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Epidemiology, Risk Factors and Tumor Profiles of Breast Cancer in Bangladeshi underprivileged women

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Abstract

Similar to cancer statistics in developed countries, breast cancer is also the leading cause of cancer-related death in the women population of Bangladesh particularly the poor and underprivileged. The objective of this study was to study the socio-demography, tumor patterns and risk factors that affect these women from Dhaka and Bangladesh in general.

Method:

This cross-sectional study involved 250 patients who presented to NICRH, Dhaka for treatment. These patients were interviewed, physically examined and vital information were gathered using approved questionnaires. Various personal, social, reproductive and tumor related factors were recorded and analyzed.

Result:

The mean age of the study group was 44.7 years, standard deviation (SD) was 9.82 (range: 21-67 ), 87% have children, 57.2% were post-menopausal, 92% were housewives, 51.4% were illiterate, 62% attended 6 months after initiation of symptoms, 72% of the patients’ yearly family income were less than US$1000/year. Almost 100% of the patients gave history of cooking from wooden fire source in the rural areas. In our study group, 79.7 percent women were within the group of BMI 20 kg/m² or more.

Locally advanced breast cancer patients (T3 and T4) were 52.6%, axillary lymph node involvement was present in 80% of cases, 61.6% patient received neoadjuvant chemotherapy. In the elderly group (>40 years) Estrogen receptor was positive in 53.2% cases, 26.6% were Triple negative breast cancer patients.

Conclusion:

Women with poor socio-economic status and have none or low educational level are often victims of late presentation and tend to have a higher stage at diagnosis. Poverty, literacy and assorted risk factors have influenced the outcome of breast cancer cases among Bangladeshi women.

Keywords: breast cancer, epidemiology, risk factors, underprivileged, Dhaka, Bangladesh

Introduction

Breast cancer is the most common cancer in women representing 1.38 million new cases worldwide (23% of all reported cancer cases in women in 2008) (1). It is the leading cause of cancer death in women (2, 3). Many differences with respect to age, stages at presentation, and biological characteristics exist between various countries. In the United States, approximately 50% of all women with newly diagnosed breast cancer are older than 63 years while in many so-called developing countries almost half of women with newly diagnosed breast cancer are younger than 50 years of age. In-situ disease has become more common in the developed world (3). Yet locally advanced and metastatic diseases at presentation remain very common in the developing countries (4).
Cancer incidence and mortality rates have been declining in developed and western nations due mainly to the reduction of risk factors such as smoking and improved screening and treatment regimens \(^{(5,6)}\). However, the opposite trend is being observed in low-income countries; cancer incidence and mortality rates have been increasing and are projected to increase at even faster rates. Of the 12 million incident cases and 8 million deaths due to cancer worldwide in 2008, 53% of the new cases and 65% of the deaths occurred in less developed countries \(^{(7)}\). There are several suggested reasons for these increases including the rising popularity of unhealthy lifestyles that includes smoking, lower physical activity levels, lower reproduction rates and higher calorie intake.

**Low-Income Countries:**

Low-income as defined according to the World Bank’s classification of countries (2010) on Gross National Income (GNI) per capita are countries that have GNI per capita of $1,005\(^{(8)}\) and below. The International Agency for Research on Cancer predicts that by 2030, the global burden of cancer will reach 21.4 million and the annual number of cancer deaths worldwide will reach 13.2 million.

The World Health Organization (WHO) predicts that by 2020, approximately 60% of all new cancer cases will occur in the least developed nations. In wealthy countries, the paradigm for treating some cancers is changing because patients’ cancers are diagnosed at an earlier stage and many of those with advanced disease are surviving for longer periods with the aid of systemic therapy. In contrast, in low and middle-income countries (LMICs), patients with cancer often present late, and the mortality rates are sobering. These diseases are becoming a leading cause of death in patients older than 15 years. The United Nations (UN) is also increasingly aware of the mortality in LMICs caused by non-communicable diseases, including cancer \(^{(9)}\).

**Status of Bangladesh:**

Bangladesh is located in Southern Asia, between India and Myanmar, and borders the Bay of Bengal to the south. It is the seventh most populous country in the world; a country of nearly 160 million people (approximately half the population of the US) in an area half the size of Italy or a mid-sized state in the US such as Iowa. Over 70% of the country is considered rural although population density is high throughout the country \(^{(10)}\). Approximately 45% of the population are employed in the agricultural sector. Bangladesh is a low-income country as per World Bank classification with a Gross National Income (GNI) of less than US $1,005 per capita \(^{(12)}\). About 40% of the population is underemployed; many in the labor force work for only a few hours a week and at low wages. Approximately 60% of women are illiterate \(^{(10)}\), and 27% of the population are undernourished \(^{(11,12)}\).

**Breast Cancer Incidence and Mortality in Bangladesh:**

It is estimated that each year, 76,000 women die of breast cancer in South Asia (India, Bangladesh, Nepal, Myanmar, Pakistan, and Tibet). In Bangladesh, there is no national cancer registry. However, age-standardized incidence rates from Karachi, Pakistan (53.8/100,000) \(^{(13)}\), and Kolkata, India (25.1/100,000) \(^{(14)}\) both of which Bangladesh shares many cultural and historical similarities, suggest an annual incidence rate of 35–40/100,000. Therefore, in Bangladesh, we estimate an annual new breast cancer case burden of about 30,000 women \(^{(15)}\).

Despite marked decrease particularly in developed countries, breast cancer is still a major challenge for health policy makers and cancer physicians for a developing country like Bangladesh where breast cancer ranks first amongst women in a hospital based report \(^{(16)}\).

This study explores the epidemiological profile including socio-demography, tumor profile and risk factors of women with breast cancer in the underprivileged population of Bangladesh.

**Patients and Methods**

Case definition: Cytologically (by fine needle aspiration cytology) diagnosed as duct cell carcinoma from breast lesions who came to the Surgical Oncology department of National
Institute of Cancer Hospital and Research and Hospital, Dhaka for treatment during the period of November 2011 to February 2013 were enrolled in the study. Here, two groups of patients were present. One group got admitted for surgical treatment another group came in outpatient department for post mastectomy follow up from different institutions. Firstly, patients attend outpatient department for preliminary assessment. Locally advanced and metastatic (Stage III and stage IV) cases were sent for neoadjuvant chemotherapy to medical oncology department. All cases from stage I to stage IV disease were registered for this study. Cases with same information including name, age, residential address, year of diagnosis and previous place of treatment were checked to avoid duplication and were eliminated (where applicable) before entering into the data base.

Case finding and data collection: Patient examination and interview were done on a case to case basis both indoors and outdoors. Patients who were not surgical candidates were interviewed in outdoor complex of the hospital. In the outpatient complex there was a separate room for breast cancer patients’ examination and interview. Two trained female medical graduates worked as research assistant in the team who were assigned for this purpose. They took all the related history, examined the patient, took their vital parameters, noted tumor profile and related laboratory findings. All information were collected and written on already designed and structured questionnaire. All data were compiled and input given in a SPSS (version-17) formatted program in the computer of the principal investigator’s office room. BMI was calculated by using the formula (Weight/Height²). Weight was taken in kg and height was taken into cm.

Ethical issues and confidentiality: The ethical committee of NICRH approved the proposal and informed consent was taken from each patient before registration. Consent form was made in the native language (Bangla) approved by Bangladesh Medical Research Council.

Results

Two hundred and fifty (250) women with breast cancer were included in the study. The mean age was 44.7 years, standard deviation (SD) was 9.82 (range: 21-67), age distribution is shown in Figure 1. Geographically, patients from every corner of the country were included, though they are described as Dhaka and non-Dhaka group as shown in Table 1. More than half were illiterate (Figure 2).

Twenty five patients (15%) were single and among the married women, 87% have children. Right and left sides were involved almost equally. Family history of breast cancer was positive in 4% of patients. Mastectomy was done for all patients. There was no operative mortality.

For demography and social status, the following variables were considered: Age, BMI, home address, economic status (monthly income), education, housing condition, occupation, marital status, lactation, menarche and menopausal status, exposure to tobacco, and cooking habits. Tumor status like type of cancer, stage of the disease, axillary lymph node condition and hormone receptor status were taken into consideration.
Patients’ characteristics:

Patient statistics are as follows: 57.2% post-menopausal, 92% were housewives, 51.4% were illiterate (Figure 2), majority (62%) attended for medical advice after 6 months of their initiation of symptoms (Figure 5), O and B blood group dominated the problem – among 78.8% O group topped the number followed by A group both combining together was 43.2% patients’ blood group was known, 72% of the patients’ family monthly income were less than US$1000/year (Figure 3), and among them more than 50% family earn less than US$600/year. Almost 100% of the patients have history of cooking from wooden fire source in the rural areas. A large bulk (65.6%) of patients came from distant areas outside the Capital Dhaka zone. All details were described in Table 1. Table 2 describes tumor profile of the patients: 52.6 % patients were in the group of locally advanced breast cancer (T3 and T4). Majority (84.6%) of the patients presented with lump. Axillary lymph node involvement was present in 80% of cases, 61.6 % patient received neoadjuvant chemotherapy (Figure 6). Estrogen receptor was
One hindrance to any discussion of global breast-cancer incidence is the limited data available for many countries. Although East Asian women still have the lowest rates (about 21 per 100,000, as compared with 101 per 100,000 in the United States and 85 per 100,000 in Western Europe), countries with the most developed registries have documented increases: rates in Japan, Singapore, and Korea have doubled or tripled in the past 40 years. The most widely cited reason for the global increase in breast cancer is the “Westernization” of the developing world. The cancers apparently causing the most deaths in lower income countries may not be those influenced by such factors; more data are needed to clarify their true effect in poorer countries. In the poor population of Bangladesh, there is a need for more research to explore the risk factors on breast cancer as it is not matching with many data from the western world (17).

### Age

In our series, mean age was 44.7 years which is much lower compared to western data with positive in 53.2% cases among the elderly group (>40 years). Over one fourth (26.6%) of the elderly group were Triple negative breast cancer patients.

### Discussion

Recent media reports have highlighted the increasing incidence of breast cancer in low and middle-income countries. Although the disease continues to be most prominent in affluent countries, the risks of both breast cancer and death due to breast cancer are clearly increasing worldwide. One hindrance to any discussion of global breast-cancer incidence is the limited data available for many countries. Although East Asian women still have the lowest rates (about 21 per 100,000, as compared with 101 per 100,000 in the United States and 85 per 100,000 in Western Europe), countries with the most developed registries have documented increases: rates in Japan, Singapore, and Korea have doubled or tripled in the past 40 years. The most widely cited reason for the global increase in breast cancer is the “Westernization” of the developing world. The cancers apparently causing the most deaths in lower income countries may not be those influenced by such factors; more data are needed to clarify their true effect in poorer countries. In the poor population of Bangladesh, there is a need for more research to explore the risk factors on breast cancer as it is not matching with many data from the western world (17).
a 10-15 years variation. In Iran, the average age of diagnosis of female breast cancer is approximately 15 years lower than those reported in western populations (18) given the increasing trend in breast cancer incidence and the large number of young age cases in Iran (19).

In developing countries, the shorter life expectancy leads to relatively large numbers of young age breast cancer, relative frequencies ranging from 10% to 30% of the total number of breast cancer cases, depending on different age definitions (20). Despite this high frequency of young age breast cancer, little has been reported on the prognostic influence of young age on breast cancer prognosis in these countries. The few studies available have mostly presented either no adverse effect or even a better survival for those diagnosed at a young age (21). In Bangladesh it is crucial to gain a better understanding of disease characteristics and clinical consequences of breast cancer at a young age in order to guide health policy makers on resource allocation, diagnosis, and treatment facilities.

**Risk factors**

Menarche and the menstrual cycle: The older a woman is when she begins menstruating, the lower her risk of breast cancer (7). For each 1-year delay in menarche, the risk decreases by around 5%. There is also evidence that, although age at menarche is related to breast cancer risk at all ages, the effect may be stronger in younger (premenopausal) women (22). Other menstrual factors, such as cycle length and regularity, have not been consistently related to risk of breast cancer. In this series 22.9% have the history of menstruation below 12 years and 94.9 percent women menstruated below 14 years which might have a link to cancer at early age.

Childbearing: Many studies have observed in their findings that there was a negative relationship between parity and chances of breast cancer. It was confirmed that low parity and late age at first birth are significantly associated with a high risk of breast cancer. The protective effect of parity persisted after adjusting for age at first birth and vice versa, suggesting that each factor has an independent effect on the breast-cancer risk. The reduction in risk for parity was estimated at about 16% for every 2 births. A first birth at the age of 35 years or later was associated with a 40% increase in risk, as compared to a first birth before the age of 20 (23,24). Fifty percent patients gave birth to their first child below 18 years in this series which contradicts other reports.

Breastfeeding: The effect of breastfeeding on the risk of breast cancer has been controversial, probably because the change in risk associated with average breastfeeding is small. However, recent studies in less developed countries, where the total duration of breastfeeding can be very long, have reported substantial protective effects 25. In our series 91.5 percent have the history of breastfeeding, so information about breast feeding in the western literature and incidence of breast cancer in Bangladesh is not matching.

Menopause: Women who experience menopause at a late age are at a higher risk of breast cancer than those who cease menstruating earlier, with risk increasing by about 3% for each year older at menopause. The magnitude of this effect is similar whether menopause occurs naturally or as a result of bilateral oophorectomy. The protective effect of menopause can be seen in the slowing rate of increase in breast-cancer incidence with age that occurs at around age 50. Thus, premenopausal women are at higher risk of breast cancer than postmenopausal women of the same age, and peri-menopausal women are at intermediate risk (26). In our series post-menopausal women comprise about 58.5 percent which indicate that the menopausal age is earlier than other series.

Oral contraceptives: Although 26.3% of our patients used oral contraceptives, it is difficult to label it as a risk factor in our scenario. The Collaborative Group on Hormonal Factors in Breast Cancer(27) has provided the most comprehensive summary of data on the association of oral contraceptives and breast cancer risk. This analysis pooled primary data from 53,297 cases and 100,239 controls, mainly from case-control studies conducted in the 1970s and 1980s. A modest increase in risk was observed among women who were currently using oral contraceptives, or who had stopped
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using them in the preceding 10 years (odds ratio, 1.24; 95% CI, 1.15-1.33). Consistent with prior meta-analyses(28) there was no overall increase in risk of breast cancer 10 years or more after stopping use. In summary according to these reports, it was confirmed that the modest increase in risk associated with current use of the oral contraceptives also applies to the formulations in contemporary use. It was observed that use of triphasic preparations with levonorgestrel as the progestin was associated with particularly high risk, and these formulations accounted for nearly all of the excess risks. We need more work to find out the risks in terms of contraceptive use in our study.

BMI: In our group of patients, 79.7 percent women are within the group of BMI 20 kg/m^2 or more. In is well documented in the literature that in postmenopausal women, obesity increases the risk of breast cancer where risk is about 50% higher in obese women (body-mass index >30 kg/m^2) than in lean women (body mass index 20 kg/m^2). This association is not observed in premenopausal women, among whom some, but not all, studies have observed that risk is slightly lower in obese women than in women of normal weight (29). There was an inverse but non-significant correlation between BMI and breast cancer risk during premenopausal period but a direct and significant correlation during postmenopausal period (30).

Delay in Presentation: Sixty-one percent presented to our outpatient department for treatment after 6 months of their first symptoms; over 5 percent presented after two years of their initial symptoms, which implies that majority of these patients have presented in advanced stage. Distance, treatment facility, ignorance, illiteracy, homeo treatment and low family income are among the leading reasons for the delay, a finding similar to a study in India (31).

Education and occupation: It has been noted that poor patients are mostly illiterate (50.8%), and that only 7.6 percent women attended school in this series; on the other hand over 92% are housewives. Low level of female literacy is often associated with poor access to health facilities, poor awareness of proper child care and other hygienic practices, which adversely affect the welfare of the whole family(31). In the present study, low-income women were more likely to wait a longer period of time following the onset of breast cancer symptoms before seeking medical treatment. Education is a key factor for cancer awareness and the availment of screening programs and cancer treatment options (32).

Tumor profile: Advanced tumor stage including T3 and T4 (AJCC staging) were found in 53.4 percent cases, clinically palpable lymph nodes were found in 81.4% patients which is not consistent with the figures recorded from developed countries but maintains similarity with the figures in other developing countries (33).

Receptor study was possible in 150 cases. Triple receptor cases were positive in 42.6% in elderly (>40 years) group, and 30% in younger group (<40 years). Triple negativity was also found in a number of cases: 26.6% in the elderly group compared to 20% in the younger group. In Nepal, it was found that in 64% cases, receptors were negative (34). In a Pakistan study, TNBC was 14% and non-TNBC was 68% (35).

The most important feature of this study was the fact that it was a hospital-based study, so it does not reflect the different cross section of the population. In fact, it is a reflection of the low income group people of a less developed country as these people come to seek public hospitals. People highlighted here are economically and educationally the weaker group in the society. Most of these people do not avail of early and standard health care services as many of them live in remote areas and that it took them more than a year just to seek medical consultation. Lack of awareness is another problem and they will oftentimes opt for alternative ways of treatment rather than seek immediate medical care. Women have to depend on the male members of the family to accompany them but who are oftentimes reluctant in seeking treatment themselves. Social customs is also a bar to female patients as they feel shy to expose their bodies to male doctors. All of these factors contribute to the problem of availing the best and effective treatment of the disease. Furthermore, most patients in this study do not observe a healthy lifestyle and eat.
balance diets and that most women in this study are exposed to smoke from burning firewood for cooking, an area which requires future research on the health implications of this practice.

In order to achieve an immediate and realistically positive outcome, launching health education and screening programs will improve cancer awareness and may facilitate early detection and treatment of breast cancer in this group of underprivileged women population.

**Conclusion**

Breast cancer control in a low-income country like Bangladesh is a challenging endeavor influenced by a myriad of challenges. Education to improve breast cancer awareness, breast self-examination, and clinical breast exam are relatively inexpensive and can be incorporated into existing primary health care infrastructures. The provision of better primary healthcare and education will provide a better medical outcome and establish a solid foundation for reducing the fear and uncertainty of seeking cancer treatment such as mammography or adjuvant therapy or screening. Imparting the knowledge that early detection will lead to a better cure and management of breast cancer will help correct the wrong perceptions of cancer in general.

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