



Original Article



Knowledge of Breast Cancer Screening and Protection Among Female Health Care Professionals of Federal Government Polyclinic Hospital, Islamabad, and its Allied Dispensaries

Saima Shan¹, Jovaria Ehsan¹, Farkhanda Jabeen¹, Maliha Baseer¹, Aisha Hameed¹, Asim Rehman¹, Zameena¹, and Rehana¹¹Department of Diagnostic Radiology, Federal Government Polyclinic Hospital, Islamabad, Pakistan

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Jovaria Ehsan

Department of Diagnostic Radiology, Federal Government Polyclinic Hospital, Islamabad, Pakistan

jovaria91@gmail.comReceived Date: 18th May, 2025Revised Date: 7th September, 2025Acceptance Date: 23rd September, 2025Published Date: 30th September, 2025

ABSTRACT

Breast cancer is one of the leading causes of mortality among women globally, and Pakistan has the highest breast cancer prevalence in Asia. Despite the importance of early detection through screening and awareness, data on healthcare professionals' (HCPs) knowledge and practices in Pakistan are limited. **Objectives:** To evaluate the knowledge of breast cancer screening and protection among female HCPs at the Federal Government Polyclinic Hospital, Islamabad, and its allied dispensaries. Additionally, it sought to identify gaps in awareness and guide future interventions. **Methods:** A cross-sectional, descriptive study was conducted over six months at the Federal Government Polyclinic Hospital, Islamabad, and its allied dispensaries. A structured, self-administered questionnaire was distributed to 530 female HCPs, including physiotherapists, psychologists, administrative officers, doctors, nurses, and support staff. Data were analyzed using SPSS version 25.0. **Results:** The majority of participants were nurses (37.7%) and aged between 21 and 25 years (24.5%). A large proportion reported no family history of breast cancer (92.8%) and were non-smokers (89.8%). Knowledge regarding breast cancer symptoms, risk factors, and screening methods varied across different roles and educational levels, with junior doctors and postgraduates showing the highest knowledge levels. Despite this, gaps were identified in understanding protective measures and screening practices. **Conclusions:** While awareness of symptoms and risk factors was adequate, there were notable deficiencies in knowledge regarding protective practices and screening behavior. These gaps highlight the need for targeted educational interventions among female HCPs.

INTRODUCTION

Cancer is one of the main causes of death and a significant obstacle to increasing life expectancy worldwide. In 2019, the World Health Organization (WHO) estimated that cancer ranks first or second in 112 out of 183 nations for causing mortality before the age of 70, and third or fourth in another 23 countries. Pakistan has Asia's highest breast cancer incidence, with young women often diagnosed at advanced stages, making prognosis difficult. Annually, the absence of screening facilities leads to many deaths from

breast cancer. In Pakistan, breast cancer was responsible for 11.7% (13,725) of all cancer-related deaths and 28.7% (25,928) of all new cases [1, 2]. The age-standardized cases of breast cancer in Pakistan are among the highest in Asia, with one in nine women currently at risk of the disease [3]. Numerous risk factors, such as positive family history, being obese, smoking, alcohol use, early menstruation, late menopause, sedentary lifestyle, hormone replacement treatment, and a history of breast cancer, interact



intricately to cause breast cancer. Nursing history, physical exercise, and weight loss are factors associated with reduced probability of breast cancer. Having a first-degree relative with breast cancer increases a woman's lifetime risk of developing the disease by two to three times [4, 5]. Early breast cancer diagnosis is a crucial public health approach as it may enhance the probability of timely discovery of the disease and favorable outcomes, which will increase the odds of survival and the quality of life for women [6]. Breast Self-Examination (BSE) may be helpful in regions with limited assets to diagnose any aberrations in the breast, even though mammography is well-known and the most efficient diagnostic tool for early assessment of breast cancer [7]. This is because BSE gives women the chance to understand the physiology of their breasts [8]. Breast Self-Examination (BSE) may be helpful in regions with limited assets to diagnose any abnormalities in the breast [9]. When BCS is conducted by trained personnel, a better attitude is displayed [10]. Therefore, the HCWs' knowledge and abilities must be improved. By regularly evaluating the present awareness, perception, and obstacles regarding breast cancer screening programs, these factors can be addressed among the healthcare workers [11]. In Pakistan, where breast cancer incidence is rising, there is limited research on the awareness and practices of female HCPs [12]. Despite the critical role of healthcare professionals in promoting breast cancer awareness and screening, there is a lack of comprehensive data on their actual knowledge, attitudes, and practices within the Pakistani healthcare context, particularly among female staff at public sector institutions. The goal of this study is to assess the knowledge of breast cancer screening and protection among female health care professionals at the Department of Diagnostic Radiology, Federal Government Polyclinic Hospital, Islamabad, and its allied dispensaries.

This aims to evaluate the knowledge of breast cancer screening and protection among female HCPs at the Federal Government Polyclinic Hospital, Islamabad, and its allied dispensaries. Additionally, it sought to identify gaps in awareness and guide future interventions.

METHODS

This cross-sectional descriptive study was carried out at the Federal Government Polyclinic Hospital, Islamabad, and its affiliated dispensaries. The study was conducted over a period of six months, from August 2024 to January 2025, at the Department of Diagnostic Radiology, Federal Government Polyclinic Hospital, and its four allied dispensaries. Approval from the Institutional Ethical Review Board was obtained from the Federal Government Polyclinic Hospital, Islamabad (Ref. No. FGPC.1/12/2023/Ethical Committee) before the study.

Verbal informed consent and willingness were obtained from the healthcare professionals through the survey. Anonymity was ensured to protect the individuals' identities and confidentiality. The inclusion criteria included female HCPs working at the Federal Government Polyclinic Hospital and its allied dispensaries. Male HCPs and individuals unwilling to participate were excluded. Data were collected using a structured, self-administered questionnaire designed to assess knowledge, attitudes, and practices related to breast cancer screening and protection. A sample size of 600 was planned using a standard sample size formula, with a 95% confidence level, an expected proportion of 0.5 (50%), and a 5% margin of error. This calculation also accounted for potential non-responses to ensure an adequate number of completed questionnaires for analysis. The study population comprised 163 female doctors, physiotherapists, psychologists, and administrative officers, 197 female nurses, and 170 female support healthcare staff. A total of 600 structured questionnaires were distributed; however, 530 participants were recruited in the research, selected through a non-probability consecutive sampling technique. The structured questionnaire was pre-tested for content validity and construct reliability among a sample of 30 healthcare professionals before the main study to ensure accuracy. A non-probability consecutive sampling technique was used in this study due to practical considerations, including limited access to participants, time constraints, and the structured work environment of healthcare professionals. This approach involved recruiting all eligible and available female healthcare professionals during the data collection period. The structured questionnaire comprised three sections: the first section focused on demographic details, the second section on knowledge of breast cancer, and the third section on screening practices, ways of protection, and awareness of the breast cancer screening center established at the Polyclinic Hospital. All documentation, record maintenance, and data analysis were carried out using SPSS version 25.0. Descriptive statistics were analyzed for variables. Statistical correlation was performed using ANOVA and t-tests. ANOVA was used to assess differences across multiple groups (e.g., by designation and education level), while t-tests were used for pairwise comparisons (e.g., between family history groups). Following significant ANOVA results, post-hoc comparisons were performed using Tukey's Honestly Significant Difference (HSD) test, with the significance level set at $p < 0.05$ to identify group differences.

RESULTS

A total of 530 health care professionals of the federal Government polyclinic hospital, Islamabad, participated in

the study. The largest cohort of participants was from the age group 21-25 years. Most of the participants were single (N=290, 44.9%) and from Islamabad (N=396, 74.7%). (N=130, 24.5%). The majority of the respondents comprised nurses (N=200, 37.7%). The age of Puberty of most of the participants was between 13 and 15 years (N=344, 64.9%). A great number of samples comprised of graduates (N=248, 46.8%). Most of the healthcare professionals reported no family History of Breast cancer (N=492, 92.8%) and no relative with a positive history of breast cancer (N=490, 92.5%). Besides this, the maximum number of participants had no history of hormonal intake (N=496, 93.6%) and were non-smokers (N=476, 89.8%) with no history of breast surgery (N=514, 3.0%). The participants who were from Islamabad have more knowledge about the risk factors ($p>0.0001$) and perform self-breast examination ($p<0.005$) (Table 1).

Table 1: Socio-Demographic Characteristics of Female Healthcare Professionals

Variables	Category	Frequency (%)
Age	Up to 20 years	32 (6.0%)
	21-25	130 (24.5%)
	26-30	124 (23.4%)
	31-35	76 (14.3%)
	36-40	48 (9.1%)
	41-45	40 (7.5%)
	46-50	32 (6.0%)
	51-55	32 (6.0%)
	56-60	10 (1.9%)
	Above 60	6 (1.1%)
Designation	Support Staff	30 (5.7%)
	Technicians	68 (12.8%)
	Nurse	200 (37.7%)
	Junior Doctor	102 (19.2%)
	Trainee Doctor	100 (18.9%)
	Consultant Doctor	30 (5.7%)
Marital Status	Married	290 (54.7%)
	Single	238 (44.9%)
	Divorced	2 (4%)
Residence	Islamabad	396 (74.7%)
	Outside Islamabad	134 (25.3%)

Age of Puberty	10-12 years	148 (27.9%)
	13-15 years	344 (64.9%)
	Above 15 years	38 (7.2%)
Age of Puberty	10-12 years	148 (27.9%)
	13-15 years	344 (64.9%)
	Above 15 years	38 (7.2%)
Qualification	Primary	10 (1.9%)
	Secondary	40 (7.5%)
	Higher Secondary	162 (30.6%)
	Graduate	248 (46.8%)
	Post Graduate	70 (13.2%)
Family History	No Family History of Breast Cancer	492 (92.8%)
	Positive Family History of Breast Cancer	38 (7.2%)
Relative to Breast Cancer	No relative with Breast Cancer	490 (92.5%)
	Mother	12 (2.3%)
	Sister	4 (8%)
	Maternal Aunt/Relative	10 (1.9%)
	Paternal Aunt/Relative	14 (2.6%)
Birth of a Child	No alive issue	294 (55.5%)
	One or More Births	236 (44.5%)
Age at Birth of 1 st Child	Never Given Birth	262 (49.4%)
	Less than 20 years	42 (7.9%)
	20-30 years	204 (38.5%)
	30-40 years	22 (4.2%)
Hormonal Intake	No history of Hormonal Intake	496 (93.6%)
	Positive History of Hormonal Intake	34 (6.4%)
Smoking	Non-Smoker	476 (89.8%)
	Smoker	54 (10.2%)

The participants with positive family history best know the protection methods ($p<0.0001$) and screening methods ($p<0.001$). Furthermore, the results indicated that the participants with no family history of breast cancer have greater knowledge about the self-breast examination ($p<0.001$), and they know that breast cancer is curable ($p<0.05$) and perform self-breast examination ($p<0.01$). Furthermore, they have visited the clinician for breast examination ($p<0.0001$) and have done their ultrasounds ($p<0.0001$) and mammograms ($p<0.0001$) as compared to the participants with positive family history of breast cancer (Table 2).

Table 2: Comparison of Breast Cancer Awareness and Practices Based on Family History Among Female HCPs

Variables	No Family History of Breast Cancer (Mean $\pm$ SD)	Positive Family History of Breast Cancer (Mean $\pm$ SD)	p-Value	t-Value (df)	Confidence Interval (95%)
How to protect oneself from it	1.77 $\pm$ 0.42	2.00 $\pm$ 0.00	0.000	-3.34 (528)	-0.36 to -0.09
How can screening be done	2.56 $\pm$ 1.26	2.84 $\pm$ 1.00	0.001	-1.34 (528)	-0.69 to 0.13
Do you know about breast self-examination	1.13 $\pm$ 0.34	1.05 $\pm$ 0.23	0.001	1.45 (528)	-0.03 to 0.19
Is breast cancer curable	1.04 $\pm$ 0.18	1.00 $\pm$ 0.00	0.000	1.19 (528)	-0.02 to 0.09
Do you do breast examination	1.29 $\pm$ 0.46	1.21 $\pm$ 0.41	0.01	1.10 (528)	-0.07 to 0.23
Have you ever been examined by a clinician	1.89 $\pm$ 0.31	1.74 $\pm$ 0.45	0.000	2.93 (528)	0.05 to 0.26
Have you ever undergone a breast ultrasound	1.93 $\pm$ 0.25	1.84 $\pm$ 0.37	0.000	2.00 (528)	0.00 to 0.17
Have you ever undergone a mammography	1.98 $\pm$ 0.13	1.79 $\pm$ 0.41	0.000	7.04 (528)	0.14 to 0.25

The significant differences exist among health care professionals across different designations. Moreover, it illustrates that the Junior doctors have maximum knowledge about the symptoms of breast cancer and screening methods, while the Junior, Trainee, and Consultant doctors have almost equal knowledge about the strategies of protection from breast cancer as compared to others. Additionally, the trainee doctors and

consultants have good information about the risk factors. Similarly, the trainee doctors know more about the age at which mammography has to be done. Furthermore, the technicians responded more positively to the question about the cure of breast cancer. Moreover, the consultants more frequently performed self-breast examination, and Trainee doctors have visited the clinician for breast examination as compared to other professionals (Table 3).

Table 3: Differences in Knowledge of Breast Cancer Screening and Protection Across Professional Designations

Variables	Support Staff Mean $\pm$ SD	Technician Mean $\pm$ SD	Nurse Mean $\pm$ SD	Junior Doctor Mean $\pm$ SD	Trainee Doctor Mean $\pm$ SD	Consultant Mean $\pm$ SD	F (5, 524)	p- Value	η^2	Post-Hoc Comparison
What do you know about the symptoms of breast cancer	2.20 $\pm$ 0.55	2.18 $\pm$ 0.71	2.27 $\pm$ 0.76	3.12 $\pm$ 0.84	2.88 $\pm$ 0.82	2.80 $\pm$ 0.55	25.64	0.000	0.19	1 > 2 < 3 > 4 < 5 < 6
What are the risk factors	2.13 $\pm$ 0.82	1.91 $\pm$ 0.82	2.07 $\pm$ 0.85	2.90 $\pm$ 0.82	3.02 $\pm$ 0.86	3.00 $\pm$ 0.64	32.73	0.000	0.24	1 < 2 > 3 < 4 < 5 > 6
How to protect one self from it	1.47 $\pm$ 0.51	1.68 $\pm$ 0.47	1.78 $\pm$ 0.42	1.88 $\pm$ 0.32	1.86 $\pm$ 0.35	1.87 $\pm$ 0.35	7.05	0.000	0.06	1 < 2 < 3 < 4 > 5 < 6
How can screening be done	1.60 $\pm$ 0.97	2.06 $\pm$ 1.12	2.35 $\pm$ 1.35	3.14 $\pm$ 0.99	3.00 $\pm$ 1.08	3.00 $\pm$ 0.92	16.54	0.000	0.13	1 < 2 < 3 < 4 > 5 = 6
Mammography is done at what age	2.27 $\pm$ 1.36	2.68 $\pm$ 1.44	3.07 $\pm$ 1.30	3.22 $\pm$ 0.94	3.26 $\pm$ 1.00	3.13 $\pm$ 1.22	4.86	0.000	0.04	1 < 2 < 3 < 4 < 5 > 6
Is breast cancer curable	1.00 $\pm$ 0.00	1.12 $\pm$ 0.33	1.05 $\pm$ 0.22	1.00 $\pm$ 0.00	1.00 $\pm$ 0.00	1.00 $\pm$ 0.00	5.25	0.000	0.04	1 > 2 > 3 < 4 = 5 = 6
Frequency of breast self-examination	0.80 $\pm$ 1.13	1.44 $\pm$ 1.09	1.40 $\pm$ 1.07	1.33 $\pm$ 1.14	1.44 $\pm$ 1.16	2.33 $\pm$ 0.96	6.18	0.000	0.06	1 < 2 > 3 < 4 > 5 < 6
Have you ever been examined by a clinician	1.87 $\pm$ 0.35	1.91 $\pm$ 0.28	1.89 $\pm$ 0.31	1.90 $\pm$ 0.29	1.92 $\pm$ 0.27	1.60 $\pm$ 0.49	5.33	0.000	0.05	1 > 2 > 3 < 4 < 5 > 6

The results depict that post-graduates have more knowledge about the symptoms of breast cancer, while the graduates are well aware of the risk factors of breast cancer. Additionally, Graduates and post-graduates have greater and approximately equal knowledge about the protection strategies. Similarly, the postgraduates have sound knowledge about the screening methods, and the mammography age is higher in postgraduates and decreases with lower qualification levels. Moreover, the post-graduates are more concerned about breast self-examination, while the ratio of mammography is higher among the supporting staff. Furthermore, the consultants have argued more about why they have not undergone mammography (Table 4).

Table 4: Knowledge of Breast Cancer Screening and Practices Across Education Levels Among Female HCPs

Variables	Primary Mean $\pm$ SD	Secondary Mean $\pm$ SD	Higher Secondary Mean $\pm$ SD	Graduate Mean $\pm$ SD	Postgraduate Mean $\pm$ SD	F (5, 524)	p- Value	η^2	Post-Hoc Comparison
What do you know about symptoms of breast cancer	2.40 $\pm$ 0.52	1.95 $\pm$ 0.59	2.27 $\pm$ 0.80	2.77 $\pm$ 0.83	2.86 $\pm$ 0.77	18.24	0.000	0.12	1 > 2 < 3 < 4 < 5
What are the risk factors	2.20 $\pm$ 0.78	1.75 $\pm$ 0.77	2.06 $\pm$ 0.85	2.74 $\pm$ 0.92	2.71 $\pm$ 0.88	22.72	0.000	0.14	1 > 2 < 3 < 4 > 5
How to protect oneself from it	1.40 $\pm$ 0.52	1.40 $\pm$ 0.49	1.75 $\pm$ 0.43	1.87 $\pm$ 0.34	1.86 $\pm$ 0.35	16.32	0.000	0.11	1 = 2 < 3 < 4 = 5
How can screening be done	1.20 $\pm$ 0.42	1.60 $\pm$ 1.03	2.07 $\pm$ 1.18	3.00 $\pm$ 1.18	3.03 $\pm$ 0.88	30.78	0.000	0.19	1 < 2, 3 < 4 < 5
Mammography is done at which age	1.60 $\pm$ 1.26	2.05 $\pm$ 1.38	2.94 $\pm$ 1.37	3.20 $\pm$ 1.03	3.49 $\pm$ 0.94	15.05	0.000	0.10	1 < 2 < 3 < 4 < 5
If yes, how frequently	1.00 $\pm$ 1.33	1.25 $\pm$ 1.15	1.28 $\pm$ 1.13	1.41 $\pm$ 1.06	1.91 $\pm$ 1.19	4.65	0.001	0.03	1 < 2 < 3 < 4 < 5
Have you ever undergone a mammography	2.00 $\pm$ 0.00	1.95 $\pm$ 0.22	1.98 $\pm$ 0.16	1.98 $\pm$ 0.13	1.91 $\pm$ 0.28	2.54	0.040	0.02	1 > 2 < 3 = 4 > 5
If not, why	1.60 $\pm$ 1.26	1.80 $\pm$ 1.74	1.52 $\pm$ 1.98	1.73 $\pm$ 2.00	2.60 $\pm$ 2.10	3.76	0.010	0.03	1 < 2 > 3 < 4 < 5

Additionally, the correlation analysis also proved that the knowledge about the symptoms of breast cancer has a significant negative correlation with the knowledge about self-breast examination and clinical breast examination. Moreover, a positive correlation exists between the knowledge and practice of self-breast examination (Table 5).

Table 5: Correlation Between Breast Cancer Knowledge Variables and Screening Practices

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. What do you know about symptoms of breast cancer	1	.58**	.32**	.42**	.16**	-.24**	-.25**	-.10*	-.08	-.06	-.04	.09*

2. What are the risk factors	-	1	.31**	.58**	.25**	-.22**	-.31**	-.17**	-.06	-.01	-.00	.05
3. How to protect oneself from it	-	-	1	.35**	.18**	-.33**	-.30**	-.11*	-.12**	.04	-.00	.07
4. How can screening be done	-	-	-	1	.22**	-.33**	-.31**	-.12**	-.19**	-.06	-.00	.05
5. Mammography is done at which age	-	-	-	-	1	-.16**	-.17**	-.12**	.05	-.04	-.12**	-.08
6. Do you know about self-breast examination	-	-	-	-	-	1	.49**	.17**	.35**	-.04	.07	.00
7. Do you know about clinical breast examination	-	-	-	-	-	-	1	.12**	.21**	.06	.07	-.08
8. Is breast cancer curable	-	-	-	-	-	-	-	1	.01	.00	.05	.03
9. Do you do self-breast examination	-	-	-	-	-	-	-	-	1	.18**	.15**	.06
10. Have you ever been examined by a clinician	-	-	-	-	-	-	-	-	-	1	.65**	.21**
11. Have you ever undergone a breast ultrasound	-	-	-	-	-	-	-	-	-	-	1	.28**
12. Have you ever undergone a mammography	-	-	-	-	-	-	-	-	-	-	-	1

*Significance is indicated as: $p < 0.05 \rightarrow *$, $p < 0.01 \rightarrow **$

DISCUSSIONS

Breast cancer remains an important public health concern in Pakistan, with the highest incidence rate in Asia. The findings reveal several important aspects of the current state of knowledge and practices among female HCPs, which play a vital role in designing valuable interventions. The study found that the majority of participants were nurses (37.7%), followed by junior doctors (19.2%) and trainee doctors (18.9%). Most participants were aged 21–25 years (24.5%), and the majority were graduates (46.8%). These demographics show the composition of the healthcare workforce in the region and emphasize the need for targeted training programs, particularly for younger and less experienced HCPs. A significant finding was that 92.8% of participants reported no family history of breast cancer, and 92.5% had no relatives with breast cancer. This aligns with data available on breast cancer from the WHO 2024 [13], which states that having a family history of breast cancer raises the risk of getting the disease, even though the majority of women who receive a breast cancer diagnosis do not have a known family history of the condition. About 5–10% of instances of breast cancer are linked to a family history, making family history a significant contributing factor for the disease [14]. However, the study also revealed that participants who had a positive family history of breast cancer had better knowledge of protection methods and diagnostic techniques, revealing that self or family exposure to the disease may increase awareness levels. This aligns with previous researchers who reported that women were more likely to undergo mammography screenings if they had a family history of cancer, and their study demonstrated that family history is really important in determining women's knowledge of and involvement in breast cancer assessment. Women may be advised to prioritize and take part in routine screening tests if they have a family history of cancer. Self or family history of benign breast disease was substantially related to all screening practices [15]. According to previous research, breast cancer diagnostic practices like CBE and mammography are significantly positively correlated with

a family history of cancer, and a history of breast diseases in oneself, friends, and peers [16]. The study identified significant differences in knowledge levels across different designations and education levels. Junior doctors and postgraduates demonstrated higher knowledge of breast cancer signs, contributing factors, and assessment methods compared to support staff and technicians. The study findings of earlier researchers showed limited female health workers' knowledge towards breast cancer, finding a negative attitude (16.1%) and a lack of knowledge about the signs and risk factors (48.6%) of breast cancer. Mammography screening was frequently hindered by concerns about radiation exposure (57%) and the stress of finding cancer (57.2%). Lack of knowledge of mammograms was found to be substantially correlated with age ($p=0.030$) and the category of healthcare workers (physicians: $p=0.016$). The study also revealed that participants from Islamabad had better knowledge of risk factors and had a higher likelihood of doing SBE than those from outside Islamabad [11]. This highlights the urban–rural divide in healthcare access and awareness. One of the most concerning findings was the low rate of self-breast examination (SBE) and clinical breast examination (CBE) among participants. Only a small percentage of participants reported performing SBE regularly, and even fewer had undergone CBE or mammography. Osei-Afriyie et al. explored that less than 50% of individuals underwent BSE, 10% underwent CBE, and 2.3% underwent mammography in the studied population [6]. Similarly, a study conducted in Bangladesh highlighted that despite relatively high awareness levels, the actual practice of breast cancer screening remained very limited [17]. Factors such as fear of diagnosis, perceived invulnerability, cultural beliefs, lack of time, or access to services may act as barriers, even when awareness is high. In line with our findings, research from Tanzania also demonstrated the effectiveness of clinical breast examination and fine-needle aspiration cytology as early detection tools in low-resource healthcare settings [18]. This is a serious

situation because breast cancer is becoming more widespread in this region of the world. Correlation analysis revealed a positive relationship between knowledge of breast cancer symptoms and awareness of contributing factors, protection methods, and screening techniques. However, there was a negative correlation between knowledge of symptoms and the practice of SBE and CBE. This suggests that while HCPs may be aware of the importance of screening, they may not be applying this knowledge in practice. Interestingly, the results showed several inverse relationships between knowledge and screening practices. For instance, participants with greater awareness of breast cancer risk factors and symptoms did not consistently report higher rates of self-breast examination or clinical screening. This suggests a possible gap between knowledge and actual health-seeking behavior [19]. The value of concise, web-based learning activities tailored to address knowledge gaps in rapidly evolving fields like breast cancer, particularly for general oncologists who need to stay updated on the latest research and guidelines, must be highlighted. Such targeted educational tools can help nonspecialists remain informed and improve their practice in complex, fast-changing medical disciplines [20]. This study has limitations that should be accounted for when analyzing its outcomes. Firstly, it was conducted at a single hospital in Islamabad, which limits the generalizability of the results to other healthcare settings or regions in Pakistan. Secondly, the reliance on self-reported data can result in response bias, as participants may have overestimated their knowledge or practices. The exclusion of male HCPs limits the understanding of the broader healthcare workforce's role in breast cancer awareness. In the future, these limitations need to be addressed to provide a wider perspective and understanding of breast cancer screening and protection among healthcare professionals in Pakistan.

CONCLUSIONS

This study revealed that while female healthcare professionals at the Federal Government Polyclinic Hospital and its allied dispensaries demonstrated a reasonable level of awareness regarding the symptoms and risk factors of breast cancer, significant gaps remain in their knowledge and practices related to screening and protective measures. The findings highlight the need for targeted educational interventions and awareness programs to enhance early detection efforts and promote proactive screening behaviors. Strengthening knowledge among healthcare professionals is important not only for their personal health but also for their role in educating and influencing the wider community. Future research should explore the effectiveness of such interventions and aim to include broader healthcare settings for more generalizable

outcomes.

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Authors Contribution

Conceptualization: SS, JE

Methodology: SS, FJ, AR, Z, R

Formal analysis: SS, JE, FJ, MB, AH

Writing review and editing: SS, JE, FJ, MB, AH, AR, Z, R

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Conflicts of Interest

All the authors declare no conflict of interest.

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REFERENCES

- [1] Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA: A Cancer Journal for Clinicians*. 2021 May; 71(3): 209-49. doi: 10.3322/caac.21660.
- [2] Menhas R, Shumaila UM. Breast Cancer Among Pakistani Women. *Iranian Journal of Public Health*. 2015 Apr; 44(4): 586.
- [3] Zaheer S and Yasmeen F. Historical Trends in Breast Cancer Presentation Among Women in Pakistan From Join-Point Regression Analysis. *Pakistan Journal of Medical Sciences*. 2024 Jan; 40(1Part-I): 134. doi: 10.12669/pjms.40.1.8236.
- [4] Dydjow-Bendek DA and Zagożdżon P. Early Alcohol Use Initiation, Obesity, Not Breastfeeding, and Residence in a Rural Area as Risk Factors for Breast Cancer: A Case-Control Study. *Cancers*. 2021 Aug; 13(16): 3925. doi: 10.3390/cancers13163925.
- [5] Xiong X, Zheng LW, Ding Y, Chen YF, Cai YW, Wang LP et al. Breast Cancer: Pathogenesis and Treatments. *Signal Transduction and Targeted Therapy*. 2025 Feb; 10(1): 49. doi: 10.1038/s41392-025-02221-7.
- [6] Osei-Afriyie S, Addae AK, Oppong S, Amu H, Ampofo E, Osei E. Breast Cancer Awareness, Risk Factors and Screening Practices Among Future Health Professionals in Ghana: A Cross-Sectional Study. *PLoS One*. 2021 Jun; 16(6): e0253373. doi: 10.1371/journal.pone.0253373.
- [7] Stroth K. Revolutionizing Breast Cancer Screening: The Impact of Artificial Intelligence on Early Cancer

- Detection in Women [Doctoral Dissertation]. Northeastern University. 2021.
- [8] Johnson OE. Awareness and Practice of Breast Self-Examination Among Women in Different African Countries: A 10-Year Review of Literature. *Nigerian Medical Journal*. 2019 Sep; 60(5): 219-25. doi: 10.4103/nmj.NMJ_109_19.
- [9] Loud JT and Murphy J. Cancer Screening and Early Detection in the 21st Century. *Seminars in Oncology Nursing*. 2017 May; 33(2): 121-28. doi: 10.1016/j.soncn.2017.02.002.
- [10] Chukwu JA, Egwu CO, Chukwu C, Agwu AO, Oluwafemi EO, Nwadam SK, et al. Knowledge and Attitude of Women Towards Breast Cancer Screening in Resource-Limited Settings in Women Aged 18-45 Years. *Women*. 2024 Dec; 4(4): 503-13. doi: 10.3390/women4040035.
- [11] Alenezi AM, Thirunavukkarasu A, Wani FA, Alenezi H, Alanazi MF, Alruwaili AS, et al. Female Healthcare Workers' Knowledge, Attitude Towards Breast Cancer, and Perceived Barriers Towards Mammogram Screening: A Multicenter Study in North Saudi Arabia. *Current Oncology*. 2022 Jun; 29(6): 4300-14. doi: 10.3390/currenco129060339.
- [12] Aslam A, Mustafa AG, Hussnain A, Saeed H, Nazar F, Amjad M, et al. Assessing Awareness, Attitude, and Practices of Breast Cancer Screening and Prevention Among the General Public and Physicians in Pakistan: A Nation with the Highest Breast Cancer Incidence in Asia. *International Journal of Breast Cancer*. 2024; 2024(1): 2128388. doi: 10.1155/2024/2128388.
- [13] Mayrovitz HN. Breast Cancer [Internet]. StatPearls Publishing. 2023. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK482286/>
- [14] Liu L, Hao X, Song Z, Zhi X, Zhang S, Zhang J. Correlation Between Family History and Characteristics of Breast Cancer. *Scientific Reports*. 2021 Mar; 11(1): 6360. doi: 10.1038/s41598-021-85842-1.
- [15] Mohammadnabizadeh S, Farkhani EM, Talkhi N. Predictive Factors of Breast Cancer Mammography Screening Among Iranian Women. *Journal of Preventive Medicine and Hygiene*. 2024 Jan; 64(4): E448. doi: 10.15167/2421-4248/jpmh2024.64.4.3224.
- [16] Seyedkanani E, Hosseinzadeh M, Mirghafourvand M, Sheikhnezhad L. Breast Cancer Screening Patterns and Associated Factors in Iranian Women Over 40 Years. *Scientific Reports*. 2024 Jul; 14(1): 15274. doi: 10.1038/s41598-024-65501-9.
- [17] Alam NE, Islam MS, Ullah H, Molla MT, Shifat SK, Akter S, et al. Evaluation of Knowledge, Awareness, and Attitudes Towards Breast Cancer Risk Factors and Early Detection Among Females in Bangladesh: A Hospital-Based Cross-Sectional Study. *PLoS One*. 2021 Sep; 16(9): e0257271. doi: 10.1371/journal.pone.0257271.
- [18] Mremi A, Pallangyo A, Mshana T, Mashauri O, Kimario W, Nkya G, et al. The Role of Clinical Breast Examination and Fine Needle Aspiration Cytology in Early Detection of Breast Cancer: A Cross-Sectional Study Nested in a Cohort in a Low-Resource Setting. *Women's Health*. 2024 May; 20: 17455057241250131. doi: 10.1177/17455057241250131.
- [19] Reddy H, Joshi A, Joshi SH, Gupta V, Mehendale AM. Understanding Preventive Health Behavior: A Mixed-Methods Study to Explore Factors Influencing the Practice of Breast Self-Examination Among Indian Medical Students. *Cureus*. 2024 Jun; 16(6): e64032. doi: 10.7759/cureus.64032.
- [20] Gnant M, Abdullah KL, Boyle F, Huang CS, Bickford K, Neunie S, et al. Assessing Knowledge, Competence, and Performance Following Web-Based Education on Early Breast Cancer Management: Health Care Professional Questionnaire Study and Anonymized Patient Records Analysis. *JMIR Formative Research*. 2024 Mar; 8(1): e50931. doi: 10.2196/50931.