

Evaluation of Women's Knowledge about Risk Factors and Early Detection of Breast Cancer among Women Working in Governmental Sector in Gaza Strip, Palestine

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Abstract: Background: Breast cancer (BC) is the most common prevailing type of women cancer and is the second cause of cancer-related mortality in women. Purpose: The purpose of the study was to evaluate women's knowledge about signs and symptoms, risk factors and early detection of breast cancer at governmental sector in Gaza Strip. Materials & Methods: The study utilized a cross-sectional design. The sample included 253 women employed in the ministries in Gaza Strip. Data were collected through a pre-tested self-administered questionnaire. The study was conducted during the period from January to June 2023. Results: The results showed that 47.4% of the study participants aged between 31 – 40 years, and 54.9% have bachelor degree. Regarding knowledge about importance of early detection of breast cancer, 59.7% of the study participants have good knowledge, 38.3% have moderate knowledge, and 2% have low knowledge. In addition, 27.3% know that change in breast shape and size, painless breast mass, armpit node, abnormal secretions from the nipple, and thickness of breast were among symptoms of BC. Concerning risk factors, 71.2% of women stated that increasing of age will increase the possibility of developing BC, 59.3% reported that absence of pregnancy and childbirth increase the possibility of developing BC.

There were no significant association between knowledge about breast cancer with age (p-value 0.800), marital status (p-value 0.221), and level of education (p-value 0.742). Conclusion: The study concluded that women at governmental sector need more experience in dealing with breast cancer.

Keywords: Women's knowledge, Risk factors, Screening and early detection, Breast cancer, Gaza Strip.

تقييم مستوى المعرفة عن عوامل الخطورة والعلامات والأعراض والكشف المبكر لسرطان الثدي لدى النساء العاملات في القطاع الحكومي في قطاع غزة – فلسطين

الدكتورة / ايمان سليمان حسونة

التعاون الدولي | وزارة الصحة | فلسطين

المستخلص: مقدمة: يعتبر سرطان الثدي من أكثر أنواع السرطان انتشاراً لدى النساء وهو المسبب الثاني للوفاة في سرطانات الإناث. هدف الدراسة: هدفت الدراسة إلى تقييم مستوى المعرفة بالعلامات والأعراض، عوامل الخطر والاكتشاف المبكر لسرطان الثدي العاملات في القطاع الحكومي في قطاع غزة. الطريقة والإجراءات: تم استخدام المنهج الوصفي المقطعي في هذه الدراسة. تكونت عينة الدراسة من 253 موظفة من العاملات في الوزارات الحكومية في قطاع غزة، وقد تم استخدام الاستبانة لجمع البيانات، وقد أجريت الدراسة في الفترة من يناير إلى يونيو 2023. نتائج الدراسة: أظهرت النتائج أن 47.4% من المشاركات في الدراسة تراوحت أعمارهم بين 31 – 40 سنة، و54.9% حاصلين على درجة البكالوريوس. بالنسبة للمعرفة بأهمية الكشف المبكر لسرطان الثدي، فقد تبين أن 59.7% من المشاركات في الدراسة لديهن معرفة جيدة، 38.3% لديهن معرفة متوسطة، و2% لديهن معرفة متدنية. أيضاً، 71.2% من المشاركات في الدراسة لديهن معرفة بأن أعراض سرطان الثدي تتضمن تغير في شكل وحجم الثدي، وجود كتلة في الثدي غير مؤلمة، تضخم الغدد تحت الإبط، خروج سائل غير طبيعي من حلمة الثدي، وزيادة سمك الثدي. بالنسبة لعوامل الخطر، فقد ذكرت 71.2% من النساء أن التقدم في العمر يزيد من احتمالية حدوث السرطان، 59.3% ذكرن أن غياب الحمل والولادة يزيد من احتمالية حدوث السرطان. وأظهرت النتائج عدم وجود علاقة ذات دلالة إحصائية بين المعرفة بسرطان الثدي وكل من العمر (0.800)، الحالة الاجتماعية (0.221)، والمستوى التعليمي (0.742).

الخلاصة: خلصت الدراسة إلى أن النساء العاملات في القطاع الحكومي بحاجة إلى مزيد من الخبرات للتعامل مع حالات سرطان الثدي.

الكلمات المفتاحية: معرفة النساء، عوامل الخطر، الفحص والاكتشاف المبكر، سرطان الثدي، قطاع غزة.

1- Introduction

Breast cancer (BC) is the most common prevailing type of women's cancer and is the second cause of cancer-related mortality in women (Alotaibi et al., 2018). According to the World Health Organization (WHO) reports, in 2020, there were 2.3 million women diagnosed with BC and 685 000 deaths globally. As of the end of 2020, there were 7.8 million women alive who were diagnosed with BC in the past 5 years, making it the world's most prevalent cancer. BC occurs in every country of the world in women at any age after puberty but with increasing rates in later life (WHO, 2023).

BC patients account for as much as 36% of oncological patients (Nardin et al., 2020). The incidence of BC is increasing all over the world, but the highest incidence occurs in industrialized countries as almost half of the cases on a global scale are in developed countries (Global Cancer Observatory, 2020).

The ongoing increase in the incidence of BC is mainly attributed to the modern lifestyle, associated with a poor diet, nicotine smoking, excessive stress and poor physical activity (Bellanger et al., 2018). In the United States, the crude rate of BC was 85/105, in United Kingdom 94/105, in Germany 85.4/105, and the average incidence in Europe was 84/105 (Global Cancer Observatory, 2020).

In the Middle East, BC is the most prevalent cancer among females; In Qatar, BC is the most commonly diagnosed cancer among women. According to the estimation of the Global Cancer Observatory, BC ranks highest, accounting for 37.5% of new cancer cases in females recorded in Qatar (Global Cancer Observatory, 2021). The incidence of BC in Algeria is 49.3, in Jordan 39.7, in Kuwait 40.8, in Lebanon 16.9, and in Morocco 35.6 (Al-Shamsi et al., 2022).

In Palestine as in other Arab countries, BC is ranked the highest in women accounting for 35.6% (Salem, 2023). Therefore, increasing women's awareness about this disease, early detection of signs and symptoms is very importance for early treatment and better outcome. It is important to assess women's knowledge about BC in order to gain insight about strong and weak areas, which will help in designing future plans and education programs to improve women's awareness and early detection of abnormal growth in breast and seeking medical assistance as early as possible.

Several demographic, social and biomedical risk factors are associated with BC. Age of the women, early age at menarche, delayed first birth and menopause, nulliparity, short duration lactation, use of birth control pills, obesity, excess consumption of fats, hormone replacements and more importantly women having family history are considered as significant risk factors of BC by various epidemiological and clinical studies (Vishwakarma et al., 2019; Mathew et al., 2008; Mohite et al., 2015).

Early detection of BC is of great importance in improving the prognosis and increase survival rate. This can be attained by breast-self exam (BSE), periodic mammography, awareness of signs and symptoms, and adequate knowledge about risk factors contributing to the possibility of developing BC (Almeshari et al., 2023).

Due to the seriousness of BC, it is essential to make sure that women are aware of its threatening effect on life and the importance of early detection through knowing signs and symptoms. Therefore, the purpose of this study is to evaluate the knowledge about risk factors of BC, signs and symptoms and methods of screening among women working in governmental sector in Gaza Strip.

2- Materials and Methods

Design and sample

A cross-sectional study was conducted on 253 women working in governmental sector in Gaza Strip including Ministry of Health (MOH), Ministry of Education (MOE), Ministry of Labor (MOL). The targeted women were contacted online, using google forms to fill out the questionnaires.

Instrument of the study

The researcher used a pre-tested self-administered questionnaire. The questionnaire was designed to measure total knowledge about breast cancer (Alabbady et al., 2017). The questionnaire was translated to Arabic language to ease understanding of participants. The questionnaire consisted of the following parts: personal information (age, marital status, and level of education). Knowledge about signs and symptoms of BC (6 questions), screening methods and early detection of BC (3 questions), risk factors (5 questions), controlling and prevention of BC (2 questions).

Data collection

Data were collated and were subjected to quality measures. The researcher contacted the targeted women from the data base in the selected ministries. The researcher used google form to fill out the questionnaires electronically.

Data analysis

Data analysis was performed using the SPSS (version 25). Descriptive statistics such as frequencies and percentages were computed for categorical variables; whereas, means and standard deviations were for continuous variables. Chi square was performed to find out the correlations between variables. The significance level (p-value) was set at 0.05.

Ethical consideration

The researcher obtained agreement from MoH to carry out the study. Before starting data collection, participants were informed about the objectives, methodology and the approximate time to complete the questionnaire. Informed consent was obtained from each participant. In addition, participants were also assured that all information related to them will be kept confidential.

3- Results**Table (1): Distribution of study participants by sociodemographic factors**

Variable	Group	n	Percent (%)
Age	21 – 30 years	30	11.9
	31 – 40 years	120	47.4
	41 – 50 years	79	31.2
	51 – 60 years	24	9.5
	Total	253	100.0
Marital status	Married	205	81.0
	Single	31	12.3
	Divorced	13	5.1
	Widow	4	1.6
	Total	253	100.0
Level of education	Secondary school and less	25	9.9
	Intermediate diploma	19	7.5
	Bachelor degree	139	54.9
	Postgraduate	70	27.7
	Total	253	100.0

Table (1) showed that age of the women ranged between 21 – 60 years, the age group 31 – 40 years old was the most prevalent (47.4%) followed by the age group 41 – 50 years old (31.2%). The majority of them were married (81%), and most of them have bachelor degree (54.9%).

Table (2): Knowledge about the importance of early detection of breast cancer

Variable	Level of knowledge			x ²	p-value
	Low (less than 60) n(%)	Moderate (60-79) n(%)	Good (80-100) n(%)		
Age					
21 – 30 years	1(0.4)	14(5.5)	15(5.9)	3.069	0.800
31 – 40 years	2(0.8)	45(17.8)	73(28.9)		
41 – 50 years	2(0.8)	31(12.3)	46(18.2)		
51 – 60 years	0	7(2.8)	17(6.7)		

Variable	Level of knowledge			x ²	p-value
	Low (less than 60) n(%)	Moderate (60-79) n(%)	Good (80-100) n(%)		
Total	5(2.0)	97(38.3)	151(59.7)		
Marital status					
Married	3(1.2)	74(29.2)	128(50.6)	7.952	0.221
Single	1(0.4)	16(6.3)	14(5.5)		
Divorced	1(0.4)	5(2.0)	7(2.8)		
Widow	0	2(0.8)	2(0.8)		
Total	5(2.0)	97(38.3)	151(59.7)		
Level of education					
Secondary school and less	1(0.4)	11(4.3)	13(5.1)	3.511	0.742
Bachelor	4(1.6)	53(20.9)	82(32.4)		
Intermediate diploma	0	7(2.8)	12(4.7)		
Postgraduate	0	26(10.3)	44(17.4)		
Total	5(2.0)	97(38.3)	151(59.7)		

Table (2) presented the correlation between level of knowledge about the importance of early detection of BC and age, marital status, and level of education. The results showed that 2% of women have low knowledge, 38.3% have moderate knowledge, and 59.7% have good knowledge about the importance of early detection of BC. 28.9% of women from the age group 31 – 40 years and 18.2% of women from the age group 41 – 50 years have good knowledge without statistical significant differences ($p= 0.800$). Also, 50.6% of married women have good knowledge and 29.2% have moderate knowledge, without statistical significant differences ($p= 0.221$). The results also showed that 32.4% of women who hold bachelor degree have good knowledge and 20.9% have moderate knowledge, without statistical significant differences ($p= 0.742$). These results indicated that the study participants have moderate to good knowledge about the importance of early detection of BC.

Table (3): Knowledge about signs and symptoms of breast cancer

Answers about symptoms of BC	n	%
Change in breast shape & size, painless breast mass, armpit node	3	1.2
Change in breast shape & size, painless breast mass, armpit node, abnormal secretions from the nipple	3	1.2
Change in breast shape & size, painless breast mass, armpit node, abnormal secretions from the nipple, thickness of breast tissue	69	27.3
Change in breast shape & size, painless breast mass, armpit node, abnormal secretions from the nipple, thickness of breast tissue, itching, ulceration of nipple	26	10.3
Change in breast shape & size, painless breast mass, armpit node, visible blood vessels on skin of breast	1	0.4
Change in breast shape & size, painless breast mass, armpit node, thickness of breast	2	0.8
Change in breast shape & size, thickness of breast tissue	42	16.6
Change in breast shape & size, white milk-like secretion from the nipple	2	0.8
Painless breast mass, armpit node	44	17.4
Painless breast mass, armpit node, abnormal secretions from the nipple	2	0.8
Painless breast mass, armpit node, abnormal secretions from the nipple, inverted nipple	1	0.4
Painless breast mass, armpit node, abnormal secretions from the nipple, visible blood vessels on skin of breast	1	0.4
Painless breast mass, armpit node, abnormal secretions from the nipple, visible blood vessels on skin of breast, thickness of breast tissue	6	2.4

Answers about symptoms of BC	n	%
Painless breast mass, armpit node, abnormal secretions from the nipple, itching, ulceration of nipple	1	0.4
Painless breast mass, armpit node, thickness of breast tissue	6	2.4
Painless breast mass, white milk-like secretion from the nipple, visible blood vessels on skin of breast, itching, ulceration of nipple	4	1.6
All the symptoms	40	15.8
Total	253	100.0

Table (3) illustrated the knowledge about signs and symptoms of BC. The results showed that 27.3% of study participants know that change in breast shape & size, painless breast mass, armpit node, abnormal secretions from the nipple, and thickness of breast were among symptoms of BC, 17.4% know that symptoms of BC included painless breast mass, and axillary node. Also, 15.8% know all the symptoms of BC. These results indicated that women knew most of the signs and symptoms of BC.

Table (4): Knowledge about risk factors of breast cancer

Factor	Response	n	Percent (%)
Effect of aging on the possibility of developing BC	Decrease	4	1.6
	Increase	180	71.2
	No effect	33	13.0
	I do not know	36	14.2
Effect of not becoming pregnant on the possibility of developing BC	Decrease	15	5.9
	Increase	150	59.3
	No effect	54	21.3
	I do not know	34	13.4
Effect of removal of ovaries on the possibility of developing BC	Decrease	22	8.7
	Increase	106	41.9
	No effect	105	41.5
	I do not know	20	7.9
Effect of obesity after menopause on the possibility of developing BC	Decrease	6	2.4
	Increase	145	57.3
	No effect	66	26.1
	I do not know	36	14.2
Main reason of increasing the possibility of developing BC in obese women after menopause	Elevated estrogen level	42	16.6
	Elevated estrogen level, elevated level of antioxidants in the blood	124	49.0
	elevated level of antioxidants in the blood	30	11.9
	Inadequate physical activity	57	22.5

Table (4) showed that 71.2% of women stated that increasing of age will increase the possibility of developing BC, 59.3% reported that absence of pregnancy and childbirth increase the possibility of developing BC, 41.9% said that removal of ovaries increase the chance of having BC, 57.3% stated that obesity after menopause increase the possibility of BC. Also, 49% of women stated that elevated estrogen level, and elevated level of antioxidants in the blood increase the possibility of developing BC after menopause. These results reflected that the studied women were knowledgeable about the possible risk factors of BC.

Table (5): Knowledge about methods of screening, early detection and prevention of breast cancer

Knowledge about:	n	Percent (%)
Methods of screening and early detection of BC		
Breast self-exam (BSE)	38	15.0
BSE, radio-active imaging	13	5.1
BSE, radio-active imaging, fine needle aspiration	6	2.4
BSE, radio-active imaging, ultra-sonography	7	2.8
BSE, clinical exam	33	13.0

Knowledge about:	n	Percent (%)
BSE, clinical exam, radio-active imaging	40	15.8
BSE, clinical exam, ultra-sonography	10	4.0
BSE, ultra-sonography	18	7.1
Clinical exam, radio-active imaging	8	3.2
All the methods	80	31.6
Total	253	100.0
Preferable time to perform BSE		
Every week	6	2.4
Every month, before menstruation	6	2.4
Every month, after menstruation	189	74.7
Every year	52	20.6
International strategies to control & reduce incidence of BC		
Early detection	68	26.9
Prevention	10	4.0
Prevention & early detection	172	68.0
Treatment at early stage	3	1.2
Total	253	100.0

Table (5) presented screening methods of BC. The results showed that 15% of study participants knew that breast self-exam (BSE) was a method of screening for BC, 15.8% reported BSE, clinical exam, and radio-active imaging as methods of screening for BC, 13% knew that BSE and clinical exam were screening method for BC. It is noticed that BSE was the most prevalent method as stated by the studied women. Also, 74.7% of women stated that the preferable time for performing BSE was every month after the menses, and 68% reported that prevention and early detection are the best strategies to control and prevent the development of BC.

Table (6): Factors of controlling and preventing breast cancer

Knowledge about:	n	Percent (%)
Factors that help in decreasing the incidence BC		
Regular periodic breast exam	51	20.2
Early pregnancy, visit the doctor when detecting breast lump, regular periodic breast exam	8	3.2
Early pregnancy, physical activity / sporting	9	3.6
Regular periodic breast exam, visit the doctor when detecting breast lump	80	31.6
Regular periodic breast exam, visit the doctor when detecting breast lump, physical activity / sporting	42	16.6
Physical activity / sporting, decrease fat consumption, regular periodic breast exam	21	8.3
All the mentioned factors	42	16.6
Total	253	100.0
Methods of preventing breast cancer		
Good nutrition	14	5.5
Good nutrition, avoid hormones consumption	25	9.9
Good nutrition, weight control	29	11.5
Good nutrition, increase physical activity	9	3.6
Good nutrition, increase physical activity, weight control, avoid hormones consumption	16	6.3
Weight control, avoid hormones	6	2.4
Increase physical activity, weight control, avoid hormones	12	4.7
Avoid alcohol consumption, good nutrition	27	10.7
All the above mentioned are correct	73	28.9
All the above mentioned are not correct	42	16.6
Total	253	100.0

Table (6) illustrated that regular periodic breast exam, and visiting the doctor when detecting breast lump are factors that help in decreasing the incidence of BC, and 20% considered periodic breast exam as a factor for decreasing the incidence of BC. The results

also showed that 11.5% of studied women stated that good nutrition, and weight control are essential methods to prevent the development of BC and 28.9% know all the methods of prevention of BC.

Discussion

The results showed that more than half of the women have good knowledge about the importance of early detection of BC, and they were aware and knew most of the signs and symptoms of BC. The results of Almeshari et al. (2023) showed that the overall knowledge level about BC was 46.36%. Similarly, the results of Hamed et al. (2022) showed that women could recognize the symptoms of BC such as lump or thickening under the armpit (54%), lump in the breast or thickening of the breast tissue (50.9%), while other signs and symptoms were not recognized by more than half of the women, while the results of Sarker et al. (2022) indicated that the overall mean score of total knowledge items about BC was 34.3%; knowledge about signs and symptoms of BC was 36.8%, and the most common symptoms that were recognized correctly were color change of breast (48.3%), new lump in the breast or armpit (42.8%), and change in breast shape and size including inverted nipple (40.3%).

The studied women expressed good knowledge about risk factors of BC including older age, lack of pregnancy and childbirth, removal of ovaries, and obesity after menopause. The results of Sarker et al. (2022) showed that the mean score of knowledge about BC risk factors was 33.5%.

Moreover, the studied women expressed knowledge about screening methods including BSE, radio-active imaging, ultrasonography, clinical exam, and fine needle aspiration. Most of the women knew that the preferred time to perform BSE was every month after menses, and prevention and early detection were the most effective strategies to control and prevent BC. The results of Hamed et al. (2022) indicated that among those who perform BSE, a fifth only check at least once every 6 months (19.95%), checking at least once a month (18.43%), and checking at least once a week (8.3%). In addition, the results of Sarker et al. (2022) indicated that the mean score of knowledge about BC screening was 36.4%. Factors that help in decreasing the incidence of BC included periodic breast exam on regular bases, physical activity and engagement in sports activities. The study of Almeshari et al. (2023) conducted in Algeria, Jordan, Kuwait, Lebanon, and in Morocco indicated that knowledge about risk factors was (57.62%) and signs and symptoms (52%), while awareness and practice of BSE (36.37%) and screening methods (38.9%)". The studied women showed good knowledge about methods of preventing BC including good nutrition, avoiding hormones consumption, weight control, and physical activity. The results of Sarker et al. (2022) indicated that the mean score of knowledge about BC prevention was 36.2%.

Conclusion

The present study concluded that women who are working in governmental sector have relatively moderate to good knowledge about signs and symptoms of BC, screening methods, risk factors, and preventive measures of BC.

Special training programs about BSE and screening should be held to reach a large number of women. Also, women should be encouraged to talk about BSE to their friends and relatives at home in order to improve awareness about BSE and encourage them to get professional medical exam periodically in order to decrease the ongoing steady increase in BC in Gaza Strip.

The researcher expects that this study may help in increasing the attention about screening for early detection of BC in order to provide early treatment, which will result in improving the outcome, improving the quality of life of survivors, and decreasing the mortality rate of BC.

References

- Alabbody H, Alelwan N, Atoof W, Badn B. Evaluation of women's knowledge about risk factors and early detection of breast cancer at Ibn Rushd College of Education in Baghdad University. *Iraqi National Journal of Nursing Specialties*, 2017; 30(1); 117-123.
- Almeshari M, Alzamil Y, Alyahyawi A, Abanomy A, Althmali O, Al-Enezi M. S, et al. Awareness level, knowledge and attitude towards breast cancer among staff and students of Hail University, Saudi Arabia. *Plos one*, 2023; 18(3), e0282916.
- Alotaibi RM, Rezk HR, Juliana CI, Guure C. Breast cancer mortality in Saudi Arabia: Modelling observed and unobserved factors. *PLoS One*. 2018; 13(10):1–16. <https://doi.org/10.1371/journal.pone.0206148> PMID: 30347002.
- Al-Shamsi, H. O., Abu-Gheida, I. H., Iqbal, F., & Al-Awadhi, A.. Cancer in the Arab world. 2022 476. Springer Nature.

- Anton-Culver H, Chang J, Bray F, Znaor A, Stevens L, Eser S, et al. Cancer burden in four countries of the Middle East Cancer Consortium (Cyprus; Jordan; Israel; Izmir (Turkey)) with comparison to the United States surveillance; epidemiology and end results program. *Cancer Epidemiol.* 2016; 44: 195–202.
- Bellanger M., Zeinomar N., Tehranifar P., Terry M.B. Are Global Breast Cancer Incidence and Mortality Patterns Related to Country-Specific Economic Development and Prevention Strategies? *J. Glob. Oncol.* 2018;4:1–16. doi: 10.1200/JGO.17.00207
- Global Cancer Observatory. International Agency for Research on Cancer. Global Cancer Observatory. *Cancer Today.* 2020. <https://gco.iarc.fr/today>. Accessed 10.9.2023.
- Hamed E, Alemrayat B, Syed M, Daher-Nashif S, Abu Rashed H, Kane T. Breast cancer knowledge, attitude, and practice among women in Qatar. *International Journal of Environmental Research and Public Health*, 2022; 19, 3995. <https://doi.org/10.3390/ijerph19073995>.
- Mathew A, Gajalakshmi V, Rajan B, Kanimozhi V, Brennan P, Mathew BS, et al. Anthropometric factors and breast cancer risk among urban and rural women in South India: a multicentre case-control study. *Br J Cancer.* 2008; 99(1):207–13.
- Mohite VR, Pratinidhi AK, Mohite RV. Reproductive risk factors and breast cancer: a case control study from rural India. *Bangladesh J Med Sci.* 2015; 14(3):258–64.
- Nardin S., Mora E., Varughese F.M., D'Avanzo F., Vachanaram A.R., Rossi V., Saggia C., Rubinelli S., Gennari A. Breast Cancer Survivorship, Quality of Life, and Late Toxicities. *Front. Oncol.* 2020;16:864. doi: 10.3389/fonc.2020.00864.
- Salem H. S. Cancer status in the Occupied Palestinian Territories: types; incidence; mortality; sex, age, and geography distribution; and possible causes. *Journal of Cancer Research and Clinical Oncology*, 2023; 149(8): 5139-5163.
- Sarker R, Islam M.S, Moonajilin M.S, Rahman M, Gesesew HA, Ward PR. Knowledge of breast cancer and breast self-examination practices and its barriers among university female students in Bangladesh: Findings from a cross-sectional study. *PLoS ONE*, 2022; 17(6): e0270417. <https://doi.org/10.1371/journal.pone.0270417>.
- The Global Cancer Observatory. International Agency for Research on Cancer, March 2021. <https://gco.iarc.fr/today/data/factsheets/populations/634-qatar-fact-sheets.pdf>.
- Vishwakarma G, Ndetan H, Das DN, Gupta G, Suryavanshi M, Mehta A, et al. Reproductive factors and breast cancer risk: a meta-analysis of case-control studies in Indian women. *South Asian J Cancer.* 2019;8(2):80-84.
- WHO. Breast cancer. Key facts, July 2023. <https://www.who.int/news-room/fact-sheets/detail/breast-cancer>.
- Global Cancer Observatory. International Agency for Research on Cancer 2020