Received: 16 April 2018 | Revised: 9 September 2018 | Accepted: 11 September 2018

DOI: 10.1002/cnr2.1141

ORIGINAL ARTICLE

WILEY Cancer Reports

Factors influencing delayed presentation of breast cancer at a tertiary care hospital in Pakistan

Mehreen Baig[1] | Iram Sohail[2] | Humera Naz Altaf[3] | Omar Shahzad Altaf[4]

[1] MRCS General Surgery, Department of surgery, Surgical Unit I, Foundation University Medical College, Rawalpindi, Pakistan

[2] FRCS Histopathology, Department of Pathology, Foundation University Medical College, Rawalpindi, Pakistan

[3] FCPS General Surgery, Department of Surgery, Shifa College of Medicine, Shifa Tameer e' Millat University, Islamabad, Pakistan

[4] Tehsil Head Quarter Hospital Hazro Khebar Pakhtoonkhawa, Hazro, Pakistan

Correspondence
Dr Humera Naz Altaf, MBBS, FCPS General Surgery, Assistant Professor, Department of Surgery, Shifa College of Medicine, Shifa Tameer e' Millat University, Islamabad, Pakistan.
Email: humeraaltaaf@gmail.com

Abstract

Background: Breast cancer is the leading cause of death despite the continuous development of newer and more effective modalities of treatment for breast cancer. In Asia, Pakistan has the highest rate of breast cancer. Breast cancer treatment shows better prognosis when it is diagnosed at an early stage, but mortality increases significantly with delayed diagnosis and advanced stage of disease. Delay in diagnosis and nonavailability of treatment are the major factors responsible for advanced stage and low survival.

Aims: The objective of our study was to identify the factors responsible for delayed presentation of patients with breast carcinoma.

Methods and results: A cross-sectional study using a questionnaire method was conducted at the Foundation University Medical College from January 2015 to December 2016. A total of 89 patients gave consent and were interviewed using a prestructured questionnaire during the study. Age ranged from 25 to 64 years. Majority of patients were in stage T3N1M0 (31.5%). Second most common stage was T4N0M0 (14.6%). Thirteen patients (12.4%) were in stage T3N0M0, and 10 patients (11.2%) were in T3N2M0. Delay ranged from 3 months to more than 1 year; 43.8% presented with delay of 3 to 6 months. The reasons for delay were lack of knowledge about breast cancer (41%), lack of availability of health care services (32.6%), *purdah* and religious reasons (6.7%), and fear of being diagnosed with cancer (10.1%).

Conclusion: The main reasons for delay identified in our study were lack of knowledge and availability of appropriate health care facilities. In order to improve outcome of breast cancer, more focus is needed on spreading awareness and improving health care services in rural areas.

KEYWORDS

awareness, breast cancer, health care facilities, knowledge

1 | INTRODUCTION

Breast cancer is the most common cancer in women all over the world with variable incidences in developed and developing regions.[1,2] Highest incidence rates of breast cancer have been reported from developed countries, that may be attributed to regular screening, early detection, and better cancer registry services.[1,2] In Pakistan, breast cancer is 2.5 times more common than in Iran and India.[1,3,4] At some stage of life, 1 in 9 Pakistani women is diagnosed with breast cancer.[1,2] World Health Organization (WHO) has ranked breast cancer as the 10th major cause of death in Pakistani women, with a reported mortality rate of 26.76%.[2,5,6] Since early detection improves the

prognosis of breast cancer, WHO emphasizes on increasing the awareness of risk factors, common presentations, and evidence-based approaches for diagnosis and management of breast cancer.[2,7] These strategies have been effectively implemented in the developed countries resulting in better outcomes. However, in developing countries like Pakistan, scarcity of availability and implementation of these strategies contribute to delayed intervention and high morbidity and mortality.[5,6,8]

The need for a National Cancer Registry in Pakistan has been increasingly realized but not completely fulfilled, making it difficult to have an exact estimate of incidence and mortality rates of breast cancer in Pakistan. There is limited data available from Pakistan health research council. It receives data from only 8 hospitals in Karachi, Rawalpindi, Peshawar, and Quetta. The data are not true representative of disease burden in Pakistan.[8,9] The only data available from a recognized population-based registry were from Karachi Cancer Registry (KCR) that reported data from 1995 to 1997. These data represented only 1% of total Pakistani population as it was only from the district south of the Karachi division.[8-10] A report by Saukat Khanum Memorial Cancer Hospital & Research Center reporting data from December 1995 to December 2009 emphasized that almost half (45.9%) of all the cancers diagnosed in the female population were of breast cancer.[2,6,7] A major problem in the developing countries including Pakistan is that women at high risk of having breast cancer do not seek timely medical attention. It has been shown that patients who delay their disease presentation in clinic by 12 to 26 weeks have lower survival rates compared to those with less than 12-week delay. The dilemma in Pakistan is that medical care is not sought in a timely manner, and especially for breast cancer, the presentation to a physician is quite late.[10,11] In their study, Ahmed et al[11] not only reported high incidence rate but also that breast cancer presentation and diagnosis in majority of cases were in stages III and IV.[11] A number of factors are responsible for this delay and higher mortality. The health care system in Pakistan is poor with rural population being mostly devoid of basic health facilities and screening programs. The problem is aggravated by lack of education and knowledge of the disease.[2] A number of studies conducted in different parts of Pakistan have established this lack of awareness among women regarding breast cancer, importance of self-examination, and early diagnosis. Most of the times, women are unable to interpret their symptoms and are misled by the false perception that a painless lump is benign.[12,13]

Fauji Foundation Hospital in Pakistan provides free of cost treatment to entitled patients and has numerous peripheral setups in rural areas. It was observed at Fauji Foundation that patients presented with significant delay. Different studies have shown different theories for the delay (*purdah* and religious reasons, nonavailability of health services, poverty, and rural population),[11-13] but there is no consensus on the precise reasons. The aim of this study was to determine the delay period and to have an objective insight into the reasons for delayed presentation of breast cancer patients in clinics. This understanding can guide government agencies and health care providers in policy-making and improving their system to provide easy access and quality services to patients in all areas of the country. Such efforts will also assist in promoting patient awareness and screening programs for early diagnosis and better outcomes.

2 | MATERIAL AND METHOD

This is a cross-sectional study carried out at Fauji Foundation Hospital Rawalpindi from January 2015 to December 2016 using a questionnaire method. Sampling was done via nonrandomized convenience sampling technique.

Inclusion criteria included female patients between age of 25 to 70 years who were admitted in surgical wards with diagnosis of breast carcinoma and who gave consent for inclusion in the study. Male patients or female patients with breast lump diagnosis other than carcinoma (for example patients of phylloide's tumor and sarcoma) were excluded from the study. Patients suffering from some mental illness were also excluded.

Upon approval by institutions ethical committee, patients who gave informed consent were interviewed face to face using a prestructured questionnaire that was developed after thorough search of literature[7,14-16] (Supplementary file 1). Data were collected using structured data sheet and analyzed using SPSS 20. Descriptive statistics were used to calculate mean and standard deviation for numerical variables like age, age at menarche, number of children, and duration of delay. Frequency and percentages were presented for categorical variables like clinical diagnosis, stage of disease, reasons for delay, education, residence (rural or urban), and socioeconomic status. Univariate and multivariate regression analyses were used to determine statistical significance between delay and stage of disease and to find most significant factor responsible for the delay.

3 | RESULTS

A total of 89 patients gave consent and were interviewed during the study. Research forms were completed according to the questionnaire. Demographics of study population are mentioned in Table 1. Most of the patients in our study presented with a delay of 3 to 6 months, in locally advanced stage. Of patients, 31.5% were in stage T3N1M0 (31.5%); stage T4N0M0 was seen in 14.6%. Thirteen patients (12.4%) were in stage T3N0M0, and 10 patients (11.2%) were in T3N2M0. Lack of knowledge about breast cancer was the reason for delay in 41.6%, and nonavailability of health care services near their hometown was seen in 32.6%. Only 6.7% of patients delayed seeking help because of *purdah* and religious reasons. Some of the patients (10.1%) delayed it because of fear of being diagnosed as cancer, and they had apprehensions and fear about the treatment. We also noted the misbelief among these women that if cancer is biopsied/cut with metal instrument, it spreads more rapidly. They sought help from holy places and sought some relief from holy relics as first-line treatment for their cure. Women had firm religious beliefs that their lump would disappear by reciting certain *wazaif* (verses from Quran). Only 9% had tried herbal and homeopathic medication. Statistically significant association was found between delay and advanced stage of presentation ($P < 0.001$). From multivariate regression analysis, lack of knowledge and nonavailability of health care facilities were the 2 most significant factors responsible for delayed presentation ($P < 0.001$) (Table 2). Most of patients who presented to Fauji Foundation Hospital Rawalpindi are referred from other areas of the country. Sixty-five

TABLE 1 Demographics of study population

Demographics N = 89	Frequency	Mean and Standard Deviation
Age		46.4 ± 11.1
Between 25 and 35	23	
Between 36 and 45	14	
Between 46 and 55	27	
Between 56 and 65	25	
Age of menarche		12.7 ± 1.1
10 to 12 years	40	
13 to 15 years	49	
Number of children		3.8 ± 2.1
No children	8	
1 to 5 children	63	
More than 5 children	18	
Menopausal status		
Premenopausal	67	
Postmenopausal	22	
Education		
Uneducated or primary school education	59	
Secondary education	30	
Residence		
Rural	65	
Urban	24	
Diagnosis		
Invasive ductal carcinoma	84	
Invasive lobular carcinoma	4	
Papillary carcinoma	1	
Delay		
3 to 6 months	39	8.3 ± 2.9
7 to 10 months	21	
8 to 12 months	16	
More than 12 months	13	

TABLE 2 Statistical analysis of factors responsible for delayed presentation

Factors Responsible for Delayed Presentation	Pearson Correlation	Significance (2-Tailed)
Fear of cancer	0.04	0.12
Nonavailability of health care services	<0.01	<0.001
Lack of knowledge	<0.01	<0.001
Alternative treatment	0.06	0.16
Parda and religious issues	0.09	0.18

From multivariate regression, analysis lack of knowledge and nonavailability of health care services were statistically significant factors responsible for delayed presentation of breast cancer patients.

percent of our study population was from rural areas, so while Fauji Foundation Hospital is a welfare organization and health care facilities are free, expenses of travel from rural areas and cost of accommodation contributed to delay in our study population.

4 | DISCUSSION

One in every 9 Pakistani women suffers from breast cancer which is one of the highest prevalence rates in Asia.[17] A number of studies have shown a rising incidence of advanced breast carcinoma in women of younger age group.[18] The mean age of women in our study was 46.4 (±11.1) years which is comparable to other studies from Pakistan.[14,17,19,20] Ayaz et al,[17] Memon et al,[19] and Talpur et al[14] reported similar results with mean age of 47 ± 11.2 years with a range of 25 to 75 years, 47.5 ± 12.1 years with a range of 25 to 77 years, and 43.5 ± 10.4 years with a range of 28 to 80 years.[14,19,20] Pakseresht et al[20] in their study from Delhi, India, reported mean age 47 ± 11.2 years, and other studies from India and Bangladesh have reported similar results with mean age of 47 (±10.1) to 49.1 (±11.7) years.[15,20] According to worldwide cancer control programs, there is a strong association between the duration of delay in diagnosis, stage at diagnosis, and the consequent overall patient survival.[21] A systematic review by Richards et al showed that delays of 3 to 6 months were clearly associated with increased tumor size, advance in disease stage, and poorer long-term prognosis.[17] In their multinational study, Jassem et al reported that the delay was shorter in women with an intermediate education level, in women who work, and in women who live in big towns or cities.[22] Higher breast cancer mortality rates in low and medium-income countries (LMICs) are thought to be due to diagnosis in advanced stages and barriers to accessing medical care.[23] Advanced stage at presentation in LMICs and in certain racial, ethnic and low socioeconomic communities in developed world are mainly because of delay in presentation to physician from onset of symptoms.[24-26] In our study, the delay ranged from 3 months to more than 1 year (mean delay 8.1 ± 3.07). Most of the patients (43.8%) presented with delay of 3 to 6 months. The results of our study are similar to other studies from Pakistan. Khan et al[1] revealed that there were 39.01% of patients who presented with a delay of >3 months.[1] El-Shinawi et al in their study done at Ain Shams University Hospital found a delay of 1 to 72 months.[15,26] In comparison, the average delay in diagnosis in Eastern European countries like Hungary is 3.4 weeks (25 days), in India is 1.5 months while Ethiopia has an alarming 18-month delay in diagnosis.[16,22,27] Our study showed that majority of the women delayed mentioning their initial symptoms of breast cancer because they did not think it was of concern. Patients (41.6%) in our study had no knowledge about clinical features of breast cancer, self-breast examination, or screening for breast cancer. These results are similar to other local studies. Memon et al and Malik et al[17,19] reported lack of awareness as the main contributing factor for delay in pursuing medical attention in women with breast cancer.[17,19] Majority of women did not consider their symptoms serious enough to warrant medical consultation and had an optimistic approach that their symptoms would resolve spontaneously.[17,19] In a study from India, Pakseresht et al[20] noticed that only 38.4% of women sought consultation with a physician within 3 months of the onset of symptoms.[20] Tiwari et al[27] in their analysis mentioned the reasons for delay in presentation comprised of unawareness regarding the signs and symptoms of cancer, lack of availability of qualified local practitioners, use of alternative medication, poor socioeconomic conditions, and lack of a proper referral infrastructure.[27] International

studies from countries like Germany, the United States, Colombia, Nigeria, and Iran have indicated that majority of the women with breast cancer delayed reporting their symptoms to a health care professional because they lacked knowledge about breast cancer or considered their symptoms harmless.[17,28,29] Breast lump is the most common presentation of breast cancer.[30] Several studies have indicated that absence of breast lump in patients with breast cancer causes delay in presentation.[30] A study by Brzozowska et al from Poland reported mean patient delay of 32.2 ± 63.8 weeks which was mainly because of disregard for symptoms.[31] Women have a pivotal role in Pakistani family system, and while they care for everyone around them, their own health issues become secondary.[13] Some of the studies have shown shyness or unavailability of female doctor as the reason for delayed presentation of patients especially those living in rural and far flung areas.[1,13,32] In our study, only a small number of patients (6.7%) delayed seeking help because of shyness, *purdah*, or religious reasons. Our observation during our study was that once these women were aware of their disease and its implications, they were less shy in consulting male or female doctors.

The second most common reason for delay in our study was lack of availability of health care services near their hometown (32.6%). Fauji Foundation Hospital is a welfare organization catering for retired army personnel, and it was an interesting observation that majority of these entitled patients were unaware of the available cancer management facilities in the government hospitals. They either consulted local setups of Fauji Foundation welfare organization (where specialized cancer care facilities are not available) or went to local private hospitals till they were finally referred to Fauji Foundation Hospital Rawalpindi which is one the very few tertiary care hospital under the umbrella of Fauji Foundation. Most of these retired army personnel belong to rural background and settle at their hometown after retirement. In the present study, it was noted that 63% of patients belonged to rural area and 26% belonged to urban areas. Overall, they belonged to a low socioeconomic group and financial consideration, required for treatment at a private institution including travel and lodging expenses, and contributed to delays in their presentation for cancer treatment. Hansen et al emphasized the crucial role of general practitioners in the proper and timely diagnosis and referral of cancer patients.[33,34]

In a review of 1590 participants from Bangladesh, 81.9% had never heard of breast cancer. There was a negative association between rural residence, lack of education, and knowledge of breast cancer.[35] In old age women, delay in presentation is attributed to the patient herself.[36] Older women may not consider early symptoms of breast cancer as alarming.[36,37] They usually associate these symptoms with generalized weakness, myalgias, obesity, or other comorbid conditions.[36] Most young women present to health care providers early after they detect a breast abnormality themselves.[36,38] Younger age is associated with delay in diagnosis by clinicians.[36,38] Lack awareness of the disease, low suspicion for malignancy, and nonavailability of screening tools for young patients contribute to delay in diagnosis of breast cancer.[36,38] Cancer is less often suspected among young patients as compared to older patients. Mammography is significantly less sensitive in detecting lesions in younger women than older women (68% vs 91%).[39] Fibroadenosis and fibrocystic disease are very common in young women.[39,40] There are serious problems in access to health services, the strength of the first level of care for the early detection of symptomatic patients, the regulation of establishments where breast imaging tests are performed, and the faulty or absent delineation of referral pathways to cancer care.[40,41]

5 | CONCLUSION

The main reasons for delay identified in our study were lack of knowledge and availability of appropriate health care facilities. Awareness about breast cancer among women in both rural and urban areas is inadequate. They need to be educated about breast cancer risk factors, importance of self-breast examination, and routine medical checkup for early detection and treatment of breast cancer. Exposure to health-related information and subsequently enhanced awareness in women about breast cancer and its management may contribute significantly to medical help seeking behaviors.

ACKNOWLEDGEMENTS

We would like to acknowledge support from Head of the Department of General Surgery Dr Etizaz Ahsan. We would also like to acknowledge Ms Rohina Faruqi for her input in writing the manuscript in English language.

CONFLICT OF INTEREST

The authors have no conflict of interest to report.

AUTHORS' CONTRIBUTIONS

All authors had full access to the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. *Conceptualization*, M.B., I.S.; *Formal Analysis*, M.B., H.N.A., O.S.A.; *Writing - Original Draft*, H.N.A.; *Writing - Review & Editing*, I.S., H.N.A., O.S.A.; *Statistical Analysis*, O.S.A., H.N.A.; *Supervision*, M.B.

ORCID

Humera Naz Altaf http://orcid.org/0000-0002-3143-0156

REFERENCES

1. Khan MA, Shafique S, Khan MT, Shahzad MF, Iqbal S. Presentation delay in breast cancer patients, identifying the barriers in North Pakistan. *Asian Pac J Cancer Prev*. 2015;6(1):377-380.
2. Naqvi AA, Zehra F, Ahmad R, et al. Awareness, knowledge and attitude towards breast cancer, breast screening and early detection techniques among women in Pakistan. *JPMA*. 2018;68:576-586.
3. Cheng ML, Ling DY, Nanu PKP, Nording HMS, Lim CH. Factors influencing late stage of presentation in a district Hospital - Segamat Hospital, Johor. *Med J Malaysia*. 2015;70(3):148-152.
4. Menhas R, Umer S. Breast cancer among Pakistani women. *Iran J Public Health*. 2015;44(4):586-587.
5. World Health Organization (WHO). Health profile of Pakistan; 2010. (Cited 2nd September 2017). http://www.worldlifeexpectancy.com/country-health-profile/Pakistan.
6. Colditz GA. *The SAGE Encyclopedia of Cancer and Society*. 2nd ed. Washington. USA; 2015:885-886.

7. Badar F, Faruqui ZS, Uddin N, Trevan EA. Management of breast lesions by breast physicians in a heavily populated south Asian developing country. *Asian Pac J Cancer Prev*. 2011;12(3):827-832.
8. Bhurgri Y. Karachi cancer registry data—implications for the National Cancer Control Program of Pakistan. *Asian Pac J Cancer Prev*. 2004;5(1):77-82.
9. Asif HM, Sultana S, Akhtar N, Rehman JU, Rehman RU. Prevalence, risk factors and disease knowledge of breast cancer in Pakistan. *Asian Pac J Cancer Prev*. 2014;15(11):4411-4416.
10. Aziz I, Rashid MU, Sultan F, Shakoori AR. Frequency of pro allele on codon 72 of TP53 in female breast cancer patients of Pakistan: molecular stress or geography. *Pak J Zool*. 2013;45(5):1437-1446.
11. Moore MA, Ariyaratne Y, Badar F, et al. Cancer epidemiology in South Asia—past, present and future. *Asian Pac J Cancer Prev*. 2009;10:49-67.
12. Sarwar MZ, Hassan Shah SF, Yousaf MR, Ahmad QA, Khan SA. Knowledge, attitude and practices amongst the Pakistani females towards breast cancer screening programme. *J Pak Med Assoc*. 2015;65(10):1075-1078.
13. Gilani SI, Khurram M, Mazhar T, et al. Knowledge, attitude and practice of a Pakistani female cohort towards breast cancer. *J Pak Med Assoc*. 2010;60(3):205-208.
14. Talpur AA, Surahio AR, Ansari A, Ghumro AA. Late presentation of breast cancer: a dilemma. *J Pak Med Assoc*. 2011;61(7):662-666.
15. Chandra Roy B, Naher S, Alam M, Hanifa M, Sarkar P. Pattern of delayed presentation of breast cancer patients: evidence from Rangpur MedicalCollegeHospital, Rangpur, Bangladesh. *Adv Cancer Res Ther*. 2015;2(1):1-6.
16. Pace LE, Mpunga T, Hategekimana V, et al. Delays in breast cancer presentation and diagnosis at two rural cancer referral centers in Rwanda. *Oncologist*. 2015;20(7):780-788. https://doi.org/10.1634/theoncologist.2014-0493
17. Ayaz F, Ayaz SB, Farrukh M. Reasons for delayed presentation of women with breast cancer. *JIMDC*. 2016;5(4):187-191.
18. Malik AM, Pathan R, Shaikh NA, Qureshi JN, Talpur KAH. Pattern of presentation and management of Ca breast in developing countries. There is a lot to do. *JPMA*. 2010;60(9):718-721.
19. Memon ZA, Shaikh AN, Rizwan S, Sardar MB. Reasons for patient's delay in diagnosis of breast carcinoma in Pakistan. *Asian Pac J Cancer Prev*. 2013;14(12):7409-7414.
20. Pakseresht S, Ingle GK, Garg S, Sarafraz N. Stage at diagnosis and delay in seeking medical care among women with breast cancer, Delhi, India. *Iran Red Crescent Med J*. 2014;16(12):e14490. Published online 2014 Dec 30. doi: https://doi.org/10.5812/ircmj.14490
21. Ermiah E, Abdalla F, Buhmeida A, Larbesh E, Pyrhönen S, Collan Y. Diagnosis delay in Libyan female breast cancer. *BMC Res Notes*. 2012;5(1):452. https://doi.org/10.1186/1756-0500-5-452
22. Jassem J, Özmen V, Bacanu F, et al. Delays in diagnosis and treatment of breast cancer: a multinational analysis. *Eur J Pulic Health*. 2013;24(5):761-767. https://doi.org/10.1093/eurpub/ckt131.
23. Sharma K, Costas A, Damuse R, et al. The Haiti breast cancer initiative: initial findings and analysis of barriers-to-care delaying patient presentation. *J Oncol*. 2013;2013:206367.
24. Porter PL. Global trends in breast cancer incidence and mortality. *Salud Publica Mex*. 2009;51(2):141-146.
25. Rajan SS, Lim JNW, Haq A. Late presentation and management of South Asian breast cancer patients in West Yorkshire, United Kingdom. *Asian Pac J Cancer Prev*. 2011;12(6):1615-1618.
26. El-Shinawi M, Youssef A, Alsara M, et al. Assessing the level of breast cancer awareness among recently diagnosed patients in Ain Shams University Hospital. *Breast*. 2013;22(6):1210-1214. https://doi.org/10.1016/j.breast.2013.08.010
27. Tiwari V, Yogi V, Ghori HU, et al. Identifying the factors causing delayed presentation of cancer patients to a government medical College of Central India. *J Clin Diagn Res: JCDR*. 2015;9(9):XC09-XC12. https://doi.org/10.7860/JCDR/2015/15104.6512
28. Ukwenya AY, Yusufu LM, Nmadu PT, Garba ES, Ahmed A. Delayed treatment of symptomatic breast cancer: the experience from Kaduna. *Nigeria S Afr J Surg*. 2008;46(4):106-110.
29. Piñeros M, Sánchez R, Cendales R, Perry F, Ocampo R. Patient delay among Colombian women with breast cancer. *Salud Publica Mex*. 2009;51(5):372-380.
30. Rastad H, Khanjani N, Khandani BK. Causes of delay in seeking treatment in patients with breast cancer in Iran: a qualitative content analysis study. *Asian Pac J Cancer Prev*. 2012;13(9):4511-4515.
31. Brzozowska A, Duma D, Mazurkiewicz T, Brzozowski W, Mazurkiewicz M. Reasons for delay in treatment of breast cancer detected due to breast self-examination in women from the Lubelskie region. *Ginekol Pol*. 2014;85(1):14-17.
32. Lodhi FB, Ahmad B, Shah SIH, et al. Determinants of delayed presentation in breast cancer. *APMC*. 2010;4(2):9-16.
33. Hansen RP, Olesen F, Sørensen HT, Sokolowski I, Søndergaard J. Socioeconomic patient characteristics predict delay in cancer diagnosis: a Danish cohort study. *BMC Health Serv Res*. 2008;8(1):49. https://doi.org/10.1186/1472-6963-8-49
34. Swaminathan R, Selvakumaran R, Vinodha J, et al. Education and cancer incidence in a rural population in South India. *Cancer Epidemiol*. 2009;33(2):89-93.
35. Ruddy KJ, Gelber S, Tamimi RM, et al. Breast cancer presentation and diagnostic delays in young women. *Cancer*. 2014;120(1):20-25.
36. Lim NWJ, Potrata B, Simonella L, et al. Barriers to early presentation of self-discovered breast cancer in Singapore and Malaysia: a qualitative multicentre study. *BMJ Open*. 2015;5(12):e009863. https://doi.org/10.1136/bmjopen-2015-009863
37. Arndt V, Stürmer T, Stegmaier C, Ziegler H, Dhom G, Brenner H. Patient delay and stage of diagnosis among breast cancer patients in Germany—a population based study. *Br J Cancer*. 2002;86(7):1034-1040. https://doi.org/10.1038/sj.bjc.6600209
38. Islam RM, Bell RJ, Billah B, Hossain MB, Davis SR. Awareness of breast cancer and barriers to breast screening uptake in Bangladesh: a population based survey. *Maturitas*. 2016;84:68-74.
39. Khan TM, Leong JP, Ming LC, et al. Association of knowledge and cultural perceptions of Malaysian women with delay in diagnosis and treatment of breast cancer: a systematic review. *Asian Pac J Cancer Prev*. 2015;16:5349-5357.
40. Čačala SR, Gilart J. Factors relating to late presentation of patients with breast cancer in Area 2 KwaZulu-Natal, South Africa. *J Glob Oncol*. 2017;3(5):497-501. https://doi.org/10.1200/JGO.2016.008060
41. Unger-Saldaña K. Challenges to the early diagnosis and treatment of breast cancer in developing countries. *World J Clin Oncol*. 2014;5(3):465-477. https://doi.org/10.5306/wjco.v5.i3.465

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Baig M, Sohail I, Altaf HN, Altaf OS. Factors influencing delayed presentation of breast cancer at a tertiary care hospital in Pakistan. *Cancer Reports*. 2019;2:e1141. https://doi.org/10.1002/cnr2.1141