

Factors Impacting the Staging of Breast Cancer: A Cross-Sectional Study

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Abstract

Original Research Article

Breast cancer remains a significant public health concern, with staging at diagnosis being a critical factor in prognosis and treatment planning. While biomedical markers have been extensively studied, there is a growing interest in understanding the diagnostic impact of various factors on the staging of breast cancer. This cross-sectional study was conducted on 50 patients with diagnosed breast cancer, further stratifying them by stage (I-IV) and correlating with different factors which includes socio demographic factors too. A significant association was found between the less than <12 years of age of menarche (p-value 0.038), more than one children (p value 0.014) and no breast feeding history (p-value 0.05) with advanced cancer stage (stage IV). No significant association was observed among age of menopause, marital status with cancer staging. Among the clinical features of respondents, the size of the breast lump, presence of nipple retraction, and axillary lymph node enlargement were found more with stage IV. The findings suggested that while certain social factors like marital status may not directly influence the stage at diagnosis, the number of children a patient has could be an indicator of later-stage diagnosis. About 40% of respondents were diagnosed at stage IV, followed by 28% at stage III, indicating a trend towards late diagnosis. This may reflect broader societal and behavioural patterns that affect health-seeking behaviour and access to healthcare. The staging of breast cancer based on these clinical features not only guides the therapeutic approach, including the decision for surgery, chemotherapy, and radiation therapy, but also has implications for the patient's survival outcomes. Understanding these associations aids clinicians in developing personalized treatment plans and also plays a role in the development of screening guidelines aimed at early detection.

Keywords: Breast Cancer, Breast Cancer Staging, Socio demographic factors, clinical features, survival.

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INTRODUCTION

Breast cancer is one of the most commonly occurring cancer globally [1]. Approximately, 2.3 million new cases occur in both sexes collectively according to GLOBOCAN estimates 2020 [2]. If breast cancer is diagnosed at an early stage and treatment is started early on, it is a potentially curable cancer. Surveillance, Epidemiology, and End Results (SEER) Program has reported that patients with breast cancer who are diagnosed at an earlier stage (Stage I/II) have a better prognosis (5-year survival rate of 85%-98%). Quite a few countries have launched interventions in their health system which focus on fast-tracking necessary investigations and diagnosis of symptomatic

patients who present in the primary care system [3]. In addition, raising awareness about breast cancer symptoms through effective health education campaigns have also been given emphasis [3, 4].

Many diverse factors contribute to breast cancer [5]. Although breast cancer occurs around the globe, its incidence, mortality, and survival rates vary significantly in different regions of the world, which could be due to several factors such as how the population is structured, lifestyle of an individual, genetic factors, and environmental factors [6]. Socioeconomic factors have an impact on the risk of breast cancer [7, 8]. In addition, several lifestyle and environmental risk factors for breast cancer have been reported such as age at menarche, age

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at menopause, parity, and age of first and subsequent pregnancies, breastfeeding [9]. On the other hand, cancer staging provides a plan for the uniformity of information among clinicians about the extent of cancer. It is also the basis for their choice of initial management approaches and consideration whether the adjuvant treatment is necessary or not [5].

Hence the importance of cancer staging is enormous. Therefore, understanding the associations between various factors that contribute to the occurrence of breast cancer and stage of cancer at the time of diagnosis is therefore warrants consideration [3]. The relation between various factors of breast cancer and staging has not been explored in depth and requires more evaluation. Therefore, in this study, we aimed to explore the association between various risk factors and the stage of breast cancer in breast cancer patients using data from patients attending a tertiary government medical college hospital of Bangladesh.

MATERIALS AND METHODS

This cross-sectional study was conducted among 50 histologically confirmed breast cancer patients included by purposive sampling technique in surgery department of Rangpur Medical College Hospital (RpMCH), Rangpur during the period between June 2018 and May 2019. This study was a part of a larger cross-sectional study conducted in the same hospital. A pre-tested, peer-reviewed data collection sheet was prepared before the study. At first the patients having histologically confirmed breast cancer were approached to be enrolled in this study. Then after consulting with the patients, we finally enrolled the patient having breast cancer according to eligibility criteria - female patients who had histologically confirmed breast cancer at any stage of cancer who were willing to participate in the study and were ready to comply with the study procedure. Male patients and patients with diagnosed benign breast disease were not considered for the study. Informed written consent was taken from all the patients who were enrolled purposively.

Thereafter patients were interviewed and examined to confirm final diagnosis. Socio demographic information (age, marital status, etc.) as well as information on risk factors (age at menarche, number of children, etc.) were collected through face to face interview from the patient herself which extended from June 2018 to May 2019. Data regarding clinical profile

were documented. Face to face interview was done to fill the semi-structured questionnaire which was well prepared in English but verbally translated to Bengali. Breast cancer staging was done by following the TNM classification and information about each patient's stage of cancer was taken from their respective medical records. Expert opinion was taken from specialists of the Department of Surgery, Department of Pathology, Department of Radiology and Department of Community Medicine.

Diagnosis and staging were again verified by researcher herself and subsequently by two competent consultants of the department of surgery to eliminate observational bias regarding the clinical findings. Physical examination, radiological assessment, and laboratory investigations were conducted for all enrolled patients. All the examinations were conducted by following standard breast examination protocols. We examined the breasts in both supine and erect positions. The examination involved all four breast quadrants, the nipple and the axillary tail. Masses palpated were described in terms of the location on the breast (quadrant), size (diameter), mobility, consistency and the presence of tenderness. Expression of discharge was performed by applying pressure to the base of the areolar tissue. This study was conducted to understand whether there is any association of socio-demographic profile and various clinical features with different stages of breast cancer. This study was approved by Ethical Review Committee (ERC) of RpMC, Rangpur.

Statistical Analysis

Data regarding socio-demographic information, clinical profile were recorded, compiled, edited and tabulated. At first, data were entered into Microsoft excel spreadsheet and consequently imported into SPSS 25. Frequency, distribution of all variables were calculated using SPSS 25. Association between socio-demographic profile of enrolled patients and staging of breast cancer were assessed using chi-squared tests. In addition, chi-squared tests were performed to see the association between other selected risk factors of patients and stages of breast cancer. All statistical tests were two-tailed. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The results and observations are given below.

Table 1: Distribution of respondents by socio-demographic characteristics

Characteristics	Frequency	Percent (%)
Age (Years)		
20-30	4	8
31-40	11	22
41-50	16	32
51-60	15	30
>60	4	8

Education		
Upto primary level	13	26
Upto SSC/equivalent	16	32
Upto HSC & above	21	42
Occupation		
Employed	4	8
Not employed	46	92
Marital status		
Single	1	2
Married	29	58
Divorced	2	4
Widow	18	36

Majority i.e. 16 (32%) of respondents were in the age group 41-50 years. Mean age was 43.74±14.99 years. Maximum i.e. 46 (92%) respondents were not employed, majority i.e. 21 (42%) and 29 (58%)

respondents studied up to HSC & above level respectively shown in table-1. More than half 29 (58%) respondents were married.

Table 2: Distribution of respondents by risk factors

Risk factors	Frequency (N)	Percent (%)
Age at menarche (Years)		
<12	41	82
12 & above	09	18
Age at menopause (Years) (N=30)		
40-50	18	60
>50	12	40
Number of children		
None	2	4
One	9	18
>One	39	78
History of breast feeding		
Yes	7	14
No	43	86

Among the respondents, majority (82%) of their age at menarche was at <12 years and menopause within 40-50 years respectively. Maximum i.e. 39 (78%) and 43

(86%) of respondents had more than one children and no history of breast feeding respectively shown in table-2.

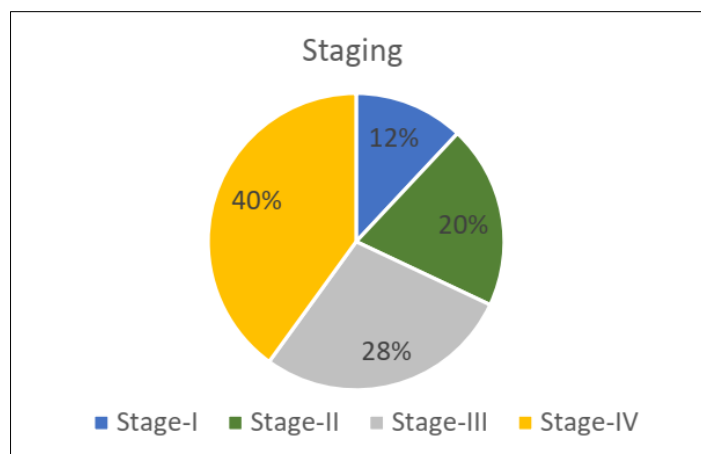


Figure 1: Distribution of respondents by staging of breast cancer

Majority i.e. 20 (40%) respondents had breast cancer in stage-IV following 14 (28%), 10 (20%) and 6

(12%) had breast cancer in stage-III, stage-II and stage-I respectively shown in figure-1.

Table 3: Distribution of clinical features and staging of breast cancer among respondents

Clinical features	Staging of breast cancer (N=50)			
	Stage-I	Stage-II	Stage-III	Stage-IV
Size of breast lump				
2 cm <5cm	1	3	8	18
5 cm & above	5	7	6	2
Nipple retraction				
Yes	2	3	9	15
No	4	7	5	5
Nipple discharge				
Yes	0	3	2	3
No	6	7	12	17
Axillary lymph node enlargement				
Present	2	4	8	17
Absent	4	6	6	3
Fixity of axillary lymph node				
Fixed	2	2	2	7
Not fixed	0	3	5	10
Site of breast lump				
Upper outer quadrant	2	5	4	9
Upper inner quadrant	1	3	4	4
Lower outer quadrant	3	1	2	3
Lower inner quadrant	0	1	1	1
Subareolar	0	0	3	1
Axillary tail	0	0	0	2
Breast lump fixed to chest wall				
Yes	1	0	1	6
No	5	10	13	14

Table-3 shows that among the clinical features of respondents diagnosed with stage IV came with breast lump sized 2 cm <5cm (18), presence of nipple

retraction (15 respondents) and axillary lymph node enlargement (17 respondents).

Table 4: Association between risk factors with staging of breast cancer

Clinical features	Staging of breast cancer				Significance
	Stage-I	Stage-II	Stage-III	Stage-IV	
Marital status					
Single	1	0	0	0	$p = 0.319$
Married	3	7	8	11	
Divorced	1	0	1	0	
Widow	1	3	5	9	
Age at menarche (years)					
<12	5	10	8	18	$p = 0.038^*$
12 & above	1	0	2	6	
Age at menopause (years)					
40-50	1	6	4	7	$p = 0.413$
>50	1	1	5	5	
Number of children					
None	0	0	1	1	
One	2	0	6	1	$p = 0.014^*$
>One	4	10	7	18	
History of breast feeding					
Yes	2	0	4	1	$p = 0.05^*$
No	4	10	10	19	

Table-4 shows that age at menarche, number of the children and no history of breast feeding were

significantly associated with staging of breast cancer ($p < 0.05$).

DISCUSSION

The study revealed a varied distribution of breast cancer across different age groups, occupations, and marital statuses. The age group of 41-50 years had the highest prevalence, followed by those in the 51- 60 and 31- 40 year's brackets. This finding is consistent with existing literature that indicates a higher incidence of breast cancer in middle-aged women, possibly due to hormonal changes and more use of oral contraceptive [6, 7].

A significant proportion (76%) of the respondents were unemployed. This finding does not correspond with existing evidences. Previous studies suggested that a significant association between occupational stress and the risk of developing breast cancer [8]. Additionally, the majority of the respondents were married. The impact of marital status on breast cancer risk and prognosis has been a subject of study, with some research suggesting that married individuals might have less chance of breast cancer than unmarried women [9].

The staging data reveals that 40% of respondents were diagnosed at stage IV, followed by 28% at stage III, indicating a trend towards late diagnosis. This trend is concerning as it directly impacts the prognosis and survival rates of breast cancer patients. The reasons behind late diagnosis could be multifaceted, including lack of awareness, limited access to healthcare facilities, or socio-cultural factors.

Clinical features such as the size of the breast lump, nipple retraction, nipple discharge, axillary lymph node enlargement, and the site of the breast lump were thoroughly assessed. Most participants had breast lump sizes within 2 cm to <5 cm, and a significant percentage exhibited nipple retraction and axillary lymph node enlargement. The high incidence of these features indicates late presentation, which is a common issue in many regions, leading to poorer outcomes. In Bangladesh, the late presentation of advanced breast cancer in women is largely due to a mix of socio-cultural and economic factors, along with healthcare system limitations. Lack of awareness and education about breast cancer, economic constraints, and inadequate healthcare infrastructure, including limited screening programs and a shortage of trained professionals, contribute significantly to this issue. The staging of breast cancer among respondents was skewed towards later stages, with 40% of cases in stage IV, followed by stages III, II, and I. This finding is concerning and highlights the need for improved awareness, early screening, and diagnosis in the community.

The study explored some risk factors such as age at menarche, age at menopause, number of children, and breast feeding. A noteworthy finding is that a significant majority of the respondents experienced menarche at less than 12 years of age (82%) and had

more than one child (78%). Early menarche have been identified in literature as risk factors for breast cancer [10]. This correlation is attributed to the early exposure to oestrogen surge, a major influence of breast cancer risk.

The significant number of respondents with the size of the breast lump and axillary lymph node enlargement with the staging of breast cancer was a critical finding which is concordant with previous study findings [11]. This underscores the importance of early detection and prompt intervention. Furthermore, the study found a significant association between the number of children and the staging of breast cancer ($p < 0.05$), which is discordant from other study findings because multiparity often has a protective role against breast cancer [12].

Limitations

There are several limitations. The sample size and geographic limitation may affect the generalizability of the findings. Future research should focus on a larger, more diverse sample to validate these findings. Additionally, prospective studies could provide more insight into the progression and outcome of the disease in relation to the risk factors identified.

CONCLUSION

In conclusion, this study provides valuable insights into the socio-demographic characteristics, risk factors, and clinical features of breast cancer patients and their association with the stage of the disease. The findings emphasize the need for increased awareness, early screening programs, and further research to understand the underlying mechanisms better. The significant association of certain factors with advanced disease stages calls for targeted interventions to improve early detection and treatment outcomes.

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