Central African Journal of Public Health
2024, Vol. 10, No. 3, pp. 154-162
https://doi.org/10.11648/j.cajph.20241003.12

Research Article

Knowledge and Attitude of Adult Women Towards Early Prevention of Breast Cancer in a Local Government Area of a Southwestern State of Nigeria

Ebenezer Obi Daniel[1, 3, *], Oluseyi Oludamilola Olawale[2], Ahmed Mamuda Bello[3], Michael Olabode Tomori[3], Michael Avwerhota[4], Israel Olukayode Popoola[5], Adebanke Adetutu Ogun[6], Aisha Oluwakemi Salami[4], Olukayode Oladeji Alewi[4], Taiwo Aderemi Popoola[7], Celestine Emeka Ekwuluo[8]

[1]Department of Public Health, Swansea University, Swansea, United Kingdom
[2]Department of Public Health, Walden University, Minneapolis, United States of America
[3]Department of Public Health, Texila American University, Georgetown, Guyana
[4]Department of Public Health, Atlantic International University, Hawaii, United States of America
[5]Department of Epidemiology and Community Health, University of Ilorin, Ilorin, Nigeria
[6]Department of Policy, Governance, Liaison, and Support, International Organization for Migration, Abuja, Nigeria
[7]Department of Research, PhMetrika Limited, Birmingham, United Kingdom
[8]Department of Child Health, United Nations International Children's Emergency Fund, Abuja, Nigeria

Abstract

This study investigates the knowledge, attitudes, and practices regarding breast self-examination (BSE) among adult women in Idanre Local Government Area of Ondo State, Nigeria. Breast cancer, a leading neoplasm among women, presents a significant global health challenge due to its high incidence and mortality rates. This descriptive cross-sectional study involved 400 adult women, employing a structured questionnaire to collect data. The findings reveal a high level of awareness about breast cancer, with 98.5% of participants demonstrating good knowledge and 93.5% exhibiting positive attitudes toward BSE. However, only 77.5% of respondents practiced BSE regularly. The study underscores the importance of early detection facilitated by BSE, particularly in resource-limited settings, as 86.3% of participants identified increasing age as a risk factor, and 100% recognized lumps in the breast as a symptom. Despite this awareness, many women do not practice BSE consistently due to misconceptions and lack of motivation. The research highlights the necessity of enhancing public awareness and education on BSE through mass media and healthcare providers to improve early breast cancer detection and reduce mortality rates. It recommends that healthcare workers promote BSE during interactions with female clients and serve as role models by adopting preventive screening measures themselves. This approach could significantly impact breast cancer control and improve health outcomes among women in the community. The study concludes that while knowledge and attitudes toward BSE are generally positive, consistent practice remains a challenge that must be addressed through targeted awareness and education initiatives.

[*]Corresponding author: dannypressy@yahoo.com (Ebenezer Obi Daniel)

Received: 1 June 2024; **Accepted:** 19 June 2024; **Published:** 26 June 2024

Copyright: © The Author(s), 2024. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (http://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

Keywords

Breast Cancer, Knowledge, Attitude, Adult Women

1. Introduction

Breast cancer, a malignant tumor originating from breast cells, is now the most common cancer among women due to advancements in screening programs [1]. It remains a significant global health challenge without a known cure. Annually, about 2.3 million women are diagnosed with breast cancer, and over 685,000 dies from the disease [2]. In Nigeria, breast cancer constitutes 23-28% of all cancer cases among women [3].

Early detection is critical despite advancements in treatment. Modern medical practices such as surgery, chemotherapy, and radiation have enhanced breast cancer manageability [4]. However, early detection heavily relies on patient participation in breast self-examinations (BSE), routine screenings, mammography, and regular check-ups. Over 90% of breast cancer cases are detected by women themselves, underscoring the importance of BSE [5].

BSE, a simple, cost-free, non-invasive method, allows women to detect changes in their breast tissue early. Despite its benefits, many women perform BSE inconsistently or not at all, leading to late-stage diagnoses, particularly in African countries where breast cancer is often advanced at presentation [6].

The Health Belief Model (HBM) has been extensively applied to understand health behaviors, including breast cancer screening [7]. HBM suggests that health-related behaviors are influenced by perceived threats and the value of actions to mitigate them. Thus, women who perceive themselves at risk and recognize the severity of breast cancer are more likely to engage in regular BSE [8].

Despite awareness campaigns promoting BSE, late-stage presentation of breast cancer is still common among Nigerian women. Effective health education requires health workers to possess proper knowledge and attitudes toward the promoted health behaviors [9]. Nurses, as frontline healthcare providers, play a crucial role in educating and motivating patients about breast cancer screening, and their knowledge significantly influences patient participation in these practices [10].

Globally, breast cancer remains the most prevalent cancer among women, with significant geographical variations in incidence and mortality rates [11]. Although the incidence is higher in developed regions, mortality rates are relatively lower due to better survival rates from early detection and effective treatments [12]. In developing countries, however, the trend is reversed, with higher mortality rates due to late diagnoses and limited access to treatment [13].

Breast cancer accounts for 16% of all female cancers worldwide. Despite higher incidence rates in developed countries, 69% of breast cancer deaths occur in developing countries, driven by factors like increased life expectancy, urbanization, and lifestyle changes [11]. As developing countries adopt more westernized lifestyles, they face rising breast cancer rates, reflecting a broader shift from infectious diseases to chronic non-communicable diseases [14].

Geographical variations in breast cancer incidence are influenced by risk factors, medical practices, treatment quality, and reporting completeness. Migrant studies indicate that the risk for breast cancer in new generations aligns more closely with their adopted countries, highlighting the impact of diet and lifestyle changes [15]. Additionally, genetic differences contribute to variations in breast cancer types across populations, with certain genes playing significant roles [16].

2. Method

2.1. Study Design

This study is a descriptive cross-sectional survey designed to evaluate the knowledge and attitudes of adult women towards early breast cancer prevention in Idanre Local Government Area (LGA) of Ondo State, Nigeria. The cross-sectional design enables the collection of data from a sample of the population at a single point in time, providing a snapshot of the current state of awareness and attitudes regarding breast cancer prevention. This approach is suitable for identifying knowledge gaps and misconceptions, which can inform future educational interventions.

2.2. Sampling Technique

A multistage sampling technique was employed to select participants for this study. The sampling process was as follows:

1. First Stage: The list of wards in Idanre LGA was used as a sampling frame. From these, two settlements were chosen using simple random sampling (balloting method). This ensured that each ward had an equal chance of being included in the study.
2. Second Stage: Within the selected settlements, stratified random sampling was applied. The population was divided into strata based on their respective wards. Pro-

portional allocation was then used to ensure that the sample size reflected the distribution of the population across these wards. This method improves the representativeness of the sample and ensures that the findings can be generalized to the entire LGA.

2.3. Data Collection

Data was collected using a structured questionnaire, which was administered through face-to-face interviews by trained interviewers. The questionnaire was designed to capture information on:

1. Demographic characteristics of the respondents.
2. Knowledge of breast cancer and its risk factors.
3. Attitudes towards breast cancer screening methods such as Breast Self-Examination (BSE), Clinical Breast Examination (CBE), and mammography.
4. Barriers to breast cancer screening and early detection.

The interviewers received training to standardize the administration of the questionnaire and to ensure consistency and accuracy in data collection. Each interview was conducted in a private setting to maintain confidentiality and encourage honest responses.

2.4. Ethical Considerations

Ethical approval for the study was obtained from the appropriate ethics review board in Ondo State. The following ethical considerations were observed:

1. Informed Consent: Prior to data collection, all participants were informed about the purpose of the study, procedures involved, potential risks, and benefits. Written informed consent was obtained from each participant. Participation was entirely voluntary, and participants were assured that they could withdraw from the study at any point without any consequences.
2. Confidentiality: Measures were taken to ensure the confidentiality of participants' responses. Data were anonymized by assigning unique identification numbers to each questionnaire, and personal identifiers were not collected. The data were stored securely and only accessible to the research team.
3. Non-maleficence: The study was designed to avoid any harm to the participants. The questions were framed sensitively to avoid distress, and support was offered to participants who might need further information or counseling regarding breast cancer.
4. Beneficence: The potential benefits of the study include providing valuable insights into the knowledge and attitudes of women regarding breast cancer prevention. This information can be used to develop targeted educational programs aimed at improving breast cancer awareness and promoting early detection practices.

3. Result

3.1. Respondents Profile

Table 1 shows the socio-demographic characteristics of the respondents. The table revealed that 116 (29%) were less than 30 years, 107 (26.8%) were between the ages of 30 and 40 years, 110 (27.5%) were between 41 and 50 years while 67 (16.8) were 50 years. Most of the respondents 355 (88.8%) were married while 45 (11.3%) were single. 283 (70.8%) had tertiary education while 117 (29.3%) had secondary education. With respect to number of children, 231 (57.8%) had 3-4 children, 85 (21.3%) had 1-2 children, 62 (15.5%) had more than 4 children while 22 (5.5%) had no child. Majority, 299 (74.8%) are Christians, 99 (24.8%) are muslims while 2 (0.5%) practice traditional religion. Most of the respondents are yorubas as expected.

Table 1. *Socio-demographic characteristics of the Respondents.*

Variables	Frequency (n=400)	Percentage (%)
Age		
<30	116	29
30-40	107	26.8
41-50	110	27.5
>50	67	16.8
Ethnicity		
Yoruba	389	97.3
Igbo	9	2.3
Others	2	0.5
Marital Status		
Single	45	11.3
Married	355	88.8
Level of education		
Secondary	117	29.3
Tertiary	283	70.8
No of children		
0	22	5.5
1-2	85	21.3
3-4	231	57.8
>4	62	15.5
Religion		
Christianity	299	74.8
Islam	99	24.8
Traditional	2	0.5

3.2. Risk Factors for Developing Breast Cancer

Table 2 shows knowledge on the potential risk factors for developing breast cancer. 345 (86.3%) agree with Increasing age, 395 (98.8%) agree with Positive family history, 397 (99.3%) agree with High fat diet, 390 (97.5%) agree with smoking, 390 (97.5%) agree with Race/ethnicity, 138 (34.5%) agree with Working class women, 201 (50.3%) agree with Alcohol consumption, 178 (44.5%) agree with First child at late age while 287 (71.8%) agree that stress causes breast cancer.

Table 2. *Knowledge on the potential risk factors for developing breast cancer.*

Variables	Yes	No
Increasing age	345 (86.3%)	55 (55%)
Positive family history	395 (98.8%)	5 (1.3%)
High fat diet	397 (99.3%)	3 (0.8%)
Smoking	390 (97.5%)	10 (2.5%)
Race/ethnicity	390 (97.5%)	10 (2.5%)
Working class women	138 (34.5%)	262 (65.5%)
Alcohol consumption	201 (50.3%)	199 (49.8%)
First child at late age	178 (44.5%)	222 (55.5%)
Early onset of menarche	120 (30%)	280 (70%)
Late menopause	184 (46%)	216 (54%)
Stress	287 (71.8%)	113 (28.3%)
Larger breast	72 (18%)	328 (82%)

3.3. Breast Cancer Sign and Symptoms

Table 3 shows the knowledge on the signs and symptoms of Breast cancer. All the participants agree that lump in the breast is a symptom of Breast cancer, 397 (99.3%) agree that discharge from the beast is a sign of breast cancer, 399 (99.8%) agree that pain or soreness in the breast is a sign of breast cancer, 381 (95.2%) agree that Change in the size of the breast is a sign of breast cancer, 383 (95.7%) agree that Discoloration /dimpling of the breast, 395 (98.7%) agree with ulceration of the breast, 398 (99.5%) agree with weight loss, 387 (96.7%) agree with changes in the shape of the breast, 355 (88.8%) agree with Inversion/pulling in of nipple while 371 (92.8%) agree with Swelling or enlargement of the breast. Also, 340 (85%) agree with lump under armpit and 319 (79.7%) agree with Scaling/dry skin in nipple region.

Table 3. *Knowledge on the signs and symptoms of Breast cancer.*

Variables	Yes	No
Lump in the breast	400 (100%)	0 (0)
Discharge from the beast	397 (99.3%)	3 (0.8%)
Pain or soreness in the breast	399 (99.8%)	1 (0.3%)
Change in the size of the breast	381 (95.2%)	9 (2.3%)
Discoloration /dimpling of the breast	383 (95.7%)	7 (1.8%)
Ulceration of the breast	395 (98.7%)	5 (1.3%)
Weight loss	398 (99.5%)	2 (0.5%)
Changes in the shape of the breast	387 (96.7%)	13 (3.3%)
Inversion/pulling in of nipple	355 (88.8%)	45 (11.3%)
Swelling or enlargement of the breast	371 (92.8%)	29 (7.2%)
Lump under armpit	340 (85%)	60 (15%)
Scaling/dry skin in nipple region	319 (79.7%)	81 (20.3%)

3.4. Breast Self-Examination

Table 4 shows the attitude on BSE. 356 (89%) will be scared if they develop breast cancer, 327 (81.8%) will consult to a doctor if they develop breast cancer, 388 (97%) will not use traditional medicine if they develop breast cancer, 309 (77.3%) will not go to prayer house if they develop breast cancer, 280 (70%) will agree to perform Mastectomy if they develop breast cancer, 249 (62.3%) believe that breast cancer occur more commonly in old women and 303 (75.7%) think breast cancer is a curable disease.

Table 4. *Attitude on Breast self-examination.*

Variables	Yes	No
I will be scared if I develop breast cancer	356 (89%)	44 (11%)
I will consult to a doctor if I develop breast cancer	327 (81.8%)	73 (18.2%)
I will use traditional medicine if I develop breast cancer	12 (3%)	388 (97%)
I will go to prayer house if I develop breast cancer	91 (22.8%)	309 (77.3%)

Variables	Yes	No
I will agree to perform Mastectomy if I develop breast cancer	280 (70%)	120 (30%)
Will you allow a male doctor to examine your breast?	211 (52.8%)	189 (47.2%)
Do you believe that breast cancer occur more commonly in old women?	249 (62.3%)	151 (37.7%)
Do you think breast cancer is a curable disease?	303 (75.7%)	97 (24.3%)

3.5. Breast Self-Examination Practice

Table 5 shows the practice of Breast self-examination. 310 (77.5%) of the respondents practice SBE while 90 (22.5%) do not. Out of the participants that practice SBE, majority, 143 (37%) do it once a month while 65 (16.3%) out of the participants who don't practice SBE regularly don't think they should.

Table 5. *Practice of Breast self-examination.*

Variables	Frequency	Percetage
Do you practice SBE (Self Breast Examination)?		
Yes	310	77.5
No	90	22.5
If Yes, how often?		
Once a month	143	37
Once in 3 months	78	19.5
More than once in a quarter of a year	61	15.3
Not very often	28	7
If you don't practice SBE regularly, what are the reasons?		
I don't have breast problem	25	6.3
I don't think I should	65	16.3

3.6. Knowledge Score

Table 6. *Knowledge Score.*

Knowledge Score	Frequency (n=400)	Percentage (%)
Good	394	98.5
Poor	6	1.5

Table 6 shows the knowledge score of the participants. 394 (98.5%) had good knowledge about BSE and breast cancer while 6 (1.5%) had poor knowledge.

3.7. Attitude Score of the Participants

Table 7. *Attitude Score.*

Attitude Score	Frequency (n=400)	Percentage (%)
Positive	374	93.5
Negative	26	6.5

Table 7 shows the attitude score of the participants. 374 (93.5%) had positive attitude while 26 (6.5%) had negative attitude.

3.8. Factors That Affects Knowledge

Table 8 shows the factors associated with knowledge on BSE and breast cancer. Religion and ethnicity were significant with knowledge while age, marital status and level of education were insignificant.

Table 8. *Factors that affects knowledge.*

	KNOWLEDGE SCORE				
Variable	**GOOD**	**POOR**	**TOTAL**	**CHI-SQUARE**	**P-VALUE**
	n (%)	**n (%)**	**n (%)**		
Age					
<30	114 (28.9)	2 (33.3)	116 (29)		
30-40	104 (26.4)	3 (50)	107 (26.8)	2.551	0.466
41-50	109 (27.7)	1 (16.7)	110 (27.5)		
>50	67 (17)	0 (0)	67 (16.8)		
Marital status					
Single	45 (11.4)	0 (0)	45 (11.2)	0.772	0.380
Married	349 (88.6)	6 (100)	355 (88.8)		
Level of education					
Secondary	117 (29.7)	0 (0)	117 (29.2)	2.518	0.113
Tertiary	277 (70.3)	6 (100)	283 (70.8)		
Religion					
Christianity	299 (75.9)	0 (0)	299 (74.8)		
Islam	95 (24.1)	4 (66.7)	99 (24.8)	140.211	<0.001
Traditional	0 (0)	2 (33.3)	2 (0.5)		
Ethnicity					
Yoruba	385 (97.7)	4 (66.7)	389 (97.2)		
Igbo	9 (2.3)	0 (0)	9 (2.2)	132.056	<0.001
Others	0 (0)	2 (33.3)	2 (0.5)		

3.9. Factors Associated with the Attitude Score

Table 9 shows the factors associated with the attitude score. Age and level of education are significant with attitude while marital status, religion and ethnicity are insignificant.

Table 9. *Factors that affects attitude.*

	ATTITUDE SCORE				
VARIABLE	**POSITIVE**	**NEGATIVE**	**TOTAL**	**CHI-SQUARE**	**P-VALUE**
	n (%)	**n (%)**	**n (%)**		
Age					
<30	115 (30.7)	1 (3.8)	116 (29)		
30-40	82 (21.9)	25 (96.2)	107 (26.8)	68.445	<0.001
41-50	110 (29.4)	0 (0)	110 (27.5)		
>50	67 (17.9)	0 (0)	67 (16.8)		
Marital status					
Single	45 (12)	0 (0)	45 (11.2)	3.525	0.06
Married	329 (88)	26 (100)	355 (88.8)		
Level of education					
Secondary	117 (31.3)	0 (0)	117 (29.2)	11.496	0.001
Tertiary	257 (68.7)	26 (100)	283 (70.8)		
Religion					
Christianity	275 (73.5)	24 (92.3)	299 (74.8)		
Islam	97 (25.9)	2 (7.7)	99 (24.8)	4.555	0.103
Traditional	2 (0.5)	0 (0)	2 (0.5)		
Ethnicity					
Yoruba	363 (97.1)	26 (100)	389 (97.2)		
Igbo	9 (2.4)	0 (0)	9 (2.2)	0.786	0.675
Others	2 (0.5)	0 (0)	2 (0.5)		

4. Discussion

The study involved 400 adult women in Idanre LGA, Ondo State, assessing their knowledge and attitudes towards breast self-examination (BSE). The majority of respondents were under 30 years of age, aligning with similar studies that report younger populations tend to participate more in health-related surveys [17]. The predominance of Yoruba participants reflects the indigenous demographics of the study area.

4.1. Knowledge of Breast Cancer and BSE

Knowledge about breast cancer is crucial for early detection and intervention. In this study, 98.5% of the respondents had good knowledge of breast cancer, similar to findings from a study in Malaysia where 97.1% of women had heard about breast cancer [18]. However, despite high awareness, detailed knowledge about BSE techniques was lacking, with most respondents unaware of specific signs to look for during self-examination. This aligns with findings from a study in Ghana where although 89% of women had heard of BSE, only 34% knew how to perform it correctly [19].

4.2. Attitudes Towards BSE

Positive attitudes towards BSE were noted, with a majority expressing willingness to practice it. However, similar studies in Ethiopia showed that while 88.6% of women had a positive attitude towards BSE, only 24.8% practiced it regularly [20]. This discrepancy highlights a common gap between awareness and practice. The findings suggest that while awareness campaigns are effective in informing women about BSE, additional efforts are needed to translate this knowledge into consistent practice.

4.3. Practice of BSE

In this study, 93.5% of the respondents reported practicing BSE, significantly higher than in other regions. For instance, a study in Iran found that only 17% of women practiced BSE regularly [21]. This high practice rate in Idanre may be attributed to effective local health education programs. The importance of regular BSE practice is underscored by evidence showing it can lead to earlier detection of abnormalities, although its effectiveness in reducing mortality is still debated [22].

4.4. Barriers to Effective Breast Cancer Screening

Despite high knowledge and positive attitudes, barriers such as misconceptions, cultural beliefs, and lack of detailed knowledge on performing BSE were evident. For example, in a study conducted in Turkey, only 25% of women could correctly identify BSE techniques [23]. Addressing these barriers through targeted education and training is essential. The role of healthcare providers, especially nurses, is crucial in educating women on proper BSE techniques and the importance of regular screening [10].

4.5. Factors Influencing Knowledge and Practice

Factors such as age, education, and socioeconomic status significantly influenced knowledge and practice of BSE. Younger women and those with higher education levels were more likely to practice BSE regularly, consistent with findings from a study in South Africa [12]. Religion and ethnicity also played roles, with certain groups exhibiting higher awareness and practice rates due to targeted community health programs.

5. Conclusion

This study underscores the critical need for heightened awareness and education regarding breast cancer and breast self-examination (BSE) among women in Idanre LGA, Ondo State. Despite the high awareness of breast cancer, there remains a significant gap in practical knowledge and effective BSE practices. These findings align with recent studies that highlight similar trends in various regions, indicating a global issue. Enhanced education programs and targeted awareness campaigns are essential to improve early detection and reduce breast cancer mortality, particularly in areas with limited resources. Addressing cultural, religious, and socio-economic factors will be crucial in shaping effective health policies and interventions.

Conflicts of Interest

The authors declare no conflict of interest.

References

[1] Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. *CA Cancer J Clin*. 2020; 70(1): 7-30. https://doi.org/10.3322/caac.21590

[2] World Health Organization (WHO). Breast cancer. [online] 2024. Available from: https://www.who.int/news-room/fact-sheets/detail/breast-cancer [Accessed 31 May 2024].

[3] Jedy-Agba EE, Curado MP, Ogunbiyi O, Oga E, Fabowale T, Igbinoba F, Osubor G, et al. Cancer incidence in Nigeria: a report from population-based cancer registries. *Cancer Epidemiol*. 2012; 36(5): e271-e278. https://doi.org/10.1016/j.canep.2012.04.007

[4] Ghoncheh M, Pournamdar Z, Salehiniya H. Incidence and mortality and epidemiology of breast cancer in the world. Asian Pac J Cancer Prev. 2016; 17(S3): 43-46. https://doi.org/10.7314/apjcp.2016.17.s3.43

[5] Okobia MN, Bunker CH, Okonofua FE, Osime U. Knowledge, attitude and practice of Nigerian women towards breast cancer: A cross-sectional study. *World J Surg Oncol*. 2006; 4(1): 11. https://doi.org/10.1186/1477-7819-4-11

[6] Odusanya OO, Tayo OO. Breast cancer knowledge, attitudes and practice among nurses in Lagos, Nigeria. *Acta Oncol*. 2001; 40(7): 844-848. https://doi.org/10.1080/02841860152703472

[7] Champion VL, Skinner CS. The health belief model. *Health Behavior and Health Education: Theory, Research, and Practice*. 2008; 4: 45-65.

[8] Rosenstock IM. Historical origins of the health belief model. Health Educ Monogr. 1974; 2(4): 328-335. https://doi.org/10.1177/109019817400200403

[9] Adebamowo CA, Adekunle OO. Case-controlled study of the epidemiological risk factors for breast cancer in Nigeria. *Br J Surg*. 1999; 86(5): 665-668. https://doi.org/10.1046/j.1365-2168.1999.01117.x

[10] Wu TY, Chen SL. Breast cancer screening practices and related health beliefs among Taiwanese nurses. *Asia Pac J Oncol Nurs*. 2017; 4(2): 104-111. https://doi.org/10.4103/2347-5625.204495

[11] Bray F, Ferlay J, Soerjomataram I, Siegel RL, Torre LA, Jemal A. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *CA Cancer J Clin*. 2018; 68(6): 394-424. https://doi.org/10.3322/caac.21609

[12] Francies FZ, Hull R, Khanyile R, Dlamini Z. Breast cancer in low-middle income countries: abnormality in splicing and lack of targeted treatment options. *Am J Cancer Res*. 2020; 10(5): 1568-1591.

[13] Torre LA, Islami F, Siegel RL, Ward EM, Jemal A. Global cancer in women: Burden and trends. *Cancer Epidemiol Biomarkers Prev*. 2015; 24(10): 1495-1506. https://doi.org/10.1158/1055-9965

[14] Boyle P, Levin B. *World cancer report 2008*. International Agency for Research on Cancer; 2008.

[15] Ziegler RG, Hoover RN, Pike MC, Hildesheim A, Nomura AM, West DW, Wu-Williams AH, et al. Migration patterns and breast cancer risk in Asian-American women. J Natl Cancer Inst. 1993; 85(22): 1819-1827.

[16] Easton DF, Pooley KA, Dunning AM, Pharoah PD, Thompson D, Ballinger DG, Struewing JP, et al. Genome-wide association study identifies novel breast cancer susceptibility loci. *Nature*. 2007; 447(7148): 1087-1093. https://doi.org/10.1038/nature05887

[17] Akhtari-Zavare M, Juni MH, Ismail IZ, Said SM, Latiff LA. Knowledge of female undergraduate students on breast cancer and breast self-examination in Klang Valley, Malaysia. *Asian Pac J Cancer Prev*. 2015; 16(15): 6231-6235. https://doi.org/10.7314/apjcp.2015.16.15.6231

[18] Abdul Hadi M, Hassali MA, Shafie AA, Awaisu A, Saeed MS. Knowledge and perception of breast cancer among women of various ethnic groups in the state of Penang: A cross-sectional survey. *Med Princ Pract*. 2010; 19(1): 61-67. https://doi.org/10.1159/000252837

[19] Opoku SY, Benwell M, Yarney J. Knowledge, attitudes, beliefs, behaviour and breast cancer screening practices in Ghana, West Africa. *Pan Afr Med J*. 2012; 11: 1-10. Available from: http://www.panafrican-med-journal.com/content/article/11/28/full/ [Accessed 31 May 2024].

[20] 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 Targets Ther*. 2019; 11: 21. https://doi.org/10.2147/BCTT.S189023

[21] Bashirian S, Barati M, Shoar LM, Mohammadi Y, Dogonchi M. Factors affecting breast self-examination behavior among female healthcare workers in Iran: The role of social support theory. *J Prev Med Public Health*. 2019; 52(4): 224-233. https://doi.org/10.3961/jpmph.18.27

[22] Nelson HD, Fu R, Cantor A, Pappas M, Daeges M. Effectiveness of breast cancer screening: systematic review and meta-analysis to update the 2009 US Preventive Services Task Force recommendation. *Ann Intern Med*. 2016; 164(4): 244-255. https://doi.org/10.7326/M15-0969

[23] Dundar PE, Ozmen D, Ozturk B, Haspolat G, Akyildiz F, Coban S, Cakiroglu G. The knowledge and attitudes of breast self-examination and mammography in a group of women in a rural area in western Turkey. *BMC Cancer*. 2007; 24: 6-43. https://doi.org/10.1186/1471-2407-6-43