Awareness of Risk Factors for Breast Cancer among Casablanca Medical Students

Bendahhou Karima   Oncology Center, IBN ROCHD University Hospital, Casablanca, Morocco.

Serhier Zineb   Clinical Neurosciences and Mental Health Laboratory, Hassan University, Casablanca, Morocco.

Diouny Samir   Clinical Neurosciences and Mental Health Laboratory, Hassan University, Casablanca, Morocco.

Bennani Othmani Mohamed   Clinical Neurosciences and Mental Health Laboratory, Hassan University, Casablanca, Morocco.

Background: Socio-economic burden of breast cancer is substantial in low and middle income countries. Therefore, preventive measures are necessary, including raise of population awareness and education on the risk factors. This study aims to assess the general awareness of cancer among Casablanca medical students, with a focus on risk factors for breast cancer.
Methods: A cross sectional study using a questionnaire on risk factors of breast cancer was carried out. Participants were randomly selected using a stratified sampling.
Results: A total of 678 students participated in the survey. Just over half of the cases (53.2%) reported knowing breast cancer risk factors with a 95% confidence interval of [49.5%; 57.0%]. The main sources of information regarding their knowledge of breast cancer risk factors reported by students were represented by the faculty and media with a similar proportion of 20.6% of cases. The average number of correct responses was statistically different depending on the students' level of education and whether they had a family history of cancer. Indeed, the average correct responses increased with the year of study, so the lowest average was noted among first-year students with 11 responses versus 15 correct responses out of 23 among sixth-year students and a degree of significance less than 0,001. Similarly, for those who reported a family history of cancer, their average correct response was 14.4 versus 13.2 for those having no relatives with cancer (p< 0.001).
Conclusion: Our medical students' knowledge on breast cancer risk factors is very weak. These future doctors play an important key role in educating people and raising awareness on breast cancer in our country. Therefore, priority programs and training should be put in place to insure successful and knowledgeable doctors.

Introduction

Cancer is a major worldwide public health problem. The number of new cases is estimated by the International Agency for Research on Cancer at 19.3 million with a number of cancer-related deaths of 9.9 million in 2020 [1]. Breast cancer is the most common cancer in the world with an incidence rate of 47.8 and a mortality rate of 13.6 per 100,000 women [1]. In Morocco, the age-standardized incidence of breast cancer is 47.5 per 100,000 women in 2017 according to Casablanca cancer registry [2].

The socio-economic burden of cancer is substantial, especially in countries with limited resources. Therefore, identifying modifiable risk factors are believed to make an important contribution to the development of prevention and mitigation measures.

Several risk factors including age, genetic mutations, especially the BRCA gene, estrogen exposure, obesity and overweight have been linked to breast cancer [3-12]. In addition, lifestyle risk factors such as smoking, alcohol consumption have been associated with increasing the risk of breast

cancer and other types of cancer [13-20]. However, research evidence suggests that breastfeeding [6, 12], in addition to high-fiber diet, especially in post-menopausal women, and regular physical activity for at least 150 minutes a week are strongly linked to a decreased risk of breast cancer [21-25].

In recent years, remarkable progress has been made in the fight against breast cancer,, particular in high-income countries. WHO recommends that breast cancer control be integrated into prevention programs to combat non-communicable diseases, including the control of risk factors while promoting healthy diets, physical activity and tobacco control, alcohol consumption, overweight, obesity, and exposure to radiation and long-term treatment with hormones [26]. This strategy could have a long-term impact on the incidence and mortality associated with abovementioned cancer.

Raising awareness of risk factors can be achieved through various channels of communication. First and foremost, health professionals are the main stakeholders; their role is to help increase awareness about breast cancer and to minimize the social stigma connected with it. Hence, the importance of upgrading and updating the state of knowledge of breast cancer risk factors among health care professionals. There is a significant lack of research examining knowledge level of cancer risk factors among health professionals in Morocco, and this study proposes to address that need. In this study, we aimed to assess the general awareness of cancer among Casablanca, medical students, with a focus on risk factors for breast cancer.

Materials and Methods

A cross-sectional study was carried out among the students of the Casablanca Faculty of Medicine and Pharmacy. The population of our study was made up of a sample of students from all levels drawn at random according to a sampling stratified on the year of study and in clusters. For undergraduate students, the draw focused on practical work groups and for graduate students, hospital services were drawn at random.

Data collection was based on a self-administered questionnaire respecting the anonymity of the participants. The data collected related to the characteristics of the students, such as age, sex, type and stream of the Baccalaureate obtained, the source of the information and the risk factors for breast cancer.

Data analysis focused on the description of the study population and knowledge of the risk factors listed in the questionnaire. A comparison of the students' knowledge according to several variables was made using the Student test or ANOVA. Statistical analysis was performed using R software.

Results

Description of the study population

A total of 678 students were included, their average age was 21.1 years with a standard deviation of 1.9 years and extremes ranging from 17 to 27 years. More than half of the sample was female gender with a proportion of 66.9% of cases. The different levels of study were represented in our study population with almost equal proportions of 17.6% except for first-year and sixth-year students who accounted for 9% and 20% of cases respectively. About 95% obtained a Moroccan Baccalaureate and more than half of the sample reported having a familly history of cancer Table 1.

	Size	Percentage
Gender		
Female	441	66.9
Male	218	33.1

Level of education		
1st année	63	9.3
2nd year	121	17.9
3rd year	119	17.6
4th year	119	17.6
5th year	119	17.6
6th year	134	19.9
Having a family history of cancer		
No	390	57.5
Yes	228	33.6
Type of baccalaureate		
Maroccan	618	94.6
French	35	5.4
Baccalaureate Stream		
Mathematical Sciences	101	15.6
Physical Sciences	437	67.5
Life and Earth Sciences	109	16.8

Table 1. Characteristics and Background of the Study Population.

Knowledge of breast cancer risk factors

Just over half of the cases (53.2%) reported knowing breast cancer risk factors with a 95% confidence interval of [49.5%; 57.0%] and when asked to identify breast cancer risk factors they know, 55% of cases could not cite any factors with a 95% confidence interval of [51.2%; 58.7%]. Some misconceptions were reported by some students, such as the use of deodorant (2.7%), tight underwear (1.2%) and no sexual intercourse (2.4%). The main sources of information regarding their knowledge of breast cancer risk factors reported by students were represented by the faculty and media with a similar proportion of 20.6% of cases Table 2.

	Size	Percentage
Source of information		
Faculty	140	20.6
Media	140	20.6
Social media	59	8.7
Reading	53	7.8
High school	21	3.1
Internship	8	1.2
Factors cited spontaneously by students		
Oral contraception intake	97	14.3
Obesity	87	12.8
Alcohol	72	10.6
Late menopause	70	10.3
Nulliparity or late first pregnancy	68	10
Hormonal treatment intake	66	9.7
Early menarche	46	6.8
Stress	45	6.6
Absence of breastfeeding	39	5.8
Age over 40	25	3.7
Irradiation	25	3.7
Use of deodorants	18	2.7
Sedentariness	16	2.4
Being single or no sexual intercourse	16	2.4

Depression	15	2.2
Wearing tight underwear	8	1.2
Large breasts	4	0.6
Drug consumption	4	0.6

Table 2. Sources of Information and Factors Spontaneously Cited by Students as Risk Factors for Breast Cancer.

Recognition of the various risk factors proposed to the students

The average number of correct responses, relating to the risk factors for breast cancer, given by each student was 13.4 correct responses out of the twenty factors proposed in the questionnaire, with a standard deviation of 3.9 and a minimum and maximum number of 0 and 23 respectively. Among the risk factors proposed in the questionnaire, most of the students stated that the female gender, between 40 and 65 of age, and family history of cancer are risk factors for breast cancer with respective proportions of 98,2%, 83.8% and 81.0% of cases. Breastfeeding was recognized as a protective factor by 81.5% of cases. Toxic habits such as smoking and alcohol consumption were reported in 71.2% and 61.2% of cases respectively.

With regard to genetic factors such BRCA1 and BRCA2 gene mutation were recognized by almost half of the study population (49% of cases) Table 3.

	Size	Percentage
Being a woman	665	98.2
Age(most common between 40 and 65)	565	83.8
Early menarche (before 14)	300	44.7
Nulliparity or late childbearing	390	59.1
Breastfeeding	548	81.5
Late menopause	259	39.1
Family history of cancer	537	81
Genetic mutation BRCA1 and BRCA2	330	49.4
Obesity and overweight	381	57.6
Sedentariness and physical inactivity	375	56.3
Smoking	477	71.2
Alcohol	406	61.2
Oral contraception	477	71.3
Hormone replacement therapy	455	67.9
Stress	383	57.2
Chronic depression	323	48.2
Food	461	69
Red meat and fat consumption	391	58.2
Fish consumption	488	72.7

Table 3. Rate of Correct Responses to the Following Statements on Risk Factors and Protective Factors for Breast Cancer.

Knowledge of risk factors according to certain characteristics of students

The average number of correct responses was statistically different depending on the students' level of education and whether they had a family history of cancer. Indeed, the average correct responses increased with the year of study, so the lowest average was noted among first-year students with 11 responses versus 15 correct responses out of 23 among sixth-year students and a

degree of significance less than 0,001. Similarly, for those who reported a family history of cancer, their average correct response was 14.4 versus 13.2 for those having no relatives with cancer, with a degree of significance less than 0.001 Table 4.

	Size	Average	Standard deviation	p-value
Gender				0.6
Female	441	13.4	3.8	
Male	218	13.6	3.9	
Type of Baccalaureate				0.1
French	35	14.5	4.2	
Moroccan	618	13.5	3.8	
Level of education				<0.001
1st year	63	11.2	4.37	
2nd year	121	12.6	3.4	
3rd year	119	12.4	3.53	
4th year	119	13.3	3.29	
5th year	119	14.9	3.91	
6th year	134	15	3.8	
Baccalaureate Stream				0.6
Life and Earth Sciences	109	13.5	3.82	
Mathematical Sciences	101	13.2	3.97	
Physical Sciences	437	13.6	3.82	
Stating knowledge of risk factors				<0.001
Yes	361	14.6	3.6	
No	305	12.1	3.8	
Having a family history of cancer				<0.001
Yes	228	14.4	3.9	
No	390	13.2	3.7	

Table 4. Comparison of the Average of the Correct Answers According to the Characteristics of the Students.

Discussion

This study involved medical students from the first to the sixth year. About a third of the students reported having a relative with cancer. The level of knowledge about breast cancer risk factors was relatively low for future doctors. Indeed, about 46% of the students reported being unaware of these risk factors. The main risk factors cited spontaneously by the students were: oral contraception (14.3%), obesity (12.8%), alcohol consumption (10.6%), late menopause (10.3%), nulliparity or advanced age of first pregnancy (10.0%) and hormone replacement therapy (9.7%).

With respect to the proposed list of risk factors, the majority (80% of cases) recognized at least 10 factors, mainly being a woman (98.2%), being over 40 of age (83.8%), family history of breast cancer (81.0%), oral contraception (71.3%) and hormone replacement therapy (67.9%). Approximately 82% and 73% respectively agreed that breastfeeding and fish consumption were protective factors.

The main sources of information cited by the students were the faculty and the media with a proportion of 20.6% each followed by the internet and the social media (18.9% and 8.7% respectively).

The average number of factors recognized among the twenty proposed was 13.4 (standard deviation=3.9). This average was associated with the level of study, and was about 15 among fifth

and sixth year students and about 11 among first year students and 12 among second year students (p<0.001). A significant difference was also noted between those with a relative with cancer (14.4 with SD of 3.9) versus 13.2 (SD=3.7) in the others and a p-value <0.001.

There are some limitations in this study, in particular, dietary factors could not be explored due to the controversial data in the literature for some of them. These controversial findings concern a few factors studied such as tobacco. We considered, for the calculation of the number of correct answers, that it increases the risk of breast cancer.

Among the strengths of this study, the assessment of knowledge was made for a multitude of factors; genetic, hormonal, environmental and associated with lifestyle. The open question on the risk factors would allow to better assess the knowledge of the students compared to the items proposed with "yes" or "no" answers that are most commonly used in this type of survey. Indeed, it was noted that the frequency of students citing the main factors was much lower than the proportion of those who responded correctly to each item.

The proportion of students who reported not knowing the risk factors for breast cancer was similar to that observed in the general population in New Zealand in 2015 (48.8%) [27] and lower than that reported among high school students in Nigeria (64.7%) [28]. The best-known factors were similar to those described by general practitioners in Morocco [29], by a population of women in Malawi [30], Ghana [31], South Africa [32] and the population of northern Saudi Arabia [33]. The frequencies of correct responses concerning the different risk factors were higher in these Moroccan students compared to the results reported in the general population of Saudi Arabia [33], of which 46% agreed that nulliparity or late childbearing increased breast cancer risk and 37% considered obesity as a risk factor versus 58% of medical students in Morocco and only 8.5% of Saudis agreed that diet could be associated with the risk of breast cancer against 69% in our study. These frequencies were also higher than those found in rural Egypt [34], which shows that the socioeconomic and educational level is related to the degree of knowledge about breast cancer and its risk factors. Medical students, future doctors, especially those in the last years of study, should have a good knowledge of the risk factors for cancer and in particular breast cancer, which is the most common in women. Indeed, they will have an important role to play in terms of health education in order to ensure good primary and secondary prevention of this disease. However, several studies in developing countries have reported the reduced role of health professionals as sources of information on cancer risk factors. In Nigeria, the sources of information were represented mainly by friends and neighbors [35], and in Egypt by television (11.3%), friends (9.8%) and health professionals were cited by only 3.2% of participants. In a study of women in Ghana [31], doctors and nurses were cited as sources of information by 12.4% and 13.9% of participants respectively, while the media represented 39.8% for radio and 20.5% for television. In this study, the main sources of information reported by students were the internet and social media (18.9%) followed by the faculty (20.6%) and the media (20.6%). In developed countries, health professionals remain an important source of information. In the United States, health professionals were cited by 76% of female university students, followed by the internet (75%) and magazines (69%) [36].

The level of knowledge of the senior students was significantly higher than that of junior students, thus indicating the important role of internships and courses taken at the faculty.

The number of correct responses was different in students with a family history of cancer compared to the others. These results could be due to the fact that the existence of a case of cancer in the family would trigger discussions on the risk factors.

It is important to note that there are a number of misconceptions that medical students hold. This includes wearing tight bras, using deodorants and large breasts. A similar result was reported among Nigerian high school students [28] who reported wearing tight or dirty bras, hiding money in bras, and the role of the devil, among others. Additionally, women in Malawi [30] believed that

breast engorgement was associated with an increased risk of breast cancer. These false beliefs were also noted among student nurses in Pakistan; for example 40.6% of the respondents believed that wearing a tight bra was a risk factor compared to 5% of the participants who believed that the evil eye is a risk factor [37].

Some factors, such as stress and chronic depression, which are not widely known, were cited spontaneously by 6.6% and 2.2% of the students respectively and were answered correctly by 57.2% and 48.2% of students respectively. These factors have not been reported in the above studies. About 4% of the students cited overexposure to radiation as a risk factor, however this factor was not explored by our questionnaire. Approximately 27.2% of rural women in Egypt [34] answered this question correctly and 49.0% of women in South Africa [32].

Studies on knowledge of breast cancer risk factors have been conducted in different populations, often rural women [32, 34, 35], the general population [27, 33], high school students [28], university students [38] or doctor population. This makes the results difficult to compare, however, it would be interesting to see if the level of knowledge of medical students is better than that of the general population. We could not find a similar study carried out in Morocco in the general population, but the level of knowledge of its students was significantly higher than the results obtained in a large number of African studies.

Although a standard questionnaire listing breast cancer risk factors would allow comparison between different populations and studies, the result obtained could be overestimated and does not reflect reality, especially since there are only two choices of responses "yes" or "no". An open question exploration would, in our view, be more appropriate to describe the state of knowledge of the populations regarding this type of subject.

In conclusion, The level of knowledge among Moroccan medical students was slightly better than that of the general African populations. However, it remains low for a population that must play a role in health education and prevention. Efforts must be made regarding the dissemination of information relating to risk factors, in particular those related to habits and a healthy lifestyle, to improve the behaviors of young women in order to prevent the development of breast cancer in the future and to enable young doctors to fulfill their role perfectly. This knowledge should not be learned only at the level of oncology internships but should be extended to all medical students. This remains a challenge, given the already overloaded programs.

References

References

1. Ferlay J, Colombet M, Soerjomataram I, Parkin DM, Piñeros M, Znaor A, Bray F. Cancer statistics for the year 2020: An overview. *International Journal of Cancer.* 2021. DOI
2. Bendahhou karima, Benider abdellatif, Bennani maria, et al. Registre des cancers du Grand Casablanca, rapport d'incidence pour la période de 2013 - 2017, https://www.contrelecancer.ma/fr/media/2022/04/13/publication-du-rapport-du-rcgc-pour-la-periode-de-2013-2017/ (accessed 21 February 2023). 2020.
3. Chan CHT, Munusamy P, Loke SY, Koh GL, Wong ESY, Law HY, Yoon CS, et al. Identification of Novel Breast Cancer Risk Loci. *Cancer Research.* 2017; 77(19)DOI
4. Fasching PA. Breast cancer in young women: do BRCA1 or BRCA2 mutations matter?. *The Lancet. Oncology.* 2018; 19(2)DOI
5. Fountzilas C, Kaklamani VG. Multi-gene Panel Testing in Breast Cancer Management. *Cancer Treatment and Research.* 2018; 173DOI
6. Lambertini M, Santoro L, Del Mastro L, Nguyen B, Livraghi L, Ugolini D, Peccatori FA, Azim HA. Reproductive behaviors and risk of developing breast cancer according to tumor subtype: A systematic review and meta-analysis of epidemiological studies. *Cancer*

Treatment Reviews. 2016; 49DOI

7. Li H, Sun X, Miller E, Wang Q, Tao P, Liu L, Zhao Y, et al. BMI, reproductive factors, and breast cancer molecular subtypes: A case-control study and meta-analysis. *Journal of Epidemiology.* 2017; 27(4)DOI

8. Memon ZA, Qurrat-ul-Ain N, Khan R, Raza N, Noor T. Clinical Presentation and Frequency of Risk Factors in Patients with Breast Carcinoma in Pakistan. *Asian Pacific journal of cancer prevention: APJCP.* 2015; 16(17)DOI

9. Morin F, Spano JP, Morère JF. Âge et cancer. In: Morère J-F, Rainfray M (eds) Cancer du sujet âgé. *Paris: Springer.* 2007;23-34.

10. Namiranian N, Moradi-Lakeh M, Razavi-Ratki SK, Doayie M, Nojomi M. Risk factors of breast cancer in the Eastern Mediterranean Region: a systematic review and meta-analysis. *Asian Pacific journal of cancer prevention: APJCP.* 2014; 15(21)DOI

11. Sifuentes-Álvarez A, Castañeda-Martínez LY, Lugo-Nevares M, Reyes-Romero MA. [Risk factors associated with breast cancer women's in Durango, Mexico]. *Ginecologia Y Obstetricia De Mexico.* 2015; 83(11)

12. Unar-Munguía M, Torres-Mejía G, Colchero MA, González de Cosío T. Breastfeeding Mode and Risk of Breast Cancer: A Dose-Response Meta-Analysis. *Journal of Human Lactation: Official Journal of International Lactation Consultant Association.* 2017; 33(2)DOI

13. Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, Fedirko V, Scotti L, et al. Alcohol consumption and site-specific cancer risk: a comprehensive dose-response meta-analysis. *British Journal of Cancer.* 2015; 112(3)DOI

14. Chen JY, Zhu HC, Guo Q, Shu Z, Bao XH, Sun F, Qin Q, et al. Dose-Dependent Associations between Wine Drinking and Breast Cancer Risk - Meta-Analysis Findings. *Asian Pacific journal of cancer prevention: APJCP.* 2016; 17(3)DOI

15. Connor J. Alcohol consumption as a cause of cancer. *Addiction (Abingdon, England).* 2017; 112(2)DOI

16. Malik A, Jeyaraj PA, Shankar A, Rath GK, Mukhopadhyay S, Kamal VK. Passive Smoking and Breast Cancer - a Suspicious Link. *Asian Pacific journal of cancer prevention: APJCP.* 2015; 16(14)DOI

17. Romieu I, Scoccianti C, Chajès V, Batlle J, Biessy C, Dossus L, Baglietto L, et al. Alcohol intake and breast cancer in the European prospective investigation into cancer and nutrition. *International Journal of Cancer.* 2015; 137(8)DOI

18. Roswall N, Weiderpass E. Alcohol as a risk factor for cancer: existing evidence in a global perspective. *Journal of Preventive Medicine and Public Health = Yebang Uihakhoe Chi.* 2015; 48(1)DOI

19. Shield KD, Soerjomataram I, Rehm J. Alcohol Use and Breast Cancer: A Critical Review. *Alcoholism, Clinical and Experimental Research.* 2016; 40(6)DOI

20. Ziembicki S, Zhu J, Tse E, Martin LJ, Minkin S, Boyd NF. The Association between Alcohol Consumption and Breast Density: A Systematic Review and Meta-analysis. *Cancer Epidemiology, Biomarkers & Prevention: A Publication of the American Association for Cancer Research, Cosponsored by the American Society of Preventive Oncology.* 2017; 26(2)DOI

21. Chen S, Chen Y, Ma S, Zheng R, Zhao P, Zhang L, Liu Y, Yu Q, Deng Q, Zhang K. Dietary fibre intake and risk of breast cancer: A systematic review and meta-analysis of epidemiological studies. *Oncotarget.* 2016; 7(49)DOI

22. Dinu M, Abbate R, Gensini GF, Casini A, Sofi F. Vegetarian, vegan diets and multiple health outcomes: A systematic review with meta-analysis of observational studies. *Critical Reviews in Food Science and Nutrition.* 2017; 57(17)DOI

23. Elkum N, Al-Tweigeri T, Ajarim D, Al-Zahrani A, Amer SMB, Aboussekhra A. Obesity is a significant risk factor for breast cancer in Arab women. *BMC cancer.* 2014; 14DOI

24. Kyu HH, Bachman VF, Alexander LT, Mumford JE, Afshin A, Estep K, Veerman JL, et al. Physical activity and risk of breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke events: systematic review and dose-response meta-analysis for the Global Burden of Disease Study 2013. *BMJ (Clinical research ed.).* 2016; 354DOI

25. Pizot C, Boniol M, Mullie P, Koechlin A, Boniol M, Boyle P, Autier P. Physical activity,

hormone replacement therapy and breast cancer risk: A meta-analysis of prospective studies. *European Journal of Cancer (Oxford, England: 1990).* 2016; 52[DOI]

26. WHO (2022). Principaux faits et recommandations, https://www.who.int/fr/news-room/fact-sheets/detail/cancer (accessed 25 February 2023)..

27. Richards R, McNoe B, Iosua E, Reeder AI, Egan R, Marsh L, Robertson L, et al. Knowledge of Evidence-Based Cancer Risk Factors Remains Low Among New Zealand Adults: Findings from Two Cross-Sectional Studies, 2001 and 2015. *Asian Pacific journal of cancer prevention: APJCP.* 2017; 18(11)[DOI]

28. Sule ST, Shehu SM, Ukwenya JE. Risk factors for common cancers in Nigeria: Knowledge, attitudes and practice among secondary school students in Kaduna, Nigeria. *IJMMS.* 2014; 6:34-41.

29. Abda N, Najdi A, Fakir SE, Tachfouti N, Berraho M, Khazraji YC, Abousselham L, Belakhel L, Bekkali R, Nejjari C. Knowledge, Attitudes, and Preventive Practice Towards Breast Cancer among General Practitioner Health Professionals in Morocco. *Asian Pacific Journal of Cancer Prevention : APJCP.* 2017; 18(4)[DOI]

30. Kohler RE, Gopal S, Lee CN, Weiner BJ, Reeve BB, Wheeler SB. Breast Cancer Knowledge, Behaviors, and Preferences in Malawi: Implications for Early Detection Interventions From a Discrete Choice Experiment. *Journal of Global Oncology.* 2017; 3(5)[DOI]

31. Opoku SY, Benwell M, Yarney J. Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa. *The Pan African Medical Journal.* 2012; 11

32. Trupe LA, Rositch A, Dickerson L, Lucas S, Harvey SC. Knowledge and Attitudes About Breast Cancer in Limpopo, South Africa. *Journal of Global Oncology.* 2017; 3(5)[DOI]

33. Alrashidi AG, Ahmed HG, Alshammeri KJK, Alrashedi SA, ALmutlaq BA, Alshammari FNM, Alshudayyid AAH, et al. Knowledge and Perceptions of Common Breast Cancer Risk Factors in Northern Saudi Arabia. *Asian Pacific journal of cancer prevention: APJCP.* 2017; 18(10)[DOI]

34. Esmail Hassan E, Seedhom AE, Mahfouz EM. Awareness about Breast Cancer and Its Screening among Rural Egyptian Women, Minia District: a Population-Based Study. *Asian Pacific journal of cancer prevention: APJCP.* 2017; 18(6)[DOI]

35. Oluwatosin OA, Oladepo O. Knowledge of breast cancer and its early detection measures among rural women in Akinyele Local Government Area, Ibadan, Nigeria. *BMC cancer.* 2006; 6[DOI]

36. Kratzke C, Amatya A, Vilchis H. Breast cancer prevention knowledge, beliefs, and information sources between non-Hispanic and Hispanic college women for risk reduction focus. *Journal of Community Health.* 2015; 40(1)[DOI]

37. Ahmed F, Mahmud S, Hatcher J, Khan SM. Breast cancer risk factor knowledge among nurses in teaching hospitals of Karachi, Pakistan: a cross-sectional study. *BMC nursing.* 2006; 5[DOI]

38. Alsaraireh A, Darawad MW. Impact of a Breast Cancer Educational Program on Female University Students' Knowledge, Attitudes, and Practices. *Journal of Cancer Education: The Official Journal of the American Association for Cancer Education.* 2019; 34(2)[DOI]