Patient Delay in Breast Cancer Diagnosis in Two Hospitals in Karachi, Pakistan: Preventive and Life-Saving Measures Needed

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PURPOSE Patients with breast cancer in Pakistan commonly present with advanced disease. The objectives of this study were to evaluate the frequency and length of delays in seeking medical consultation and to assess the factors associated with them.

METHODS Four hundred ninety-nine patients with newly diagnosed breast cancer were enrolled and interviewed over the period from February 2015 to August 2017. Information on sociodemographic factors, delay to medical consultation, stage of breast cancer at presentation, and tumor characteristics of the breast cancer were collected through face-to-face interviews and medical file review.

RESULTS The mean (standard deviation) age of patients with breast cancer was 48.0 (12.3) years. The mean (standard deviation) patient delay was 15.7 (25.9) months, with 55.2% of women detecting a breast lump but not seeking a medical consultation because of a lack of awareness about the significance of the lump. A total of 9.4% of the women decided to seek treatment initially using complementary and alternative medicine and traditional treatment; 9.4% of the women presented to a health care provider with a breast lump but no action was taken, and they were wrongly reassured about the lump without mammography or biopsy. For 26% of the women, the delay in presentation was caused by anxiety, fears and misconceptions regarding diagnosis and treatment, and other social factors including possible adverse effects on their relationship with their husband. Multivariable analysis showed a strong association of lower socioeconomic status (odds ratio [OR], 8.11 [95% CI, 2.46 to 26.69]) and late stage of breast cancer (OR, 4.83 [95% CI, 1.74 to 13.39]) with a patient delay of ≥ 3 months.

CONCLUSION Patient delay is a serious problem in Pakistan. There is an urgent need for intensive and comprehensive breast cancer education that addresses the myths and misconceptions related to breast cancer.

INTRODUCTION

Although breast cancer incidence was reported initially to be highest in developed countries, its incidence is rising rapidly in lower- and middle-income countries (LMICs) such as Pakistan.[1,2] The incidence of breast cancer among females in Pakistan has been shown previously to be 2.5 times greater than that in India or Iran.[3] Pakistan is a developing country and is in the lower- and middle-income category with countries such as Bangladesh, Bhutan, and India, where in 2017 gross national income per capita was US $5,830 and total expenditure on health as a percentage of GDP was only 2.6%.[4] According to a study undertaken at Aga Khan University Hospital (AKUH), the financial burden of cancer care is huge and overwhelming.[5] Pakistan is the fifth most populous country in the world, and Karachi, the most populous city in Pakistan, has an estimated population of 24

million, which includes people from multiple ethnicities. However, there is a dearth of well-equipped cancer hospitals: nearly 320,000 new cases of cancer are expected every year in Pakistan, but the entire country has only 20 cancer hospitals. Moreover, there are no palliative care facilities or hospices for patients with advanced cancer.[6] Pakistan to this day does not have any national breast cancer screening or awareness programs, and this is likely to contribute to presentation of the disease at a more advanced stage.[7]

Early detection of breast cancer is of critical importance because smaller tumor sizes and reduced chances of metastasis are major factors in overall better survival.[8] A delay in detection of breast cancer is associated with larger tumor size, increased risk of involvement of lymph nodes and distant metastasis, and subsequent poor survival after surgery. Earlier

CONTEXT

Key Objective

There is dearth of epidemiological studies to assess the extent of patient delay in breast cancer diagnosis among Pakistani women. The main objective of the study was to evaluate the frequency, length of the patient delay and assess factors associated with patient delay.

Knowledge Generated

Patient delay of 15.7 months is one of the longest delays and urgent measures are needed to improve the awareness of women regarding breast cancer symptoms through comprehensive and positive breast cancer education campaigns, addressing the myths and misconceptions.

Relevance

Information about the delayed presentation of breast cancer should call attention to the magnitude of the problem. Developing strategies to shorten these delays would significantly reduce the impact of breast cancer on patients and the health care system.

diagnosis may be possible with self-screening and a better awareness and understanding of the early signs of breast cancer. A Thai study found that patients delayed seeking a medical diagnosis even when there were physical signs of breast cancer.[9] Patients with breast cancer in Pakistan commonly present with advanced disease, and this remains a dilemma for the treating oncologists and surgeons. According to a local study in Pakistan, 69.9% of patients with breast cancer had stage III or IV disease at the time of first presentation.[10] Previous studies have also shown high rates of delay in breast cancer diagnosis, with 39% reporting late in northern Pakistan and going for their first visit regarding the breast lump after a delay of 6 months after noting any symptoms.[11-13] The delay in presentation and detection of patients with breast cancer is a major contributor to the advanced stage at presentation and to the increased mortality rates in Pakistan.[12] Development of specific strategies by policymakers to reduce delays requires an understanding of the factors that influence this delay.[14,15] Strategies could include public education and awareness campaigns about the symptoms and signs of breast cancer, breast self-examination (BSE), and screening mammography, and encouraging women to seek medical consultation at the earliest possible time.[16] Delayed presentation of cancer has a significant economic impact because it is far less expensive to treat patients with early-stage disease and success rates are increased significantly. Given the growing burden of breast cancer and observed delays before medical consultation, an understanding of the factors influencing patient delay is important to reduce late presentation of this curable cancer. The objectives of the current study were to evaluate the frequency and length of delays in seeking medical consultation, to assess the factors associated with them, and to examine the relationship between patient delays and disease stage.

METHODS

Study Population and Study Sites

Four hundred ninety-nine patients with newly diagnosed breast cancer were enrolled from 2 main hospitals in Karachi, Pakistan, AKUH and the Karachi Institute of Radiation and Nuclear Medicine (KIRAN) cancer hospital. KIRAN caters mostly to people from the low- or middle-income group, whereas AKUH is a private hospital. These patients were selected from a multicenter matched case-control study consisting of 1,195 participants.[17] All participants were interviewed face to face by research medical officers in clinics in a quiet and private place for to allow for confidentiality and privacy. The questionnaire and interview procedures were evaluated and revised after a pilot study on 50 patients.

Ethical approval was obtained by the human research ethics committee of the University of Adelaide and the ethical review committees of the 2 hospitals in Karachi Pakistan. Informed consent was obtained using the patient information sheet and consent form. Participants were informed clearly about the objectives and procedures of the study, their rights and commitments, and the benefits and risks involved. If the patients agreed to participate, they were asked to sign the consent paper. The consent form of the study was provided in both English and the local language, Urdu. If a patient was unable to read the consent form, the form was read out and verbal consent to participate was obtained.

Variables in the Questionnaire

Patient delay was defined as the time between the appearances of any of the first symptoms of breast cancer and the date of initial consultation for diagnostic mammography, ultrasonography, or medical advice for breast symptoms. "No delay" ($\leq$ 1 month) indicated that patients sought medical advice for their breast cancer symptoms

TABLE 1. Sociodemographic and Clinical Characteristics of Patients With Breast Cancer in Two Hospitals in Karachi, Pakistan

Variable	No Delay (n = 172)		Intermediate Delay (< 3 months; n = 98)		Long Delay (≥ 3 months; n = 229)		Total (n = 499)		P^a
	No.	%	No.	%	No.	%	No.	%	
Hospital									< .001
AKUH	117	68.0	41	41.8	106	46.3	264	52.9	
KIRAN	55	32.0	57	58.2	123	53.7	235	47.1	
Age group, years									.08
< 35	17	9.9	18	18.4	33	14.4	68	13.6	
35-44	47	27.3	34	34.7	55	24.0	136	27.3	
45-54	44	25.6	21	21.4	69	30.1	134	26.9	
≥ 55	64	37.2	25	25.5	72	31.4	161	32.3	
Education, grade									< .001
< 8	50	29.1	43	44.3	111	48.7	204	41.0	
8-12	59	34.3	33	34.0	74	32.5	166	33.4	
> 12	63	36.6	21	21.6	43	18.9	127	25.6	
Mother tongue									.26
Urdu	83	48.3	44	44.9	110	48.0	237	47.5	
Sindhi	22	12.8	14	14.3	33	14.4	69	13.8	
Punjabi	23	13.4	9	9.2	21	9.2	53	10.6	
Pashto	3	1.7	4	4.1	17	7.4	24	4.8	
Balochi	6	3.5	3	3.1	11	4.8	20	4.0	
Other	35	20.3	24	24.5	37	16.2	96	19.2	
Marital status									.76
Single	10	5.8	4	4.1	12	5.2	26	5.2	
Married	130	75.6	81	82.7	180	78.6	391	78.4	
Widow/divorcee	32	18.6	13	13.3	37	16.2	82	16.4	
Socioeconomic status									< .001
Upper	18	10.7	6	6.3	7	3.1	31	6.3	
Middle	112	66.3	46	47.9	96	42.7	254	51.8	
Lower	39	23.1	44	45.8	122	54.2	205	41.8	
Parity									.25
Nullipara	17	9.9	16	16.3	25	11.0	58	11.7	
≤ 3	81	47.4	41	41.8	89	39.2	211	42.5	
> 3	73	42.7	41	41.8	113	49.8	227	45.8	
Menopausal status									.47
Premenopause	79	46.5	50	51.5	99	44.2	228	46.4	
Postmenopause	91	53.5	47	48.5	125	55.8	263	53.6	
Benign breast disease									.23
Yes	18	10.9	15	15.6	21	9.3	54	11.1	
No	147	89.1	81	84.4	205	90.7	433	88.9	
Family history of breast cancer									.005
Yes	45	26.2	13	13.3	34	14.9	92	18.5	
No	127	73.8	85	86.7	194	85.1	406	81.5	

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TABLE 1. Sociodemographic and Clinical Characteristics of Patients With Breast Cancer in Two Hospitals in Karachi, Pakistan (Continued)

Variable	No Delay (n = 172)		Intermediate Delay (< 3 months; n = 98)		Long Delay (≥ 3 months; n = 229)		Total (n = 499)		P^a
	No.	%	No.	%	No.	%	No.	%	
Family history of cancer									.03
Yes	70	40.7	25	25.5	73	32.0	168	33.7	
No	102	59.3	73	74.5	155	68.0	330	66.3	
BMI, kg/m^2									.09
< 23	24	16.6	20	22.7	48	23.6	92	21.1	
23-25	23	15.9	22	25.0	31	15.3	76	17.4	
> 25	98	67.6	46	52.3	124	61.1	268	61.5	
First symptom									.04
Lump	150	87.2	86	89.6	216	94.3	452	90.9	
Other	22	12.8	10	10.4	13	5.7	45	9.1	
Mode of detection									.05
Accidental	132	79.0	75	79.8	186	86.1	393	82.4	
BSE	25	15.0	9	9.6	11	5.1	45	9.4	
Clinical examination	5	3.0	6	6.4	12	5.6	23	4.8	
Other	5	3.0	4	4.3	7	3.2	16	3.4	
First consultation									< .001
CAM	2	1.2	4	4.4	26	12.0	32	6.8	
Medical health provider	160	98.8	87	95.6	190	88.0	437	93.2	

Abbreviations: AKUH, Aga Khan University Hospital; BMI, body mass index; BSE, breast self-examination; CAM, complementary and alternative medicine; KIRAN, Karachi Institute of Radiation and Nuclear Medicine.

$^a P$ values generated from χ^2 test/Fisher's exact test.

within a month of finding them. "Delay" indicated that patients sought medical help > 1 month after noticing possible symptoms of breast cancer. Delay was further categorized into "intermediate delay" (< 3 months) and "long delay" (≥ 3 months). Information was collected about sociodemographic and reproductive factors including age, level of education, socioeconomic status (SES), self-reported family history of breast cancer or any other cancer, and reasons for delay; anthropometric data were also collected. The cutoffs used for body mass index were based on WHO and International Association for the Study of Obesity criteria for the Asian population.[18,19] Information was also collected on breast tumor histopathology, type, and grade, and the stage of disease was categorized according to TNM staging sourced from pathology reports.[20]

The study participants were asked to recall the onset of any symptoms that they became aware of and the day of first medical consultation. Questions dealt with the presence of the initial sign or symptom of breast cancer, any breast lump, nipple discharge, breast pain, skin changes, changes in breast shape, breast ulcer, arm edema, axillary lymph nodes, or any other sign or symptom. The mode of detection was recorded as either self-detected accidentally or through regular BSE, by a clinician or health care provider, by a screening mammogram or other imaging test indicating an abnormality, or on the basis of systemic symptoms like weight loss or fatigue. To minimize recall bias, the participants were reminded of events in the calendar year, such as religious and national occasions, school holidays, festival celebrations, or Independence Day, to help them remember important dates relative to their medical history.[21]

Reasons for delay included a lack of awareness about breast cancer symptoms, use of traditional methods of treatment, fear of breast cancer treatment, fear of diagnosis, fear of mastectomy, fear of rejection by husband, possible shame and embarrassment, family commitments, myths and misconceptions related to breast cancer, financial constraints, and wrong assurances by health care providers. Provider delay was defined as a delay in breast cancer diagnosis by the health care provider when women were reassured falsely without follow-up tests or proper referrals, even though the women presented with typical symptoms of breast cancer.

Statistical Analysis

Mean and standard deviations were obtained for continuous variables, and categorical variables were assessed by

TABLE 2. Histopathologic Findings in Patients With Breast Cancer in Two Hospitals in Karachi, Pakistan (n = 514)

Variable	No Delay		Intermediate Delay (< 3 months)		Long Delay (≥ 3 months)		P^a
	No.	%	No.	%	No.	%	
Side with breast cancer							.380
Right	86	50.9	45	46.9	109	48.4	
Left	82	48.5	50	52.1	109	48.4	
Both	1	0.6	1	1.0	7	3.1	
Histopathology							.440
IDC	139	80.8	85	86.7	187	81.7	
Other	26	15.2	7	7.1	26	11.2	
Grade							.200
I	5	3.2	2	2.4	6	3.1	
II	78	50.0	52	61.2	121	62.1	
III	73	46.8	31	36.5	68	34.9	
Tumor size, cm							< .001
≤ 5	125	87.4	56	81.2	113	65.3	
> 5	18	12.6	13	18.8	60	34.7	
Nodes							.160
NoN1	106	74.1	51	71.8	110	68.8	
N2/N3	33	23.1	18	25.4	36	22.5	
Nx	4	2.8	2	2.8	14	8.8	
Metastasis							.010
No	98	87.5	45	83.3	89	73.0	
Yes	14	12.5	9	16.7	33	27.0	
Stage of breast cancer							.001
I	27	23.1	3	5.8	10	8.3	
II	40	34.2	24	46.2	38	31.7	
I	36	30.8	16	30.8	39	32.5	
IV	14	12.0	9	17.3	33	27.5	
Estrogen receptor							.670
Positive	99	69.2	50	70.4	104	65.4	
Negative	44	30.8	21	29.6	55	34.6	
Progesterone receptor							.750
Positive	82	58.2	45	63.4	95	60.5	
Negative	59	41.8	26	36.6	62	39.5	
HER2 neu status							.640
Positive	26	20.6	9	14.1	25	17.4	
Negative	85	67.5	43	67.2	97	67.4	
Unknown	15	11.9	12	18.8	22	15.3	
Type of tumor							.900
Non-TNBC	111	82.8	53	80.3	118	81.4	
TNBC	23	17.2	13	19.7	27	18.6	

Abbreviations: HER2, human epidermal growth factor receptor 2; IDC invasive ductal carcinoma; TNBC, triple-negative breast cancer.

[a]P values generated from χ^2 test/Fisher's exact test.

TABLE 3. Reasons for Delay in Seeking Medical Help for Breast Cancer Among Patients in Two Hospitals in Karachi, Pakistan (n = 339)

Reason for Delay	No.	%	Mean (SD), months
Lack of awareness	187	55.2	11.4 (23.2)
Fears	46	13.6	12.3 (25.1)
Provider delay	32	9.4	8.5 (10.8)
Traditional methods of treatment	32	9.4	23.0 (39.4)
Other	42	12.4	10.7 (12.4)

frequencies and percentages. To facilitate analysis, variables with multiple categories were collapsed to fewer categories in a meaningful way. χ^2 and Fisher's exact tests were used to assess categorical variables. To identify the most important determinants of patient delay (no delay [< 1 month] v intermediate delay [< 3 months] v long delay [≥ 3 months]), multinomial logistic regression was performed. The significance levels for entering into and staying in the model were both set to 0.25. Women with no delay (< 1 month) represented the reference group for both the intermediate and the long patient delay groups. Univariate analysis of each variable of interest and unadjusted odds ratio (ORs) and their 95% CI, together with P values, were calculated. In multivariate analyses, multinomial logistic regression was performed to identify the factors associated with delay, while adjusting for other variables. The overall significance of the model was assessed by likelihood ratio test statistics.[22] Statistical analysis of the data was carried out using the SPSS package for Windows 22.0 (SPSS IBM, Armonk, NY).

RESULTS

Study Population

The sociodemographic characteristics of the study population (n = 499) in the 2 hospitals are listed in Table 1. The mean (SD) age of patients was 48.0 (12.3) years. The mean patient delay of 15.7 months is substantial but avoidable. Out of the 65.5% of women who delayed seeing a doctor, 45.9% waited > 3 months before seeking professional health care. A breast lump was the most common first symptom of breast cancer (89.8% of women), with this being an accidental finding in 82.1% of these women. Routine BSE was performed by only 9.6% of women; 90.4% of women had not performed any BSE and neither did they receive any clinical breast examinations during routine visits to care providers or other clinics before experiencing their breast symptoms. Only 3.5% of breast cancer was detected by screening mammography, evidence of the lack of available screening for the early detection of breast cancer among Pakistani women.

Histopathologic findings of patients with breast cancer stratified into 3 categories are listed in Table 2. Stage IV cancer was highest (27%) among those who delayed seeking medical advice for ≥ 3 months.

Table 3 lists the reasons for a delay >1 month in seeking medical help in those women in whom symptoms were noted that were consistent with a breast cancer diagnosis. The most common cause for delay among these patients was lack of awareness (55.2%), despite the fact that a lump in the breast is the most common mode of breast cancer presentation. Twenty-one women had a history of a breast lump for >4 years and presented with ulcerated masses because they had opted for traditional treatment.

Determinants of Patient Delay

Factors associated with patient delay among women by univariate multinomial analysis are listed in Table 4. Univariate analysis showed that KIRAN patients were more likely to experience intermediate and longer delays than were AKUH patients (OR, 2.96 [95% CI, 1.77 to 4.94] and OR, 2.47 [95% CI, 1.63 to 3.73], respectively). A significant association was observed between patient delay and education level (P < .001). Intermediate and longer delays were both associated with an education level of less than grade 8 (OR, 2.58 [95% CI, 1.36 to 4.90]) and (OR, 3.25 [95% CI, 1.95 to 5.43], respectively), compared with women with an education level higher than grade 12. Both delays were higher among women with an education level of grade 8-12. Intermediate and longer delays were both also associated with lower SES compared with higher SES (OR, 3.39 [95% CI, 1.22 to 9.38] and OR, 8.04 [95% CI, 3.13 to 20.69], respectively). Patients were less likely to delay their first consultation if they had a positive family history of breast cancer (OR, 0.43 [95% CI, 0.22 to 0.85]). There was a significant association between a delay of ≥ 3months among women seeking traditional methods of treatment such as homeopathic treatment and "hakeems" for complementary and alternative medicine (CAM) compared with those seeking help from health care providers including gynecologists, surgeons, and general practitioners (OR, 10.95 [95% CI, 2.56 to 46.83]).

A patient delay of ≥ 3 months was associated with a larger tumor size of > 5 cm at the time of first presentation (OR, 3.69 [95% CI, 2.05 to 6.62]). A patient delay of ≥ 3 months was associated with metastasis (OR, 2.60 [95% CI, 1.31 to 5.16]). Patient delays of < 3 months and ≥ 3 months were also associated with advanced breast cancer stages II-IV (Table 5).

The final multivariate model showed a strong association between lower SES and a patient delay of ≥ 3 months (OR, 8.11 [95% CI, 2.46 to 26.69]; Table 6). Those patients who delayed tended to present at a more advanced stage at initial diagnosis. Compared with that of stage I, the OR for stage IV was 4.83 (95% CI, 1.74 to 13.39) among women who sought medical help for their symptoms after a delay of ≥ 3 months.

DISCUSSION

In this study, the finding that the majority of women had become aware of a breast lump but still delayed any

TABLE 4. Factors Associated With Patient Delay in Breast Cancer Diagnosis Among Women in Two Hospitals in Karachi, Pakistan

Variable	Intermediate Delay (< 3 months)			Long delay (≥ 3 months)		
	Crude OR	95% CI	P	Crude OR	95% CI	P
Hospital			.001			.001
KIRAN	2.96	1.77 to 4.94		2.47	1.63 to 3.73	
AKUH	REF[a]			REF[a]		
Age group, years			.02			.49
< 35	2.71	1.21 to 6.08		1.73	0.88 to 3.39	
35-44	1.85	0.98 to 3.51		1.04	0.62 to 1.74	
45-54	1.22	0.61 to 2.45		1.39	0.84 to 2.31	
≥ 55	REF[a]			REF[a]		
Education, grade			< .001			.05
< 8	2.58	1.36 to 4.90		3.25	1.95 to 5.43	
8-12	1.68	0.87 to 3.22		1.84	1.10 to 3.08	
> 12	REF[a]			REF[a]		
Mother tongue			.16			.81
Urdu	0.77	0.41 to 1.46		1.25	0.73 to 2.16	
Sindhi	0.93	0.40 to 2.17		1.42	0.70 to 2.89	
Punjabi	0.57	0.23 to 1.45		0.86	0.41 to 1.83	
Pashto	1.94	0.40 to 9.48		5.36	1.44 to 19.9	
Balochi	0.73	0.17 to 3.20		1.73	0.58 to 5.19	
Other	REF[a]			REF[a]		
Marital status			.18			.48
Single/widow/divorced	0.65	0.35 to 1.22		0.84	0.53 to 1.35	
Married	REF[a]			REF[a]		
Socioeconomic status			.02			.03
Lower	3.39	1.22 to 9.38		8.04	3.13 to 20.69	
Middle	1.23	0.46 to 3.30		2.20	0.88 to 5.50	
Upper	REF[a]			REF[a]		
Parity			.20			.88
Nullipara	1.68	0.77 to 3.67		0.95	0.48 to 1.88	
≤ 3	0.90	0.53 to 1.54		0.71	0.47 to 1.08	
> 3	REF[a]			REF[a]		
Menopausal status			.43			.65
Premenopause	1.23	0.74 to 2.02		0.91	0.61 to 1.36	
Postmenopause	REF[a]			REF[a]		
Family history of breast cancer			.02			.01
Yes	0.43	0.22 to 0.85		0.50	0.30 to 0.81	
No	REF[a]			REF[a]		
Family history of cancer			.01			.07
Yes	0.50	0.29 to 0.86		0.69	0.45 to 1.04	
No	REF[a]			REF[a]		
BMI[b], kg/m^2			.10			.08
< 23	1.78	0.89 to 3.54		1.58	0.91 to 2.76	
23-25	2.04	1.03 to 4.03		1.07	0.58 to 1.94	
> 25	REF[a]			REF[a]		

NOTE. Restricted to women who had ever had a full-term pregnancy (a pregnancy was considered full term if it resulted in a live birth or lasted ≥ 7 months).

Abbreviations: AKUH, Aga Khan University Hospital; BMI, body mass index; KIRAN, Karachi Institute of Radiation and Nuclear Medicine; OR, odds ratio; REF, Reference.

[a]ORs are for comparisons with those women who had no delay in seeking medical advice for their symptoms.

[b]BMI was categorized according to the WHO classification for Asians as underweight/normal weight (< 23 kg/m^2), overweight (23-25 kg/m^2), or obese (≥ 26 kg/m^2).

TABLE 5. Tumor Characteristics Associated With Patient Delay in Breast Cancer Diagnosis in Two Hospitals in Karachi, Pakistan

Characteristic	Intermediate Delay (< 3 months)			Long Delay (≥ 3 months)		
	Crude OR	95% CI	P	Crude OR	95% CI	P
Grade			.69			.67
I	0.94	0.17 to 5.12		1.29	0.38 to 4.42	
II	1.57	0.91 to 2.71		1.67	1.08 to 2.58	
III	REF[a]			REF[a]		
Tumor size, cm			.23			< .001
> 5	1.61	0.74 to 3.52		3.69	2.05 to 6.62	
≤ 5	REF[a]			REF[a]		
Nodes			.71			.86
NoN1	0.88	0.45 to 1.71		0.95	0.55 to 1.63	
N2/N3	REF[a]			REF[a]		
Metastasis			.47			.007
Metastasis	1.4	0.56 to 3.47		2.60	1.31 to 5.16	
No metastasis	REF			REF[a]		
Stage			.02			< .001
IV	5.79	1.35 to 24.85		6.36	2.44 to 16.58	
III	4.00	1.06 to 15.13		2.93	1.24 to 6.88	
II	5.40	1.48 to 19.73		2.57	1.1 to 6.01	
I	REF[a]			REF[a]		

Abbreviations: OR odds ratio; REF, Reference.

[a]ORs are for comparisons with those women who had no delay in seeking medical advice for their symptoms.

medical consultation by a mean of 8.79 months is important. The main determinant of patient delay was lower SES. Similar findings were observed in a study conducted in Uganda in 2014 where patient delay was common (89%) with a delay of more than 3 months.[23] A systematic review of the factors associated with delay in Africa also showed low SES as an important factor causing delay.[24] Delay was also strongly associated with advanced breast cancer stage, and the ORs for stages II, III, and IV were higher compared with that of stage I. These findings of a strong association between lower SES and advanced stage of breast cancer at first consultation with patient delay are similar to the findings of other studies.[25-29]

The most common reason given by patients for the delay in diagnosis was a lack of awareness about the importance of the finding of an abnormality in the breast (55.2%). Similar findings were reported by a recent study in Pakistan despite a smaller sample size of 200 patients.[30] Similarly, there was a strong influence of CAM, such as homeopathy and "Hakeems," in 2 other studies.[31,32] Consulting a traditional healer and low education were also reasons for patient delay in a study among African women.[27] Choosing

alternative medicine has been shown to be responsible for delays in various other studies,[23,31] but our study results show it is less of an issue than in Malaysia, where it was reported more often (42%)[33] Other reasons for delay, such as myths, fears related to diagnosis and treatment, and family commitments, were also observed in other studies.[34-36] In a study of delayed breast cancer diagnosis in Malaysia, CAM, negative information about breast cancer and treatment such as the adverse effects of chemotherapy, a perceived lack of a cure for breast cancer, and fear of divorce or remarriage of the husband were the significant factors leading to a delay in breast cancer diagnosis and treatment.[33]

These findings confirm the results of other studies in developing countries and among minority groups in developed countries. All those studies have reported that a lack of awareness and knowledge of breast cancer symptoms and poor education are strongly associated with patient delays.[28,32,37-43] Moreover, as suggested by other studies, more education and awareness are needed to address misconceptions about breast cancer.[34,44] It is apparent that even in the more educated women, a lack of awareness of the symptoms of breast cancer was also a major reason for delay. An interesting finding was that patients were more likely to delay their first consultation if they did not have a family history of breast cancer. This suggests that awareness of breast cancer significantly reduces delay because it is consistent with the personal knowledge and experience of cancer in these families.

The limitations of this study include reliance on patient recall of delay and symptoms, but this was minimized by limiting the study to incident cases only and enrolling patients within 6-12 months of breast cancer diagnosis. Moreover, some verbal information was verified by medical records and the documented findings of laboratory investigations. Delays were self-reported by patients, who in some cases might have tended to underreport their delay because of a wish to avoid any guilt. However, the major strengths of our study were a large sample size of incident cases only and comprehensive assessment and analysis of a wide range of factors associated with patient delay. Good quality of data collection was ensured by in-person interviews conducted by medically qualified doctors. Their medical history–taking experience ensured conduct of interviews in a polite, sensitive and time-efficient manner with patients' confidence in them.

Delayed presentation of breast cancer is a preventable problem, which if addressed, would have a significant impact on reducing the morbidity and mortality of breast cancer. First, it is recommended that women's awareness about breast cancer symptoms and the critical importance of seeking immediate medical diagnosis and treatment be improved. The implementation of an intensive, comprehensive, and positive breast cancer education campaign through structured community health awareness programs

TABLE 6. Final Multivariate-Adjusted ORs of Factors Associated With Patient Delay in Breast Cancer Diagnosis in Two Hospitals in Karachi, Pakistan

Variable	Intermediate Delay (< 3 months)			Long Delay (≥ 3 months)		
	Adjusted OR	95% CI	P	Adjusted OR	95% CI	P
Socioeconomic status			.16			< .001
Upper	REF[a]			REF[a]		
Middle	1.30	0.39 to 4.37		2.63	0.90 to 7.74	
Lower	2.70	0.68 to 10.68		8.11	2.46 to 26.69	
Stage of breast cancer			.04			.001
I	REF[a]			REF[a]		
II	6.33	1.62 to 24.70		2.75	1.12 to 6.77	
III	4.31	1.08 to 17.25		2.75	1.11 to 6.80	
IV	4.91	1.05 to 22.94		4.83	1.74 to 13.39	

NOTE. Adjusted for age, hospital, education, family history of breast cancer, first consultation, tumor size, and metastasis.
Abbreviations: OR odds ratio; REF, Reference.
[a]ORs are for comparisons with those women who had no delay in seeking medical advice for their symptoms.

addressing the myths and misconceptions related to breast cancer will reduce the burden of late-stage breast cancer in Pakistani women. Such an education campaign will need to be cognizant of the sociocultural and religious values of Pakistani society, while making women "breast aware" of their healthy breasts and any changes in them. The second recommendation is to include health care providers, clinicians, nurses, and female health visitors in such educational campaigns. It is essential that health care providers and traditional healers play their roles in timely referrals and necessary investigations. The resource requirements to implement such a program are relatively limited and do not require expensive technology; however, this program will have a significant impact on reducing the life-threatening delay in breast cancer diagnosis. The third action to minimize such a delay is to provide low-cost mammograms, with a target population of women with a high-risk profile in particular. Last but not least, in Pakistan, as in any other LMIC, health care access and treatment facilities for patients with breast cancer should be improved as a part of a breast cancer control program. For timely initiation of breast cancer treatment and quality care, awareness and education to avoid delays will not be useful without available cancer hospitals. Delayed presentation of breast cancer is a preventable problem that, if addressed, would have a significant impact on reducing the morbidity and mortality of the disease.

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