86) would prefer to share this news with a friend or a family member while 4.5%(n=17) showed reluctance to take any action.

When judging the aspect of practice, we discovered that 24.9% (95) have performed BSE at least once and 79.5% (303) of the students had made arrangements for breast screening by a health professional to detect any breast pathology at least once in their lifetime.

Among those who never opt for screening (n= 78), many respondents (39.1%, n=24) never felt the need to screen themselves because they had never experienced any symptoms of breast pathology. Some of them confided (23.4%, n= 18) that they had an overall hectic daily routine which never gave them enough time to schedule a screening appointment. However, 16% (n=13) of the candidates admitted that they don't have

any knowledge about it which was a hindrance in making arrangements. Fig 2 summarizes the reason for not doing breast cancer screening.

3.3 Discussion

Population of Pakistan includes more females than males and Breast cancer is one of the most prevailing cancer in Pakistani women. Most of the population in Pakistan lives in rural areas

where limited health care facilities are available. Also, women are not well aware of importance of screening. Breast self-examination is most economical among other screening modalities and if taught properly every woman can perform this simple procedure every month at home without the help of any skilled personnel. Practice of breast self-examination have potential to improve prognosis and reduce breast cancer morbidity by early detection [18].

Table 1. Sociodemographic information of undergraduate female students of Karachi. (n=381)

Characteristics	Frequency (n=381)	Percentage (%)
Age (mean ± SD)	20.45 ± 3.67	
Marital status		
Married	17	4.6
Unmarried	363	95.4
Field of education		
Medical	218	57.2
Non-medical	163	42.8
Family history		
Yes	82	21.5
No	299	78.5

Table 2. Knowledge of breast cancer and breast self-examination among undergraduate students (n=381)

Characteristics	Frequency (n)	Percentage (%)
Knowledge of BC and BSE		
Breast cancer knowledge	373	97
Knowledge about Prevalence	249	65.4
BSE knowledge	297	78
How to perform BSE	167	43.8
BC can be early detection by screening	260	68.2
Knowledge of Signs and Symptoms		
Lump	290	76.1
Skin changes	185	48.6
Nipple discharge	227	59.6
Pain	244	64
Swelling under armpit	207	54.3
Weight loss	163	42.8
Knowledge of Diagnostic Modalities		
Ultrasound	208	54.6
Mammography	234	61.4
MRI	166	43.6
Knowledge of Risk Factors		
Age	173	45.4
Early menstruation	87	22.8
Post menopause	148	33.8
Family History	270	70.9
Non-lactating women	152	39.9
Contraceptives	135	35.4
Trauma/Injury	118	31
Personal Hygiene	147	38.6
Genetics (BRCA1/BRCA2)	261	68.5
Hormonal replacement therapy	188	49.3

Table 3. Attitude and Practice of breast self-examination and screening among undergraduate students (n=381)

Variable	Frequency (n)	Percentage (%)
Attitude		
Made arrangement for screening	303	79.5
What would you do if you found a lump		
See a doctor	305	80.1
Tell a friend or a family member	86	22.6
Would do nothing	17	4.5
Do you want to learn BSE	349	91.6
Practice		
Have you ever performed BSE	95	24.9
Have you made arrangement for screening	303	79.5

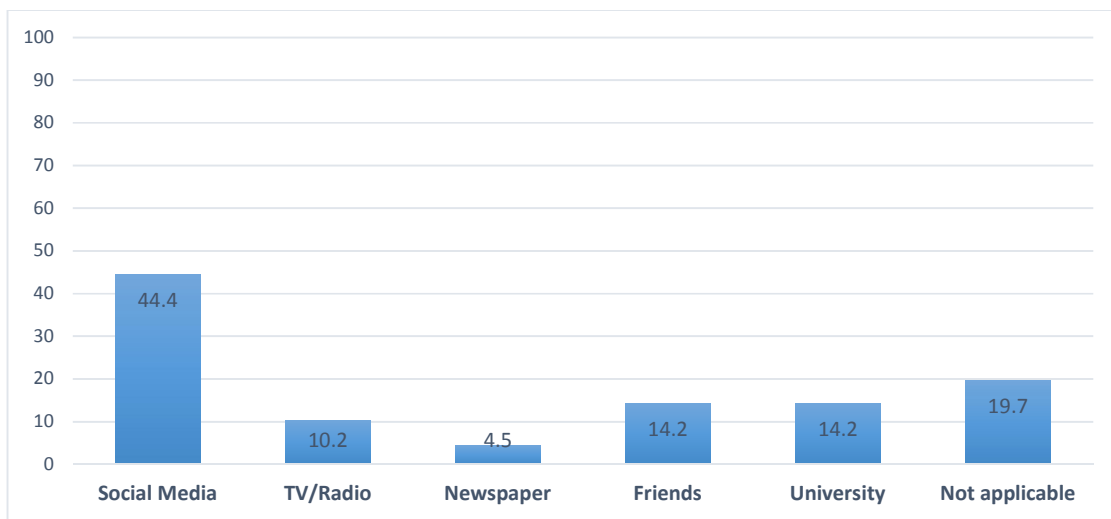


Fig. 1. Source of information of students regarding breast self-examination

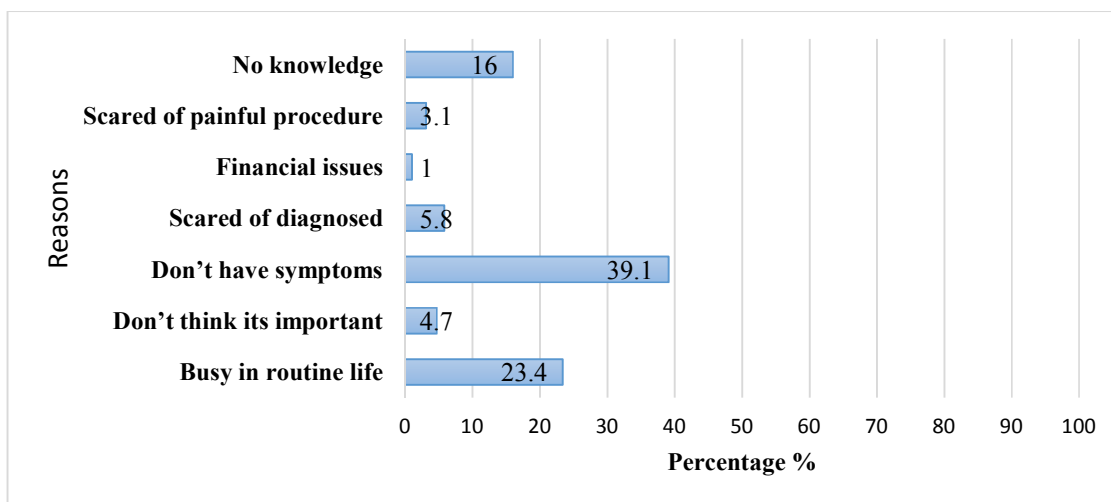


Fig. 2. Reasons for not doing Breast cancer screening

Our study consisted of exclusively female respondents from an undergraduate population out of which 97% heard about breast cancer which shows that an outstanding number of students were well aware which is in consistent with the study conducted in Iran [13]. On the other hand according to a survey conducted among undergraduate students in Cameroon, only 47% of the candidates were aware of breast cancer [19]. This showed better awareness among Pakistani young females on breast cancer. Also 65.4% of the respondents in our survey knew that breast cancer have high prevalence rate in Pakistan and is one of the leading causes of death among females with cancers. Similar result was reported in another Pakistani research [20] conducted on 1304 females of 18 years and above in Karachi and Islamabad which has reported that 60.3% considered it as a major health problem. However, another study conducted in Punjab on medical and non-medical students showed that 73% nonmedical and 80% medical students knew that BC is the most prevalent cancer among Pakistani women [21].

High prevalence of Breast cancer was also reflected in the finding of this study, as 21.5% of participants have family history of Breast cancer. Slightly less prevalence (17.33% and 11.4% respectively) were reported in other Pakistani studies, [20,22] on the other hand, When comparing our findings with other Islamic countries, different studies has reported varying percentages such as Akhtari-Zavare in Hamedan Iran [13] found that 37.5% of their participants' family member have had breast cancer however, another study by Ghodsi in Hamedan Iran reported that only 13% have such family history [23]. More or less similar statistics were reported by studies conducted in Jordan [24] and UAE [25] (12.5% and 9.2% respectively) whereas in African countries like Ethiopia and Cameroon very low prevalence were reported (3% -3.5 %) [26,27].

Knowledge of early sign and symptoms is also necessary for early recognition of Breast cancer. Fortunately, the bulk of the students in our study (76.1%, n=290) identified lump and nipple discharge 59.6% (n=227 as important symptom of Breast cancer Tis is higher than a local study which has reported an overall inadequate knowledge of sign symptoms of breast cancer where only 37.4% identified lump and 21% mention pain as chief symptoms of disease [20]. In our study also it was noticed that 64% (n=244)

respondents have misconception that pain is an important symptom of breast cancer but a study in Punjab showed better understanding of respondents regarding pain that it does not always indicate breast cancer [21]. Similarly a survey conducted in Angola also showed deficient knowledge among university students about early sign of BC and recommended educational programs to increase the awareness to encourage screening and early detection [14]. On contrary a cross sectional study conducted in Karachi among health professionals showed that all doctors (100%) and majority of the nurses (96%) had sufficient information about the multiple warning signs and symptoms of suspected breast cancer [16].

Regarding knowledge of risk factors of Breast cancer, our study statistics indicated family history (70.9%) influence of genes (BRCA1/BRCA2) (68.5%) and hormone replacement therapy (49.3%) as most frequently chosen risk factor. However, some local and Asian studies reported aging and elderly primigravida as major risk factors apart from family history [20,28].

It is a known fact that any disease can be detected and treated successfully by advanced screening methods and there is no doubt that there has been immense technological research put into the diagnostic modalities for screening of breast cancer. Participants in this study demonstrated reasonable awareness of screening techniques as more than half of our participants knew about mammography (61.4%) and Ultrasound (54.6%) use as screening modalities for Breast cancer which is in accordance with other local study [16].

Regarding source of Information on breast cancer, this study discovered that social media has played the most crucial role in spreading information however, another study conducted in Karachi reported friends, family and college lectures [4] whereas study in Ajman UAE reported friends and healthcare providers as a main source of their information [29].

Breast self-examination is a very integral part of early self-diagnosis as it can help patients feel initial and minor symptoms such as breast lump, tenderness, enlarged axillary nodes and look for any obvious skin changes. Even though an enormous amount of people knew about breast self-examination but very few had actually

implemented it into practical life which indicates that their attitude towards the early detection of the disease was flawed. 78% of our respondents knew about this method of detection and 43.8% knew how to perform it out of which only 24.9% had actually performed it once in their lifetime. More or less similar results were reported in a study conducted in Punjab [22] where 41% respondents knew how to perform BSE but 25% actually practice it. Better practice than this was reported in another local study among medical students, which showed that 67% knew how to perform BSE and 56% actively perform BSE [16]. If we compare with international studies we found that in a study conducted in Iraq, 90.9% participants had heard of BSE while only 48.3% had actually practiced [30]. In an Indian research it was reported that 65% students were aware of BSE and only 11% practice it regularly [31]. Likewise a study in Iran on 119 health professional claimed that 87.4% of the participants perform BSE and 39.5% perform it on regular monthly basis [32]. Various other global researches also reported deficiency in BSE practice among females [12,24,26,27,29, 33].

A research carried out on Breast cancer practices and awareness in 189 female patients admitted to a tertiary care hospital of Lahore also revealed inconsistency in attitude and practice where results showed that 85% believed that early detection improved survival but only 36.9% practiced breast self-examination [17].

When judging the aspect of practice, we discovered that 24.9% have performed BSE at least once and 79.5% of the students had made arrangements for breast screening by a health care provider. A study in Germany on migrant women showed low participation rates in cancer screening mostly in Turkish migrants [34]. This shows that although young women in our community have inadequate knowledge about BSE but they are somehow participating in screening programs. If Early educational intervention has been proposed to improve their knowledge, they have potential to improve their health care seeking behavior. A study was carried to determine the effectiveness of an educational intervention on improving knowledge, attitudes and practices among public health midwife in district of Gampaha in Sri Lanka. It was concluded that the educational intervention had a significant impact on improving KAP of participants for early detection

of breast cancer [11]. Regarding barriers in uptake of screening showed that 20.5% of our participants had never considered Breast screening. Reason were found to be the non-experience of any symptoms and busy routine and lack of time for screening. Whereas barriers in other local study was reported to be the lack of knowledge of screening technique, shyness, and non-availability of female staff and fear of diagnosing disease [16]. Another research carried among women of Delhi, India revealed that lack of breast cancer awareness was prevalent, especially in low socio-economic class and barriers in uptake of BSE was found to be shyness, fear and not prioritization of self-health [35]. These findings directed us to the conclusion that portable and less time-consuming methods should be introduced in workplaces or in local clinics at affordable prices by the government or Non Governmental Organizations (NGOs). These facilities would increase the acceptance and interest of female and make screening feasible.

4. LIMITATIONS OF THE STUDY

Originally designed 400 questionnaires out of which 19 were never retrieved as they were distributed randomly in bulk. We could not include a larger student population because we did not have enough transport, security and financial resources.

It is suggested that a larger population should be included, detailed comparison between medical and non medical students and also a wider age group of candidates should be included.

5. CONCLUSION

Our study concluded that the knowledge and awareness regarding breast cancer, its spread, risk factors and its examination was at good scale among our undergraduate students. Their attitude towards it was also considerable. Point to ponder is their practice towards breast self examination which was found lacking in them.

This shows that it is not necessary that possessed knowledge will always be implemented. Therefore, programmes should be carried out that aim both towards the awareness of screening and its accessibility.

We expect that our results may provide useful data that could be used by the department of

health in Karachi, Pakistan to formulate their health programs to increase the knowledge, attitude and practice towards breast cancer and breast self-examination. Our results are still preliminary but promising. We require further large scale studies for strengthening of our results.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the author(s). Consent form was formulated and filled up by each participant.

ETHICAL APPROVAL

Ethically approved by Ethical Review Committee, Jinnah Medical & Dental College, Karachi, Pakistan.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Bird Y, Banegas MP, Moraros J, King S, Prapasiri S, Thompson B. The impact of family history of breast cancer on knowledge, attitudes, and early detection practices of Mexican women along the Mexico-US border. *Journal of Immigrant and Minority Health*. 2011;13(5): 867-75.
2. Getu MA, Kassaw MW, Tlaye KG, Gebrekiristos AF. Assessment of breast self-examination practice and its associated factors among female undergraduate students in Addis Ababa University, Addis Ababa, Ethiopia, 2016. *Breast Cancer (Dove Med Press)*. 2019; 11:21-8.
3. Tfayli A, Temraz S, Abou Mrad R, Shamseddine A. Breast cancer in low-and middle-income countries: An emerging and challenging epidemic. *Journal of Oncology*; 2010.
4. Ahmed A, Zahid I, Ladiwala ZFR, Sheikh R, Memon AS. Breast self-examination awareness and practices in young women in developing countries: A survey of female students in Karachi, Pakistan. *J Educ Health Promot*. 2018;7:90.
5. Sohail S, Alam SN. Breast cancer in pakistan-awareness and early detection; 2007.
6. WHO. Health Profile of Pakistan: WHO; 2017. [Cited 2019 24 February]
7. Anders CK, Johnson R, Litton J, Phillips M, Bleyer A, editors. Breast cancer before age 40 years. *Seminars in Oncology*; Elsevier; 2009.
8. Borkar MM, Quraishi AM, Jannawar G. Study of carcinoma breast in women under 40 years of age. *International Surgery Journal*. 2018;5(10):3273-81.
9. Chopra B, Kaur V, Singh K, Verma M, Singh S, Singh A. Age shift: Breast cancer is occurring in younger age groups-Is it true? *Clinical Cancer Investigation Journal*. 2014;3(6):526.
10. Soomro R, Faridi S, Khurshaidi N, Zahid N, Mamshad I. Age and stage of breast cancer in Pakistan: An experience at a tertiary care center. *JPMA The Journal of the Pakistan Medical Association*. 2018; 68(11):1682-5.
11. Vithana P, Ariyaratne M, Jayawardana P. Effectiveness of an educational intervention among public health midwives on breast cancer early detection in the district of Gampaha, Sri Lanka; 2015.
12. Elobaid YE, Aw TC, Grivna M, Nagelkerke N. Breast cancer screening awareness, knowledge, and practice among Arab women in the United Arab Emirates: a cross-sectional survey. *PLoS one*. 2014; 9(9):e105783.
13. Akhtari-Zavare M, Ghanbari-Baghestan A, Latiff LA, Matinnia N, Hoseini M. Knowledge of breast cancer and breast self-examination practice among Iranian women in Hamedan, Iran. *Asian Pacific Journal of Cancer Prevention*. 2014; 15(16):6531-4.
14. Sambanje MN, Mafuvadze B. Breast cancer knowledge and awareness among university students in Angola. *Pan African Medical Journal*. 2012;11(1).
15. Parvani Z. Breast self examination. *The Professional Medical Journal*. 2011;18(02): 336-9.

16. Rizvi F. Knowledge and practice of breast self-examination. *Journal of Rawalpindi Medical College*. 2013;17(1):88-90.
17. Maqsood B, Zeeshan MM, Rehman F, Aslam F, Zafar A, Syed B, et al. Students' corner breast cancer screening practices and awareness in women admitted to a Tertiary Care Hospital of Lahore, Pakistan. *JPMA*. 2009;59(418).
18. Menhas R, Umer S. Breast Cancer among Pakistani Women. *Iranian Journal of Public Health*. 2015;44(4):586-7.
19. Carlson-Babila S, Bonaventure D, Jules K, Ekabe CJ, Brice V, Abua NL, et al. Awareness of breast cancer and breast self-examination among female undergraduate students in a higher teachers training college in Cameroon. *The Pan African Medical Journal*. 2017;28.
20. Naqvi AA, Zehra F, Ahmad R, Ahmad N, Yazdani N, Usmani S, et al. Awareness, knowledge and attitude towards breast cancer, breast screening and early detection techniques among women in Pakistan. *JPMA The Journal of the Pakistan Medical Association*. 2018;68(4): 576-86.
21. Noreen M, Murad S, Furqan M, Sultan A, Bloodsworth P. Knowledge and awareness about breast cancer and its early symptoms among medical and non-medical students of Southern Punjab, Pakistan. *Asian Pac J Cancer Prev*. 2015; 16(3):979-84.
22. Awan NJ, Abid S. Assessment of knowledge regarding breast self-examination among College Students (Girls) of District Islamabad, Pakistan. *Pakistan Journal of Medical Research*. 2018;57(1):3-7.
23. Ghodsi Z, Hojjatoleslami S. Breast self examination and mammography in cancer screening: Women health protective behavior. *Journal of Preventive Medicine and Hygiene*. 2014;55(2):46.
24. Amasha HA-R. Breast self-examination and risk factors of breast cancer: Awareness of Jordanian nurses. *Health Science Journal*. 2013;7(3):303.
25. Al-Sharbatti SS, Shaikh RB, Mathew E, Al-Biate MAS. Breast self examination practice and breast cancer risk perception among female university students in Ajman. *Asian Pacific Journal of Cancer Prevention*. 2013;14(8):4919-23.
26. Birhane K, Alemayehu M, Anawte B, Gebremariyam G, Daniel R, Addis S, et al. Practices of breast self-examination and associated factors among female debre berhan university students. *International Journal of Breast Cancer*; 2017.
27. Nde FP, Assob JCN, Kwenti TE, Njunda AL, Tainenbe TRG. Knowledge, attitude and practice of breast self-examination among female undergraduate students in the University of Buea. *BMC Research Notes*. 2015;8(1):43.
28. Pilehvarzadeh M, Rezie HH, Reza M, Aflatoonian FR, Mashayekhi F. Knowledge and attitude of women about breast self-examination. *Breast*. 2015;36(40.4): 23.5.
29. Suleiman AK. Awareness and attitudes regarding breast cancer and breast self-examination among female Jordanian students. *Journal of Basic and Clinical Pharmacy*. 2014;5(3):74.
30. Alwan N, Al Attar W, Eliessa R, Madfaic Z, Tawfeeq F. Knowledge, attitude and practice regarding breast cancer and breast self-examination among a sample of the educated population in Iraq; 2012.
31. Jadhav C, Keerti S. Breast tumors and college students: A study of their knowledge, attitude and practice. *Indian Journal of Pathology and Oncology*. 2017;4(3):361-4.2017.
32. Reisi M, Javadzade SH, Sharifirad G. Knowledge, attitudes, and practice of breast self-examination among female health workers in Isfahan, Iran. *Journal of Education and Health Promotion*. 2013;2.
33. Ameer K, Abdulie SM, Pal SK, Arebo K, Kassa GG. Breast cancer awareness and practice of breast self-examination among female medical students in Haramaya University, Harar, Ethiopia. *Ethiopia IJIMS*. 2014;2(2):109-19.
34. Berens EM, Mohwinkel LM, van Eckert S, Reder M, Kolip P, Spallek J. Uptake of gynecological cancer screening and performance of breast self-examination among 50-year-old migrant and non-migrant women in Germany: Results of a

- cross-sectional study (InEMa). J Immigr Minor Health; 2018.
35. Dey S, Sharma S, Mishra A, Krishnan S, Govil J, Dhillon PK. Breast cancer awareness and prevention behavior among women of Delhi, India: Identifying barriers to early detection. Breast Cancer: Basic and Clinical Research. 2016; 10:BCBCR. S40358.

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