Original Research Article

Delay in diagnosis of breast cancer in a developing country: a single centre observational study in a tertiary care hospital in North Kerala, India

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ABSTRACT

Background: Around the world breast cancer is the most common cancer in women. In India, peak incidence is between 45-50 years of age. Early diagnosis improves survival, hence reducing diagnostic delay in breast cancer will have major social and economic implications besides improving the quality of life. This observational study aims to decipher various factors influencing diagnostic delay so that early treatment can be instituted.
Methods: We interviewed 212 consecutive patients who attended the twice weekly breast clinic conducted by Department of general surgery and department of radiotherapy, government medical college, Kozhikode between September 2014 and February 2015. All patients with primary breast cancer were included in the study. Exclusion criteria included recurrence, second primaries, history of partial treatment and incomplete records. Finally, we interviewed 202 patients with the help of a pretested semi-structured questionnaire.
Results: In present study, the commonest age group was 40-50 years with 62.4% participants presenting with early breast cancer and 37.6% having advanced breast cancer. Most of present study subjects were educated up to high school and unemployed. Awareness about breast cancer was 74.25% but many were ignorant of its symptomatology. Practice of breast self-examination (BSE) was low at 32.1%. Side and quadrant were statistically significant factor.
Conclusions: In present study religion, educational status, marital status, breast cancer awareness, practice of BSE and location of tumor were statistically significant factors influencing delay in diagnosis. There was a general lack of knowledge about the importance of self-examination in breast cancer which needs health education and need for active social propaganda in print and electronic media regarding its importance. In future institution of a screening programme will hasten diagnosis and improve survival of breast cancer patients.

Keywords: Breast cancer, Diagnostic delay, Screening

INTRODUCTION

Worldwide breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death among females, accounting for 23% of the total cancer cases and 14% of cancer deaths.[1] In India, it is the most common cancer among women in the cancer registries of Mumbai, Thiruvanthapuram and Dibrugarh while being second to carcinoma cervix in other registries.[2] The peak incidence of breast cancer in India is in the 45-49 years age group with incidence of early breast cancer ranging from a mere 1% in Dibrugarh to a peak of 22.3% in

Thiruvananthapuram.[2] Taken together these two facts indicate that most Indian women are diagnosed at an advanced stage of breast cancer during the most productive phase of their lives. It has been proven that patients with longer duration of symptoms present with more advanced disease and that a delay in diagnosis between 3-6 months after onset of symptoms reduces 5-years survival by 7% compared to patients diagnosed within 3 months of onset of symptoms.[3,4]

Overall in the western population there has been a fall in deaths caused by breast cancer as a result of breast screening, early diagnosis and better treatment although the relative contribution of these factors is yet to be evaluated.[5] Lack of a screening program and delay in diagnosis is hindering attempts to improve breast cancer survival in India. Significant gains can be made by encouraging women who delay presenting to seek help more quickly and improving hospital practices. It is therefore important to understand factors that influence diagnostic delay and develop strategies to reduce it which is precisely what this paper aims to do.

METHODS

The general surgery department of government medical college, Kozhikode in coordination with the radiotherapy department conducts a twice weekly breast clinic where all patients with breast cancer are presented and a treatment plan is formulated. On an average 380-400 patients present annually to the breast clinic.

For this study, we identified 212 consecutive patients who attended breast clinic in a 6-months period from September 2014 to February 2015. We included all patients with primary breast cancer. The exclusion criteria included recurrence, second primaries, history of partial treatment from other hospitals and incomplete records. After excluding patients who did not meet present study criteria we conducted interviews of 202 patients with the help of a pretested semi-structured questionnaire. We gathered information regarding demographic profile, educational status, marital status, occupation, personal history of breast disease, family history of breast cancer, time lag between noticing symptoms and final diagnosis, awareness regarding breast cancer and its source, prevalence and frequency of breast self-examination (BSE), reasons for delaying presentation after noticing symptom, hospital first visited, time taken by doctors to give a final diagnosis and tumor characteristics.

Family history was defined as breast cancer in a first-degree relative. Participants were split into two groups based on the time taken between noticing symptoms and diagnosis into <12 weeks and >12 weeks. This was done because delay more than 12 weeks has been shown to result in advanced disease and worse survival.[3,4] The participants were staged based on AJCC Cancer Staging Manual 7th Edition guidelines.[6] Tumors were considered

to be early stage if they were Stage Ia, Ib, IIa and IIb, locally advanced if they were Stage IIIa, IIIb, IIIc and metastatic if they were Stage IV as per TNM guidelines.[1]

Cross tabulation was done between stage of disease and the other variables to identify factors which significantly influenced presentation with advanced breast cancer. We used Chi Square test to evaluate for statistical significance and used Fischer's exact t test wherever the 'n' was low. 't' test for equality of means was used for testing quantitative variables. The analysis was done using SPSS version 16. This study has been approved by the institutional ethics committee of government medical college, Kozhikode, Kerala, India.

RESULTS

A total of 202 participants were included in the final analysis, of these 126 (62.4%) were early stage and 76 (37.6%) were advanced breast cancer. Table 1 lists the demographic and socioeconomic profile of present study participants. 36.1% of the participants were in the 40-50 years age group. There were 3 (1.5%) men and 199 women, of these 67.3% had completed their schooling but the number of graduates was less at 5.9%. A significant majority (82.2%) were married.

Table 2 represents the clinical profile of present study subjects. Very few of our participants reported previous history of breast related symptoms (5.4%) of which mastalgia (n=6) was commonest followed by abscess (n=3) lumps (n=2) and miscellaneous disorders like papilloma (n=1). 5% (n=10) had family history of breast cancer and 35.6% (n=72) gave history of medical co morbidities like diabetes, hypertension, asthma and COPD. Most of our participants were diagnosed after a delay of >12 weeks (52%).

The commonest symptom in present study subjects was lump (92.1%) followed by pain (4.5%) and nipple related symptoms (4%), some of the participants had multiple symptoms. 52.5 % of the participants did not consider their symptoms serious although 74.3% claimed to be aware about breast cancer. 64% of the aware participants cited friends and family as one of their sources of information regarding breast cancer with 41.3% citing it as their only source.

Media was the second most common source (50%) followed by health workers/professionals (18%). The prevalence of breast self-examination (BSE) was low at 32.2% (n=65), of these most participants were irregular (n=54) in the frequency of examination. Only one participant regularly visited a doctor for evaluation of breast lumps. We asked participants who were diagnosed after a period of 12 weeks questions regarding reasons for delay in presentation. The most common reason was ignorance (n=77) regarding disease symptomatology (for example expectation of pain as a common manifestation of breast cancer, one participant ignored the lump purely

based on its location laterally rather than anteriorly). The complete list of reasons is listed in Table 3.

Table 1: Demographic and socioeconomic profile of patients.

Factor	Category	Stage		P value
		Early n (%)	Advanced n (%)	
Age	20-30 years	2 (100)	0 (0)	0.080
	30-40 years	20 (74.1)	7 (25.9)	
	40-50 years	43 (58.9)	30 (41.1)	
	50-60 years	22 (48.9)	23 (51.1)	
	>60 years	39 (70.9)	16 (29.1)	
Sex	Male	2 (66.7)	1 (33.3)	0.877
	Female	124 (62.3)	75 (37.7)	
Religion	Hindu	82 (69.5)	36 (30.5)	0.036#
	Muslim	36 (50.7)	35 (49.3)	
	Christian	8 (61.5)	5 (38.5)	
Education	Illiterate	7 (43.8)	9 (56.3)	0.033#
	Primary	18 (47.4)	20 (52.6)	
	High School	94 (69.1)	42 (30.9)	
	Graduate	7 (58.3)	5 (41.7)	
Occupation	Employed	15 (51.7)	14 (48.3)	0.201
	Unemployed	111 (64.2)	62 (35.8)	
Marital Status	Unmarried	6 (54.5)	5 (45.5)	0.001#
	Married	113 (68.1)	53 (31.9)	
	Divorced/separated	0 (0)	4 (100)	
	Widow	6 (30)	14 (70)	

# indicates significance.

Table 2: Clinical profile of patients.

Factor	Category	Stage		P value
		Early n (%)	Late n (%)	
Co-morbidities	Yes	40 (55.6)	32 (44.4)	0.136
	No	86 (66.2)	44 (33.8)	
Previous breast disease[+]	None	118 (61.8)	73 (38.2)	0.612
	Mastalgia	5 (83.3)	1 (16.7)	
	Lumps	1 (50)	(50)	
	Breast abscess	2 (66,6)	1 (33.3)	
	Papilloma	1 (100)	0 (0)	
Family history	Yes	7 (70)	3 (30)	0.610
	No	119 (62.0)	73 (38.0)	
Time since first symptom	<12 weeks	80 (82.5)	17 (17.5)	<0.001#
	>12 weeks	46 (43.8)	59 (56.2)	
First symptom[+]	Lump	116 (62.3)	70 (37.7)	0.591
	Pain	5 (55.5)	4 (44.5)	
	Nipple related	6 (75)	2 (25)	
	Skin changes	1 (50)	1 (50)	
Was it considered serious	Yes	79 (82.3)	17 (17.7)	<0.001#
	No	47 (44.3)	59 (55.7)	
Awareness about breast cancer	Yes	105 (70)	45 (30)	<0.001#
	No	21 (40.4)	31 (59.6)	
Source of awareness[+]	Family and friends	73 (76.1)	23 (23.9)	
	Media	53 (70.6)	22 (29.4)	
	Health workers/professionals	25 (92.5)	2 (7.5)	
Breast self-examination	Yes	54 (83.1)	11 (16.9)	<0.001#

	No	72 (52.6)	65 (47.4)	
Frequency of breast self-examination	Nil	72 (52.6)	65 (47.4)	0.001#
	Weekly	3 (75)	1 (25)	
	Monthly	6 (85.7)	1 (14.3)	
	Infrequently	45 (83.3)	9 (16.7)	
Regular clinical breast evaluation	Yes	1 (100)	0 (0)	0.436
	No	125 (62.2)	76 (37.8)	

+Some patients have multiple categories, # Indicates statistical significance.

Table 3: Reasons for delay in diagnosis more than 12 weeks.

Reasons for delaying presentation	Frequency* (*n*)
Ignorance about disease symptomatology	77
Fear of breast cancer diagnosis and treatment	16
Embarrassment	15
Underwent alternative therapies like Ayurveda, homeopathy, tribal medicines etc.	9
Fear of treatment expense and loss of income	6
Events in family	5
Hospital side delay	4
Suffering from other diseases and currently undergoing treatment	2

* Some patients have multiple reasons.

It is to be noted that roughly half of present study subjects consulted private consultants or hospitals before being referred to our centre (47.5%). In the government sector, the first touch point was usually community health centres (21.8%) followed by tertiary centre (11.9%). The mean number of hospitals visited was 1.93 (SD of 0.479). The doctors usually took a mean of 12.92 (SD 8.222) days to confirm diagnosis.

Participants usually visited the OPD 2.13 times (SD 0.801) and underwent a mean of 1.30 (SD 0.583) invasive tests to confirm diagnosis. Side and quadrant involved were statistically significant factors. Hospital related variables are listed in Table 4 and tumor characteristics are listed in Table 5.

Table 4: Hospital related variables.

Factor	Stage	N	Mean	SD	95% CI	P value
Number of hospitals visited	Early	126	1.90	0.503	-0.214-0.061	0.274
	Late	76	1.97	0.434		
Days taken by doctors to give diagnosis	Early	126	13.52	9.639	-0.894-3.810	0.223
	Late	76	12.07	4.997		
Number of OPD visits	Early	126	2.14	0.901	-0.206-0.255	0.835
	Late	76	2.12	0.610		
Number of invasive tests	Early	126	1.30	0.638	-0.153-0.182	0.865
	Late	76	1.29	0.485		

Table 5: Hospital related factors and tumor characteristics.

Factor	Category	Stage		P value
		Early n (%)	Advanced n (%)	
Hospital first visited	Private consultants/ hospitals	62 (64.6)	34 (35.4)	0.470
	Primary health centre	8 (50)	8 (50)	
	Community health centre	25 (56.8)	19 (43.2)	
	District hospital	13 (59.1)	9 (40.9)	
	Medical college	18 (75)	6 (25)	
Result of Mammogram*	NA	16 (53.3)	14 (46.7)	0.243
	2	2 (100)	0 (0)	
	3	5 (71.4)	2 (28.6)	
	4	17 (68)	8 (32)	
	5	60 (65.9)	31 (34.1)	
	6	22 (55)	18 (45)	
	Phyllodes tumor	0 (0)	1 (100)	

Side involved	Right	79 (69.2)	35 (30.8)	0.025#
	Left	47 (53.4)	41(46.6)	
Quadrant involved	Upper outer quadrant	56 (73.7)	20 (26.3)	<0.001#
	Upper inner quadrant	26 (83.9)	5 (16.1)	
	Lower inner quadrant	5 (100)	0 (0)	
	Lower outer quadrant	7 (53.8)	6 (46.2)	
	Central	13 (81.3)	3 (18.7)	
	Multiple quadrants	19 (31.1)	42 (68.9)	
Histology	Ductal carcinoma In situ	5 (100)	0 (0)	0.425
	Invasive ductal carcinoma not otherwise specified	113 (61.1)	72 (28.9)	
	Invasive lobular carcinoma	2 (66.66)	1 (33.33)	
	Malignant phyllodes	0 (0)	1 (100)	
	Medullary carcinoma	3 (75)	1 (25)	
	Metaplastic carcinoma	1 (100)	0 (0)	
	Mucinous carcinoma	2 (66.66)	1 (33.33)	

# Indicates statistical significance, * NA indicates not available, numbers correspond to the BI-RADS reporting system.

DISCUSSION

In present study 37.6% of participants presented with advanced breast cancer, comparable to statistics elsewhere and the most commonly involved age group was between 40 to 50 years with 50.5% below the age of 50, which is again comparable to statistics provided by the national cancer registry programme in India.[2,7,8] On the other hand in the west, peak incidence is in the 55-64 years age group with a median age of 61.[7] Male breast cancer contributed to 1.5% of the total number of cases which is twice the western prevalence of 0.8%.[9]

All of our participants belonged to one of three major religions- Hinduism, Islam and Christianity. Hindus constituted 58.4% of the study group, of which 69.5% presented with early breast cancer, conversely Muslims formed 35.1% of the study population with 50.7% of them having early breast cancer, but they contributed to 46.1% of advanced breast cancers overall. This relationship was statistically significant (P 0.036) and needs further study.

Education was also a significant factor (P 0.033) determining incidence of advanced breast cancer, most of our participants were educated up to high school. Participants who had only done their primary schooling (18.8%) and those who were illiterate (7.9%) contributed disproportionately to the total number of advanced breast cancer cases (26.3% and 11.8% respectively). Occupation did not seem to play an influential role in determining stage of presentation but marital status was a significant factor (P 0.001). Widows and divorcees had higher incidence of advanced breast cancer, probably due to lack of motivation and deficient social support structure. Presence of co-morbidities, past history of breast diseases, family history and symptom first noticed were found to be irrelevant variables in present study but the seriousness accorded to the symptom by the patient (P

<0.001) and awareness about breast cancer (P <0.001) were highly significant variables. Aware patients who were motivated to seek medical help for their symptoms usually tended to present with early stage breast cancer. Unfortunately, participants received most of their information regarding breast cancer from friends and family which resulted in unscientific beliefs and reasoning. The proportion of participants citing scientific sources of information was low at 50.4%. This is probably why only 32.1% of the subjects practised breast self-examination (P <0.001) and those who did it were usually infrequent (83.1%) (P 0.001). Both these variables had a statistically significant influence on stage of breast cancer at time of diagnosis. BSE practisers were more likely to have early stage breast cancer.

Delay more than 12 weeks after first noticing symptom was more likely to result in advanced stage of breast cancer. This relationship is statistically significant (P <0.001) and 52% of our patients fall in the delayed group. When we investigated the causal factors for this delay, we found that most of the subjects were ignorant about breast cancer symptoms with almost all of them expecting pain to be a prominent symptom. Many were embarrassed to seek help or felt afraid of being labelled as a cancer patient. Noticeably some of them preferred to undergo alternative therapies like Homeopathy and Ayurveda eventually presenting with advanced breast cancer.

The low socioeconomic group feared expenses and loss of income due to morbidity. Five of our participants gave events such as death, marriage and child birth in the family as reasons for putting off consulting a doctor, reflecting the pressure our social structure applies on women to put family before self. Few of our participants also cited delay by doctors in providing diagnosis due to inconclusive invasive tests requiring repetition. However, the hospital first visited by the patient, days taken by

doctors to provide diagnosis, number of OPD visits and number of invasive tests were all found to be statistically insignificant. The side involved had statistically significance (P 0.025) with left sided breast cancers more likely to present late probably due to a negligent attitude, similarly the quadrant involved also had statistical significance (P <0.001). Lower outer quadrant (LOQ) lesions and lesions involving multiple quadrants were more likely to be advanced. The bulkiness of multiple quadrant lesions makes them advanced but cause for LOQ lesions to be advanced is unclear. Interestingly medial lesions were diagnosed earlier than lateral lesions.

Current study has highlighted an acute knowledge gap that exists in the population regarding symptomatology of breast cancer and relevance of breast self-examination, this is a common theme present in many studies done elsewhere.[10-12] This needs to be corrected with proactive steps taken by the health system and media to bring out scientific information into the public domain so that patients do not rely on hearsay for medical information. Moreover, establishment of breast cancer support groups in the community will help patients in overcoming their fears and doubts regarding treatment and rehabilitation. These actions would go a long way in reducing the time gap between noticing symptoms and diagnosis which currently is more than 12 weeks in most of our patients (52%). It was noted that the mean duration taken for diagnosis after patient reported to the OPD was 12.98 days, this can be shortened by improving technical expertise of physicians and pathologists by regular updates and CMEs. There is a need for a screening programme to pick up breast cancers early as it has been shown that early diagnosis leads to better survival especially in breast cancer.[5,13,14] Along with this there should be decentralization in the government health infrastructure enabling easy access to surgeons and pathologists so that delay caused by reference to higher centre can be avoided.

CONCLUSION

Thus, from the above study we conclude that proper patient education about the signs and symptoms of breast cancer and the importance of breast self-examination and inclusion of screening practices is of utmost importance for early detection and treatment of breast cancer and there is an urgent need to bridge the knowledge attitude and practice gap in the community to help win this fight against breast cancer.

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