

ASSESSMENT OF KNOWLEDGE, ATTITUDES, AND PRACTICES OF FAMILY
PHYSICIANS REGARDING BREAST CANCER SCREENING AND EARLY
DETECTION IN PRIMARY HEALTH CARE CENTERS IN BAGHDAD, IRAQ: A
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ABSTRACT

Background: Breast cancer remains a major public health concern worldwide. Family physicians play an essential role in promoting screening and early detection. This study aimed to assess the knowledge, attitudes, and practices of family physicians regarding breast cancer screening in primary health care centers in Baghdad, Iraq. **Methods:** A cross-sectional study included 106 family physicians working in primary health care centers in Baghdad. Data were collected using a structured questionnaire assessing sociodemographic characteristics, knowledge, attitudes, screening practices, and perceived barriers. Descriptive and inferential statistical analyses were performed, with $P < 0.05$ considered statistically significant. **Results:** Most participants were females (84.9%), and 67.9% were aged 30–45 years. The mean knowledge, attitude, and practice scores were 4.77 ± 2.93 , 6.74 ± 0.50 , and 7.21 ± 3.05 , respectively. Mammography was recognized by 94.3% of physicians, while only 32.1% always referred eligible women for mammography. Screening practices were significantly associated with clinical experience ($P = 0.014$), primary healthcare experience ($P = 0.001$), and previous screening training ($P < 0.001$). Heavy workload (43.4%) and insufficient consultation time (39.6%) were the principal reported barriers. **Conclusion:** Family physicians demonstrated favorable attitudes but comparatively lower knowledge and screening practice scores. Strengthening professional training, standardized screening protocols, and referral systems may improve breast cancer early detection services.

KEYWORDS: Breast cancer; Screening; Early detection; Knowledge; Attitudes; Practices; Family physicians; Iraq.

INTRODUCTION

Breast cancer remains a major global public health challenge and is the most frequently diagnosed malignancy among women worldwide. According to the International Agency for Research on Cancer (IARC), approximately 2.3 million new breast cancer cases were diagnosed globally in 2022, accounting for 11.6% of all newly diagnosed cancers. Despite advances in diagnostic techniques and treatment strategies, breast cancer continues to contribute substantially to cancer-related

morbidity and mortality, particularly in low- and middle-income countries, where delayed diagnosis and limited access to healthcare services remain important challenges.^[1] Early detection is essential for improving breast cancer outcomes, as diagnosis at an earlier stage increases treatment opportunities and improves survival. Screening mammography is an established method for detecting breast cancer before symptoms develop. The United States Preventive Services Task Force updated its recommendations in 2024, advising biennial

mammography screening for women aged 40–74 years at average risk. However, screening recommendations should consider individual risk factors, national guidelines, available resources, and patient preferences.^[2] The World Health Organization (WHO), through its Global Breast Cancer Initiative, emphasizes health promotion, early detection, timely diagnosis, and comprehensive management as essential components of effective breast cancer control.^[3] Family physicians play a central role in implementing breast cancer prevention and early detection strategies within primary health care centers (PHCCs). Their responsibilities include identifying women at increased risk, providing appropriate screening counseling, recommending mammography, recognizing suspicious clinical findings, and ensuring timely referral for further assessment. Effective implementation of these activities requires adequate knowledge, positive professional attitudes, appropriate clinical practices, and accessible referral pathways. In Iraq, breast cancer represents an important women's health concern, making the strengthening of early detection services particularly relevant. Previous research conducted among primary healthcare physicians in Baghdad has examined knowledge and screening practices, highlighting the importance of assessing physicians' preparedness to deliver breast cancer screening services.^[4] Additionally, a study among female physicians in Babylon reported generally moderate attitudes but unsatisfactory breast self-examination practices, suggesting potential gaps between awareness and actual preventive behavior.^[5] Assessing physicians' knowledge, attitudes, and practices (KAP) can help identify educational needs, professional barriers, and organizational limitations affecting screening implementation. Such evidence may support targeted training programs, standardized clinical protocols, and improvements in referral systems within primary healthcare settings. Therefore, the present study aimed to assess the knowledge, attitudes, and practices of family physicians regarding breast cancer screening and early detection in primary health care centers in Baghdad, Iraq, and to identify sociodemographic and professional factors associated with their screening-related practices.

Method

Study Design and Setting: A descriptive cross-sectional study was conducted among family physicians working in primary health care centers (PHCCs) in Baghdad, Iraq, from January 2026 to August 2026.

Study Population and Sample Size: The study included 106 family physicians working in PHCCs in Baghdad. Physicians with different academic qualifications and

years of clinical experience were included. Participation was voluntary, and physicians with incomplete responses were retained for analyses where the relevant data were available.

Data Collection: Data were collected using a structured questionnaire consisting of 25 questions covering sociodemographic characteristics, professional background, knowledge, attitudes, practices, and barriers related to breast cancer screening. Sociodemographic variables included age, gender, academic qualification, clinical experience, years working in PHCCs, and previous screening training. Age was categorized into three groups: less than 30, 30–45, and more than 45 years.

Assessment of Knowledge, Attitudes, and Practices:

Knowledge was assessed through questions addressing the recommended screening age, screening methods, and breast cancer risk factors. Attitudes were evaluated using statements concerning physicians' responsibilities, screening counseling, clinical examination, standardized protocols, and professional training. Practices were assessed through the reported frequency of screening discussions, clinical breast examinations, mammography referrals, and patient education. Additional questions explored workload, consultation time, referral systems, and guideline availability. Provisional composite scores were calculated for knowledge (0–8), attitudes (0–7), and practices (0–12), with higher scores indicating better performance within each domain. The screening-age question was excluded from the knowledge score pending selection of a reference guideline.

Statistical Analysis: Data were analyzed using descriptive and inferential statistical methods. Categorical variables were expressed as frequencies and percentages, while numerical scores were summarized using means, standard deviations, medians, and interquartile ranges. The Mann–Whitney U test and Kruskal–Wallis test were used to compare KAP scores across sociodemographic and professional groups, as appropriate. A P-value <0.05 was considered statistically significant.

RESULTS

The study included 106 family physicians, predominantly females (84.9%). Most participants were aged 30–45 years (67.9%), and 59.4% held Arab or Iraqi Board qualifications. Approximately 43.4% had 11–20 years of clinical experience, while 50.9% had received formal training in breast cancer screening. As in table 1.

Table 1: Sociodemographic and professional characteristics of family physicians (n=106)

Variables	Categories	No. (%)
Age (years)	<30	11 (10.4%)
	30–45	72 (67.9%)
	>45	23 (21.7%)
Gender	Female	90 (84.9%)

	Male	16 (15.1%)
Highest qualification	Arab / Iraqi Board	63 (59.4%)
	MBChB	19 (17.9%)
	Diploma	19 (17.9%)
	MSc	5 (4.7%)
Clinical practice (years)	11-20	46 (43.4%)
	5-10	28 (26.4%)
	>20	23 (21.7%)
	<5	9 (8.5%)
PHCC experience (years)	<5	38 (35.8%)
	>10	37 (34.9%)
	5-10	31 (29.2%)
Formal screening training	Yes	54 (50.9%)
	No	52 (49.1%)

More than half of the physicians (54.7%) identified 40 years as the recommended age for initiating breast cancer screening. Mammography was the most frequently recognized screening method (94.3%). Increasing age

(78.3%) and family history (71.7%) were the most commonly identified risk factors, while alcohol consumption was recognized by only 33.0%. as in table 2.

Table 2: Knowledge regarding breast cancer screening and early detection.

Knowledge item	Response	n (%)
Recommended starting age	40 years	58 (54.7%)
	< 40 years	35 (33.0%)
	45 years	7 (6.6%)
	50 years	5 (4.7%)
	Not sure	1 (0.9%)
Screening methods selected	Breast self-awareness	58 (54.7%)
	Breast ultrasound	2 (1.9%)
	Clinical Breast Examination (CBE)	60 (56.6%)
	Mammography	100 (94.3%)
Risk factors selected	Alcohol use	35 (33.0%)
	Family history	76 (71.7%)
	Increasing age	83 (78.3%)
	Late menopause	53 (50.0%)
	Nulliparity	53 (50.0%)
	Obesity	53 (50.0%)
	Smoking	53 (50.0%)

Most physicians demonstrated favorable attitudes toward breast cancer screening. Almost all participants (99.1%) considered screening an essential responsibility of family physicians, while 100% acknowledged their role in

reducing breast cancer mortality. However, 87.7% agreed that time constraints negatively affected screening services. As in table 3.

Table 3: Attitudes toward breast cancer screening and early detection.

Statement	Response	n (%)
Essential responsibility	Agree	105 (99.1%)
	Disagree	1 (0.9%)
Role in mortality reduction	Agree	106 (100.0%)
Counseling for eligible women	Agree	105 (99.1%)
	Disagree	1 (0.9%)
Routine clinical breast examination	Agree	86 (81.1%)
	Disagree	20 (18.9%)
Standardized PHCC protocols	Agree	104 (98.1%)
	Disagree	2 (1.9%)
Additional training	Agree	104 (98.1%)
	Disagree	2 (1.9%)
Time constraints	Agree	93 (87.7%)

Awareness campaigns	Disagree	13 (12.3%)
	Agree	104 (98.1%)
	Disagree	2 (1.9%)

Screening practices varied among participants. Approximately 30.2% always discussed breast cancer screening with eligible women, 24.5% always performed clinical breast examinations, and 32.1% always referred

women for mammography. Furthermore, 40.6% consistently provided breast self-examination education, while 58.5% reported counseling fewer than five women. As in table 4.

Table 4: Screening and early detection practices.

Practice item	Response	n (%)
Screening discussions	Sometimes	34 (32.1%)
	Always	32 (30.2%)
	Often	26 (24.5%)
	Rarely	13 (12.3%)
	Never	1 (0.9%)
Clinical breast examination	Sometimes	33 (31.1%)
	Always	26 (24.5%)
	Often	25 (23.6%)
	Rarely	14 (13.2%)
	Never	8 (7.5%)
Mammography referrals	Always	34 (32.1%)
	Sometimes	30 (28.3%)
	Often	21 (19.8%)
	Rarely	17 (16.0%)
	Never	4 (3.8%)
Breast self-examination education	Always	43 (40.6%)
	Sometimes	22 (20.8%)
	Often	21 (19.8%)
	Rarely	10 (9.4%)
	Never	10 (9.4%)
Women counseled	<5	62 (58.5%)
	5-10	25 (23.6%)
	>20	11 (10.4%)
	11-20	8 (7.5%)

The mean knowledge score was 4.77 ± 2.93 (59.7% of the maximum score), compared with 6.74 ± 0.50 (96.2%) for attitudes and 7.21 ± 3.05 (60.1%) for practices. These

findings indicate markedly favorable attitudes, while knowledge and practice scores were comparatively lower on their respective provisional scales. As in table 5.

Table 5: Distribution of provisional knowledge, attitude, and practice scores.

Domain	Valid n	Mean $\pm$ SD	Median (IQR)	Observed range	Mean % of maximum
Knowledge	106	4.77 ± 2.93	4.50 (2.00–8.00)	1–8	59.7%
Attitude	106	6.74 ± 0.50	7.00 (7.00–7.00)	5–7	96.2%
Practice	106	7.21 ± 3.05	7.50 (5.00–10.00)	0–12	60.1%

Age groups were significantly associated with knowledge ($P=0.023$) and attitude scores ($P=0.022$), but not practice scores ($P=0.079$). Practice scores differed significantly according to clinical experience ($P=0.014$) and PHCC experience ($P=0.001$). Physicians who

received formal screening training demonstrated significantly higher practice scores than untrained physicians (median 9 versus 5; $P<0.001$). Gender and academic qualifications showed no statistically significant associations with KAP scores. As in table 6.

Table 6: Association of professional characteristics with provisional KAP scores.

Characteristic	Category	n	Knowledge median (IQR)	Attitude median (IQR)	Practice median (IQR)
Age (years)	<30	11	2.0 (2.0–2.0)	7.0 (6.0–7.0)	4.0 (4.0–5.0)
	30–45	72	7.0 (2.0–8.0)	7.0 (6.0–7.0)	7.5 (4.0–10.0)
	>45	23	2.0 (2.0–7.5)	7.0 (7.0–7.0)	8.0 (6.0–10.0)

P-value			0.023	0.022	0.079
Gender		3	7.0 (4.5–7.5)	7.0 (7.0–7.0)	5.0 (2.5–8.5)
	Female	90	2.0 (2.0–8.0)	7.0 (6.0–7.0)	8.0 (5.0–10.0)
	Male	16	7.0 (2.0–8.0)	7.0 (7.0–7.0)	6.0 (4.0–8.0)
P-value			0.868	0.057	0.276
Highest qualification	Arab / Iraqi Board	63	7.0 (2.0–8.0)	7.0 (7.0–7.0)	8.0 (5.0–10.0)
	Diploma	19	2.0 (2.0–8.0)	7.0 (7.0–7.0)	8.0 (5.0–10.0)
	MBChB	19	2.0 (2.0–8.0)	7.0 (6.0–7.0)	4.0 (3.0–9.0)
	MSc	5	2.0 (2.0–8.0)	7.0 (6.0–7.0)	9.0 (4.0–11.0)
P-value			0.743	0.090	0.118
Clinical practice (years)	11-20	46	7.0 (2.0–8.0)	7.0 (7.0–7.0)	8.0 (5.2–10.0)
	5-10	28	2.0 (2.0–8.0)	7.0 (6.0–7.0)	5.5 (4.0–10.0)
	<5	9	2.0 (2.0–7.0)	7.0 (7.0–7.0)	3.0 (2.0–5.0)
	>20	23	7.0 (2.0–8.0)	7.0 (7.0–7.0)	9.0 (5.5–10.0)
P-value			0.531	0.089	0.014
PHCC experience (years)	5-10	31	7.0 (2.0–8.0)	7.0 (7.0–7.0)	8.0 (7.0–10.0)
	<5	38	2.0 (2.0–8.0)	7.0 (6.0–7.0)	4.0 (4.0–8.5)
	>10	37	2.0 (2.0–8.0)	7.0 (7.0–7.0)	8.0 (6.0–9.0)
P-value			0.709	0.229	0.001
Formal screening training	No	52	4.5 (2.0–8.0)	7.0 (6.8–7.0)	5.0 (4.0–8.0)
	Yes	54	4.5 (2.0–8.0)	7.0 (7.0–7.0)	9.0 (6.2–11.0)
P-value			0.892	0.629	<0.001

Heavy workload (43.4%) and insufficient consultation time (39.6%) were the most frequently reported barriers to breast cancer screening. More than half of physicians (54.7%) considered the referral system partially

adequate, while 79.2% reported the availability of screening guidelines in their primary health care centers. As in table 7.

Table 7: Barriers and health-system factors affecting screening.

Factor	Response	n (%)
Reported barriers	Heavy workload	46 (43.4%)
	Lack of consultation time	42 (39.6%)
	Patient refusal	3 (2.8%)
	Poor patient awareness	15 (14.2%)
Referral system adequacy	Partially	58 (54.7%)
	Yes	31 (29.2%)
	No	17 (16.0%)
Guidelines available in PHCC	Yes	84 (79.2%)
	No	22 (20.8%)

DISCUSSION

The present study assessed knowledge, attitudes, and practices regarding breast cancer screening among 106 family physicians working in primary health care centers in Baghdad, Iraq. The findings demonstrated highly favorable attitudes toward breast cancer screening, although knowledge and reported screening practices were comparatively lower. This discrepancy suggests that recognizing the importance of early detection does not necessarily translate into consistent clinical implementation. The mean knowledge score was 4.77 ± 2.93 (59.7% of the maximum score). This finding was comparable to a recent Jordanian study involving 544 healthcare providers, which reported a mean knowledge score of 57.0%.^[6] Similarly, a Saudi Arabian study found that 48.6% of female healthcare workers had low knowledge regarding breast cancer.^[7] However, Aslam et al. in Pakistan reported good knowledge among 73% of physicians^[8] Such differences may reflect variations in

professional training, screening guidelines, questionnaire content, and access to continuing medical education. In the current study, mammography was recognized by 94.3% of physicians, comparable to the 98.7% reported among Pakistani physicians.^[8] Nevertheless, only 54.7% identified 40 years as the recommended screening initiation age, highlighting possible uncertainty regarding screening recommendations. A Saudi study similarly reported that only 52.1% of participating women identified age 40 as the recommended starting age.^[9] These comparisons should be interpreted cautiously because screening recommendations differ across guidelines and populations. Regarding attitudes, the present study demonstrated a mean score of 6.74 ± 0.50 , representing 96.2% of the maximum score. Nearly all physicians acknowledged their responsibility for breast cancer screening. This agrees with a Pakistani study reporting highly positive attitudes among female doctors despite suboptimal screening practices.^[10] Likewise, a

study among healthcare professionals found widespread awareness of screening methods but insufficient implementation.^[11] These findings suggest that favorable attitudes alone may be insufficient to ensure effective screening delivery. The mean practice score was 7.21 ± 3.05 (60.1% of the maximum score), while only 32.1% of physicians always referred eligible women for mammography. This was broadly consistent with a Saudi study in which 51.8% of primary healthcare physicians recommended breast cancer screening.^[12] A Jordanian study also reported a mean practice score of 49.0%.^[6] Differences may be related to healthcare organization, referral accessibility, patient attendance, and available screening facilities. Previous screening training was significantly associated with higher practice scores ($P < 0.001$). Clinical experience ($P = 0.014$) and PHCC experience ($P = 0.001$) were also significantly associated with practices. Similarly, Aslam et al. found better screening-related outcomes among physicians with higher qualifications and greater professional experience.^[8] These associations may reflect greater clinical confidence, familiarity with referral pathways, and repeated exposure to screening opportunities. However, causality cannot be established from cross-sectional findings. Heavy workload (43.4%) and insufficient consultation time (39.6%) were the principal reported barriers. A recent Pakistani study similarly identified busy schedules as a major barrier among female doctors.^[10] In contrast, studies from Saudi Arabia emphasized patient fear, embarrassment, and inadequate awareness as major obstacles.^[13,14] Such differences may arise because the present study focused on physicians' workplace limitations, whereas the Saudi studies primarily investigated patients' barriers. Furthermore, 54.7% of physicians considered referral systems partially adequate, suggesting opportunities for organizational improvement. Studies from Ethiopia demonstrated that healthcare professional recommendations were strongly associated with women's screening participation^[15], while research across the Middle East and North Africa highlighted persistent barriers to early breast examination and screening.^[16] Strengthening standardized protocols, professional training, referral pathways, and protected consultation time may therefore improve breast cancer screening practices in Baghdad's primary healthcare centers.

CONCLUSION

Family physicians demonstrated highly favorable attitudes toward breast cancer screening, despite comparatively lower knowledge and practice scores. Previous training and greater professional experience were significantly associated with better screening practices. Heavy workload and limited consultation time were major barriers. Strengthening continuous medical education, screening protocols, and referral systems is recommended.

REFERENCES

1. Sung H, Filho AM, Laversanne M, Ferlay J, Siegel RL, Soerjomataram I, Jemal A, Bray F. Global cancer statistics 2024: GLOBOCAN estimates of incidence and mortality worldwide for 34 cancers in 186 countries. *CA Cancer J Clin.* 2026 Jul-Aug; 76(4): e70090. doi: 10.3322/caac.70090. PMID: 42417444; PMCID: PMC13343830.
2. US Preventive Services Task Force; Nicholson WK, Silverstein M, Wong JB, Barry MJ, Chelmow D, Coker TR, Davis EM, Jaén CR, Krousel-Wood M, Lee S, Li L, Mangione CM, Rao G, Ruiz JM, Stevermer JJ, Tsevat J, Underwood SM, Wiehe S. Screening for Breast Cancer: US Preventive Services Task Force Recommendation Statement. *JAMA.* 2024 Jun 11; 331(22): 1918-1930. doi: 10.1001/jama.2024.5534. Erratum in: *JAMA.* 2024 Sep 30. doi: 10.1001/jama.2024.19851. Erratum in: *JAMA.* 2026 May 12; 335(18): 1640. doi: 10.1001/jama.2025.27265. PMID: 38687503.
3. World Health Organization. Global breast cancer initiative implementation framework: assessing, strengthening and scaling up of services for the early detection and management of breast cancer. Geneva: WHO; 2023. Available from: <https://www.who.int/publications-detail-redirect/9789240065987>
4. Abdulhameed AA, Al-Akydi K, Al-Diwan JK, Sultan AH. Knowledge and practice of breast cancer screening among PHC centre doctors in Al-Karkh, Baghdad. *Int J Adv Community Med.* 2024; 7(3): 119–123. doi: 10.33545/comed.2024.v7.i3b.332.
5. Attitudes and practices related to breast-cancer screening among female doctors in the province of Babylon. *Iraqi Natl J Med.* 2024; 6(1): 7–11. Available from: <https://iqnjm.com/index.php/homepage/article/view/151>
6. ALSalamat H, Qtaishat E, Jardaneh D, Al-Hadid M, Al-Ajlouni R. Knowledge, attitudes, and practice in breast cancer early detection: evidence from a nationally stratified study of healthcare providers in Jordan. *Front Public Health.* 2026 Jul 22; 14: 1845992. doi: 10.3389/fpubh.2026.1845992. PMID: 42558454; PMCID: PMC13437638.
7. Alenezi AM, Thirunavukkarasu A, Wani FA, Alenezi H, Alanazi MF, Alruwaili AS, Alashjaee RH, Alashjaee FH, Alrasheed AK, Alshrari BD. Female Healthcare Workers' Knowledge, Attitude towards Breast Cancer, and Perceived Barriers towards Mammogram Screening: A Multicenter Study in North Saudi Arabia. *Curr Oncol.* 2022 Jun 15; 29(6): 4300-4314. doi: 10.3390/curroncol29060344. PMID: 35735453; PMCID: PMC9222040.
8. Aslam A, Mustafa AG, Hussnain A, Saeed H, Nazar F, Amjad M, Mahmood A, Afzal A, Fatima A, Alkhalidi DK. Assessing Awareness, Attitude, and Practices of Breast Cancer Screening and Prevention Among General Public and Physicians in Pakistan:

- A Nation With the Highest Breast Cancer Incidence in Asia. *Int J Breast Cancer*. 2024 Sep 28; 2024: 2128388. doi: 10.1155/2024/2128388. PMID: 39372363; PMCID: PMC11455591.
9. Alruwaili NW, Alfehaid AM, Al-Toum KAS, Bin Zarah A, Alafif N. Knowledge, Attitudes, and Practices Regarding Breast Cancer Screening Among Females in Saudi Arabia. *Healthcare (Basel)*. 2026 Jul 6; 14(13): 2003. doi: 10.3390/healthcare14132003. PMID: 42451013; PMCID: PMC13362469.
 10. Tanveer S, Gul F, Peerzada AR, Johar A, Mumtaz N, Haq N, Nayab S, Bilal Elahi M, Qadus N, Ullah I. Knowledge, Attitudes, and Practices Regarding Breast Cancer and Its Prevention Among Female Doctors at a Tertiary Care Hospital in Pakistan. *Cureus*. 2026 Jan 6; 18(1): e100962. doi: 10.7759/cureus.100962. PMID: 41658846; PMCID: PMC12877411.
 11. Heena H, Durrani S, Riaz M, AlFayyad I, Tabasim R, Parvez G, Abu-Shaheen A. Knowledge, attitudes, and practices related to breast cancer screening among female health care professionals: a cross sectional study. *BMC Womens Health*. 2019 Oct 22; 19(1): 122. doi: 10.1186/s12905-019-0819-x. PMID: 31640681; PMCID: PMC6806575.
 12. Aljohani M, Alsaykhan A, Almutairi A, Almadhi F, Alhawshani T, Almishrafi S, Alharbi B. Practices of Cancer Screening for Average-Risk Cancer Patients Among Primary Healthcare Center Physicians in Al-Qassim Region, Saudi Arabia. *Cureus*. 2023 Jan 16; 15(1): e33829. doi: 10.7759/cureus.33829. PMID: 36819377; PMCID: PMC9930872.
 13. Alsalamh R, Al-Harbi FA, Alotaibi RT, Al-Harbi ON, Alshahrani N, Alfadhel SM, Fatani ER, Al-Harbi A, Lasloom RA, Alzahrani RM. Barriers to Breast Cancer Screening in Saudi Arabia: A Systematic Review and Meta-Analysis. *Cureus*. 2024 Jul 22; 16(7): e65103. doi: 10.7759/cureus.65103. PMID: 39170991; PMCID: PMC11338644.
 14. AlAbdulKader A, Gari D, Al Yousif G, Alghamdi A, AlKaltham S, AlDamigh F, AlEisawi Y, AlGhamdi A, Al-Hayek O, AlMudhi A. Perceived Barriers and Facilitators to Breast Cancer Screening Among Women in Saudi Arabia. *Breast Cancer (Dove Med Press)*. 2023 Jul 25; 15: 505-513. doi: 10.2147/BCTT.S406029. PMID: 37520408; PMCID: PMC10386841.
 15. Assefa AA, Abera G, Geta M. Breast Cancer Screening Practice and Associated Factors Among Women Aged 20-70 Years in Urban Settings of SNNPR, Ethiopia. *Breast Cancer (Dove Med Press)*. 2021 Jan 8; 13: 9-19. doi: 10.2147/BCTT.S286441. Erratum in: *Breast Cancer (Dove Med Press)*. 2021 Feb 22; 13: 133. doi: 10.2147/BCTT.S307042. PMID: 33447077; PMCID: PMC7802910.
 16. Qtaishat E, Al-Ajlouni R, Ammar K, Liswi M, Al-Ani A, Fakheraldeen R, Al-Hasson S. Exploring barriers to early breast examination and screening among Arab women in the MENA region: A KAP study. *Heliyon*. 2025 Jan 23; 11(3): e42167. doi: 10.1016/j.heliyon.2025.e42167. PMID: 39944346; PMCID: PMC11815657.