RESEARCH COMMUNICATION

Breast Cancer Scenario in a Regional Cancer Centre in Eastern India over Eight Years - Still a Major Public Health Problem

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Abstract

In spite of screening and early diagnostic tests, the upward trend of breast cancer has become a matter of great concern in both developed and developing countries. The data collected by Population Based Cancer Registry in Chittaranjan National Cancer Institute, a regional cancer centre in Kolkata, from 1997 to 2004 gives an insight about the scenario of Breast Cancer in this part of Eastern India. The total no of female breast cancer cases were steadily increasing from 1997 to 2001 and only slightly lower from 2002 to 2004. and majority were in the 40-49 year old age group during this period. The next most commonly affected age group was 50-59 years. Regarding the distribution according to treatment, the main modality was surgery and radiotherapy followed by combined surgery, chemotherapy and radiotherapy and then combined surgery and chemotherapy. The commonest type was ductal followed by lobular cancer. In this eight year study in CNCI, status of patients on last day of the respective year was assessed. Number of patients alive was 43.5% in 1997. The percentage gradually increased up to 2000 and then gradually decreased to 47.4% in 2004. Also with every passing year, percentage mortality gradually decreased from 25.7% in 1997 to 16.8% in 2004. Better pattern of care (diagnosis and treatment) was reflected in this picture. However, lost to follow up, which also implies non compliance to treatment, increased to 30.8% in 1997 to 35.8% in 2004. Due to the small number of male breast cancers, only female cases were considered. In conclusion, breast cancer continues to be a major problem in Kolkata, India

Keywords: Breast cancer - histopathological type - treatment modality - Kolkata, India

Introduction

The rising trend of breast cancer both in developed and developing countries is a real threat challenging all efforts to screening, prevention and treatment aspects to reduce this cancer.

The incidence of breast cancer is rising in India and is now the second most common cancer diagnosed in women after cervical cancer. It is estimated that in 2008 there were 115,251 new cases of breast cancer with an age standardised incidence rate of 22.9 per 100,000. It is estimated that by 2030 the number of new cases of breast cancer in India will reach just under 200,000 per year

According to study of Farley et al. (2000), Cancer of the breast in women is a major health burden worldwide. It is a growing problem in both high-resource and low-resource settings, and is responsible for over one million of the estimated 10 million neoplasms diagnosed worldwide each year in both sexes. It is also the primary cause of cancer death among women globally, responsible for about 375,000 deaths in the year 2000.

According to study of Sinha (2011), the maiden global analysis that factored the trend over the past three decades shows the number of new breast cancer cases diagnosed worldwide has increased dramatically from about 6.4 lakhs in 1980 to 16 lakhs in 2010. In contrast, the rise in deaths from breast cancer globally has been slower, increasing from about 2.5 lakhs in 1980 to 4.25 lakhs in 2010, possibly reflecting the effectiveness of early detection and advances in treatment in developed countries. According to the Indian National Cancer Registry Programme, the analysis of time trends reveals that the burden of breast cancer patients will climb to 123,634 in 2020. All the urban registries at Bangalore, Bhopal, Chennai, Delhi and Mumbai showed statistically significant increase in the incidence of breast cancer, the APC (Annual Percent Change) varying from 1.0 in Delhi to 2.7 in Bangalore. In Chennai the increase was more (APC:4.0) during the later year (1995-2005) while in Mumbai the increase was more (APC:3.1) during the earlier years (1982-1991).

A study done by Murthy et al. (2011) shows that the Age Specific Incidence Rate for age intervals (viz.15-34, 35-44, 45-54, 55-64 and 65+ years) by period revealed an increase in the incidence of the disease in various age groups in all the registries except in Ahmedabad. Increase in MAPC% was noted in all the age-intervals in most of the registries. The MAPC% in the youngest age group of 15-34 years were 2.28, 1.42, and 5.89 while for the oldest age interval of 65+ years, it ranged from 0.97% to 2.35% in Chennai, Mumbai and Nagpur respectively. In Bangalore and Delhi, except in the first and the first two age intervals, increases were noted in other age groups.

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Henderson et al. (1979) also reveals that breast cancer incidence has a distinctive age-specific curve. The rapid rate of increase before the menopause (ages 40-50) slows down after that, probably owing to diminishing levels of circulating oestrogens in low-incidence countries, the slope of the curve after the menopause may be flat, or even negative. This is a consequence of increasing risks of occurrence in consecutive generations of women rather than a real decline in risk with age.

Farley et al. (2000) shows variation in age incidence rates in India. It suggests that the disease peaks at a younger age (e.g. 40-50 years) than in Western countries and as a result, the majority of new diagnosis occur in pre-menopausal women.

Farley, (2001) points out that the current age-standardized rate is 19.1 per 100000 per annum, but, in contrast to what is observed in developed countries, the incidence rate peaks below age 50.

Jussawalla et al. (1981), in a study in greater Bombay shows the distribution according to histological types of breast cancer in India. It is characterized by a high frequency of infiltrating duct carcinoma. Medullary, lobular, and squamous cell carcinoma were typical histological varieties of the older age groups, whereas ductal carcinoma was encountered mostly in premenopausal women

Chintamani et al. (2005), in another study shows various morphological variants and patterns of Breast cancer. The histomorphological types seen among 569 female breast cancers , 502 cases (88.2%) with histology of IDC was found to be the most common type and followed in decreasing order by infiltrating lobular carcinoma in 21 cases (3.7%); colloid carcinoma in 6 cases (1.1%), ductal carcinoma-in-situ in 6 cases (1.1%), metaplastic type in 5 cases (0.9%), schirrous carcinoma in 5 cases (0.9%), apocrine type in 4 cases (0.7%) and the rest 20 cases (3.5%) with other types of carcinoma.

Albrektse et al. (2010) in a study showed ductal tumors, the most common histological type accounted for 81.4% of all cases, followed by lobular tumors (6.3%) and unspecified carcinomas (5.5%). Other subtypes accounted for 0.4%-1.5% of the cases each. For all histological types, the proportions differed significantly by age at diagnoses

The Madras Metropolitan Tumour Registry (MMTR), underwent a survival study by Gazalakshmi et al. (1997) of 1747 cases of invasive female breast cancer registered in MMTR during 1982-89. The mean follow-up time was 43 months. The overall Kaplan-Meier observed survival rates at 1, 3 and 5 years were 80%, 58% and 48% respectively; the corresponding figures for relative survival were 81%, 61% and 51%

Materials and Methods

Chittaranjan National Cancer Institute is the first regional cancer institute in this eastern region of India and catering comprehensive cancer care to a large no. of cancer patients.

This Institute is running Population Based Cancer Registry since 1997 and was covering an area of 300.14 Sq. Km, 142 wards(185.0 Sq.Km) under Kolkata Municipal Corporation and some adjoining areas (115.14 Sq. Km) under the Kolkata Metropolitan Development Authority. In the beginning it was sponsored by Health and Family Planning Welfare Department of West Bengal and IARC(France).Technical support was provided by ICMR. Since 2005, it is totally sponsored by ICMR and has been included under National Cancer Registry Programme of ICMR. Social Investigators are retrieving data from 52 centres including Cancer hospitals, General hospitals, Diagnostic centres and private oncologists.

Incidence Data (No. of new cases in a calendar year) was collected both by active and passive method. Direct interview was taken in some centres and medical records of other centres was main source of data. Data was collected also from Diagnostic centres and private oncologists.

Mortality data (death due to cancer) was collected from Vital Statistics Department of Kolkata Mununicipal corporation. The data collected from 1997 to 2004 was analyzed to know the change in magnitude of Breast cancer cases with time, variation in occurrence of cancer with age, changing modality of treatment with time, histopathological variation, status of patient at the end of the corresponding year

Results

The Table 1 shows that in a span of 8 years i.e.1997 to 2004, total no. of cancer cases and total no of female breast cancer cases were steadily increasing from 1997 to2001(537 in 1997 to 720 in 2001). Total no. of breast cancer cases were slightly lower from 2002 to 2004 (597 in 2002 to598 in 2004). In 2005 the relative frequency was 26.8 (AAR-20.6) and in 2006-2007 it was 27.2 (AAR-25.5).

The Table 2 shows that out of no. of breast cancers, majority were in 40-49 years old age group in 1997-2004, ranging from 22.69% in 1997 to 24.4% in 2002 and 27.9% in 2003. The next most commonly affected age group is 50 years age group, varying from 22.8% in 1997 to 26% in 2002 to 22.6% in 2004.

According to distribution of breast cancer patients, according to treatment (Table 3), the main modality of treatment was surgery and radiotherapy followed by combined treatment of surgery, chemotherapy and radiotherapy followed by combined treatment of surgery and chemotherapy. Majority (46%)underwent surgery in

Table 1. Distribution of Breast Cancer Patients from 1997 to 2004

Year	Total No. Cancer	Total No. Female Breast Cancer	Relative Frequency (%)	Total No. of Male Breast Cancer	Relative Frequency (%)
1997	4935	537	10.88	31	0.62
1998	5867	653	11.14	28	0.47
1999	6062	638	10.51	20	0.33
2000	6118	671	10.96	18	0.29
2001	5872	720	12.26	24	0.40
2002	5277	597	11.30	21	0.39
2003	4529	511	11.28	21	0.46
2004	4868	598	12.28	16	0.39

Table 2. Distribution of Breast Cancer Cases According to Age Group

Year	0-29	30-39	40-49	50-59	60-69	70-79	80 <	Total
1997: Female	22[3.87]	110[19.36%]	163[28.69%]	141[22.82%]	74[13.02%]	19[3.54%]	8[1.4%]	568
Male	1[0.2]	0[0]	6[1.05%]	13[2.29%]	10[1.76%]	0[0.0%]	1[0.2%]	
1998: Female	20[2.94%]	103[15.13%]	188[27.61%]	172[25.25%]	116[17.03%]	42[6.17%]	12[1.76%]	681
Male	2[0.3%]	6[0.88%]	3[0.44%]	7[1.03%]	5[0.73%]	5[0.73%]	0[0.0%]	
1999: Female	27[4.10%]	129[19.60%]	176[26.75%]	150[22.80%]	104[15.81%]	47[7.14%]	5[0.76%]	658
Male	2[0.3%]	3[0.46%]	3[0.46%]	1[0.15%]	4[0.61%]	7[1.06%]	0[0.0%]	
2000: Female	21[3.04%]	119[17.27%]	190[27.57%]	168[24.38%]	126[18.29%]	35[5.08%]	12[1.74%]	689
Male	1[0.15%]	1[0.15%]	1[0.15%]	2[0.30%]	9[1.30%]	4[0.58%]	0[0.0%]	
2001: Female	36[4.84%]	109[14.65%]	200[26.88%]	196[26.34%]	121[16.26%]	47[6.32%]	11[1.48%]	744
Male	0[0]	7[0.94%]	3[0.40%]	6[0.81%]	4[0.54%]	4[0.54%]	0[0.0%]	
2002: Female	28[3.38%]	94[15.21%]	198[32.04%]	152[24.60%]	76[12.30%]	40[6.47%]	9[1.46%]	618
Male	0[0]	1[0.16%]	8[1.29%]	4[0.65%]	2[0.3%]	4[0.65%]	2[0.32%]	
2003: Femal	18[4.84%]	82[15.41%]	146[27.44]	120[22.56%]	92[17.30%]	42[7.9%]	11[2.07%]	532
Male	0[0]	3[0.56%]	4[0.75%]	5[0.94%]	3[0.56%]	1[0.19%]	0[0.0%]	
2004: Female	13[2.12%]		171[27.85%]	150[24.43%]	112[18.24%]	43[7.0%]	6[0.98%]	614
Male	0[0]		4[0.65%]	5[0.81%]	2[0.32%]	2[0.32%]	0[0.0%]	

Table 3. Distribution of Total Breast Cancer Patients According to Treatment Modality

	1997	1998	1999	2000	2001	2002	2003	2004
Surgery	77	107	89	94	118	85	71	74
	(23.8)	(27.7)	(22.9)	(22.8)	(25.1)	(22.1)	(23.5)	(21.1)
Radiotherapy	49	30	33	34	40	34	40	61
	(15.1)	(7.8)	(8.5)	(9.2)	(8.5)	(8.9)	(13.3)	(17.4)
Chemotherapy	29	37	40	51	51	62	63	72
	(9.0)	(9.6)	(10.3)	(12.4)	(10.8)	(16.2)	(20.9)	(20.5)
Surgery& Radiotherapy	39	47	26	29	54	26	22	27
	(12.0)	(12.1)	(6.7)	(7.0)	(11.5)	(6.8)	(7.3)	(7.7)
Surgery & Chemotherapy	47	59	76	88	84	60	40	50
	(14.5)	(15.2)	(19.6)	(21.3)	(17.8)	(15.6)	(13.2)	(14.3)
Radiotherapy & Chemotherapy	39	46	54	54	47	60	26	46
	(12.0)	(11.9)	(13.9)	(13.1)	(10.0)	(15.6)	(8.6)	(13.1)
Surgery& Radiotherapy & Chemotherapy	36	56	67	55	75	51	37	20
	(11.1)	(14.5)	(17.3)	(13.3)	(15.9)	(13.3)	(12.3)	(5.7)
Palliative	8	5	3	4	2	6	3	1
	(2.5)	(1.3)	(0.8)	(1.0)	(0.4)	(1.6)	(1.0)	(0.3)

Table 4. Distribution of Breast Cancer Patients According to Histopathological Type

	1997 (568) (%)	1998 (681) (%)	1999 (658) (%)	2000 (689) (%)	2001 (744) (%)	2002 (618) (%)	2003 (532) (%)	2004 (614) (%)	2004 (614) (%)
Ductal Ca	426	518	519	530	579	484	428	510	510*
	(75.0)	(76.1)	(78.9)	(76.9)	(77.8)	(78.3)	(80.5)	(83.1)	(83.1)
Lobular Ca	50	49	45	55	60	41	37	45	45
	(8.8)	(7.2)	(6.8)	(8.0)	(8.1)	(6.6)	(7.0)	(7.3)	(7.3)
Paget' Disease	44	50	45	47	47	32	28	33	33
	(7.8)	(7.3)	(6.9)	(6.4)	(6.3)	(5.2)	(5.3)	(1.8)	(5.4)
Others	78	97	81	86	91	81	57	48	48
	(13.7)	(14.2)	(12.3)	(12.5)	(12.2)	(13.1)	(10.7)	(7.8)	(7.8)

10.71% in 2004

In this eight year study (Table 5) in CNCI, status of patients on last day of the respective year was assessed. No. of patients alive was 43.50% in 1997. The percentage gradually increased to 56.45% in 2001 and again fallen to 55.01% in 2001 and gradually decreased to 47.4% in 2004. There was overall rise in percentage of alive patients. Also with every passing year, percentage of death gradually decreased from 25.7% in 1997 to 19.6% in 2000 to ultimately to 16.8% in 2004. Better pattern of care(diagnosis and treatment) was reflected in this picture. Lost to follow up which also implies non compliance to treatment increased to 30.8% in 1997 to 30.6% in 2000 to finally 35.8% in 2004

1997, rising to 27.7% in 1998 then declining to 22.13% in 2002 and to 21.08% in 2004. Chemotherapy was more common with passing time ie rising to 8.95% in 1997 to 12.4% in 2000 and ultimately rising to 20.9% in 2003 and 20.51% in 2004. Combined treatment of surgery and chemotherapy was done in 14.50% cases rising to 21.31% in 2000 falling to 13.24% in 2003 and then to 14.25% in 2004.

According to distribution of total cancer cases (Table 4), the commonest type was ductal cancer. It was 75.00% in 1997 gradually rising to77.82% in 2002,78.32% in 2003 and 80.45% in 2004. The second commonest variety was glandular cancer which was 8.80% in 1997 then slightly falling to 6.63% in 2003 and 6.96% in 2004. Paget's disease was 7.76% in 1997 gradually falling to 5.51% in 2003 and 5.27% in 2004. Other histopathological types constituted from 13.73% in 1997 to 13.11% in 2003 to

Discussion

Chittaranjan National Cancer Institute (CNCI) in Kolkata is serving as a premier Regional Cancer Centre (RCC) for the Eastern Region of the Country. The hospital was formally inaugurated by Prof. Madam J. Curie in January 2, 1950 and named after Desbandhu Chittaranjan Das, as a tribute to and in acknowledgement of his enormous support.

Population Based Cancer Registry started in 1997 and initially funded by IARC, France and Dept of Health and

Table 5. Distribution of Total Treated Breast Cancer Patients According to Physical Status of Patients at the End of the Corresponding Year

Year	Total cases	Alive	Dead	Lost to Follow up
1997	568	247(43.50)	146(25.70%)	175(30.80%)
1998	681	301(44.20%)	182(26.73%)	198(29.07%)
1999	658	312(47.42%)	134(20.38%)	212(32.20%)
2000	689	362(52.54%)	116(16.84%)	211(30.62%)
2001	744	420(56.45%)	146(19.63%)	178(23.92%)
2002	618	340(55.01%)	60(9.71%)	218(35.28%)
2003	532	208(39.10%)	111(20.86%)	213(40.04%)
2004	614	291(47.4%)	103(16.77%)	220(35.83%)

Family Welfare, Government of West Bengal and technical support was provided by Indian Council of Medical Research. Now it is totally sponsored by Indian Council of Medical Research from 2005 onwards.The study of data collected by Population Based Cancer Registry from 1997 to 2004 gave an insight of scenario of Breast cancer in Kolkata.

The study shows that in a span of 8 years i.e.1997 to 2004, total no of female breast cancer cases were steadily increasing from 1997 to 2001 (537 in 1997 to 720 in 2001). Total no. of breast cancer cases were slightly lower from 2002 to 2004 (597 in 2002 to 598 in 2004). In 2005 the relative frequency was 26.8 (AAR-20.6) and in 2006-2007 it was 27.2 (AAR-25.5).

A study done by Ahmed et al. (2011) shows breast cancer is the most frequently diagnosed cancer and the leading cause of cancer death in females worldwide, accounts for 23% (1.38 millions) of total cancer cases and 14% (458,499) of total cancer deaths in 200814((Parkin et al., in a study in 2000 shows that breast cancer, although it is the second most common cancer overall (1.05 million new cases) ranks much less highly (5th) as a cause of death because of the relatively favourable prognosis (ratio of mortality:incidence = 0.4). In terms of prevalence, the most common cancer is breast (3.9 million breast cancer cases. The ratio between prevalence and incidence is an indicator of prognosis. This explains why breast cancer appears as the most prevalent cancer in the world, despite there being fewer new cases than for lung cancer, for which the outlook is considerably poorer.

Ferlay et al. (2000) revealed that breast cancer resulted in an estimated 189,000 deaths in developed countries and 184,000 deaths in developing countries, accounting for16 and 12 percent, respectively, of all cancer deaths in woman.

A study done by Forbes, (1997) points out that over the past several decades, the risk of breast cancer in developed countries has increased by one to two percent annually. In our study in eight year time period, major patients were in the 40-49 year old age group in 1997-2004, 29.69% in 1997 to 32.04% in 2002 and finally to 27.85% in 2004 and the next most commonly affected age group was 50-59 year age group which varies from 22.80% in 1997 to 24.60% in 2002 and ultimately to 24.43% in 2004

In a study in Netherlands by Louwman et al. (1975: 2004) reveals that incidence for patients aged below 40 and 40-49 has increased by 2.1% and 2.4% annually, since 1995 (p = 0.08 and p = 0.001, respectively). Mortality decreased in all age groups, but most markedly among women aged 50-69 (-1.5% yearly since 1985, p = 0.14).

Age is the single most important risk factor for breast cancer. Forbes, (1997) shows that compared with women in their twenties, women are 10 times as likely to develop breast cancer in their thirties, 40 times as likely in their forties, 60 times as likely in their fifties, and 90 times as likely after age 60. Breast cancer incidence has a distinctive age-specific curve.

The observation by Henderson BE et al in 1988 reveals that the rapid rate of increase before the menopause (ages 40-50) slows down after that, probably owing to diminishing levels of circulating oestrogens.In our study, according to treatment modality, the main modality of treatment was surgery and radiotherapy.It was followed by combined treatment of surgery, chemotherapy and radiotherapy and by combined treatment of surgery and chemotherapy. Majority, 23.77% underwent surgery in 1997,rising to 27.65% in 1998 then declining to 22.13% in 2002 and to 21.08% in 2004.Chemotherapy was more common with passing time i.e. rising to 8.95% in 1997 to 12.35% in 2000 and ultimately rising to 20.86% in 2003 and 20.51% in 2004.Combined treatment of surgery and chemotherapy was done in 14.50% cases rising to 21.31% in 2000 falling to 13.24% in 2003 and then to 14.25% in 2004.

In a study, of the 173 confirmed cases of breast cancer, 65 (37.6%) declined any form of treatment. Among the remaining 108 patients, 57(52.8%) accepted only a single treatment modality, while 51 (47.2%)accepted two or more treatment modalities.

In a study in Eastern Nigeria by Stanley et al. (????) , a total of 140 patients were offered therapeutic surgery at some point in their management; 71 (50.7%) accepted some form of mastectomy and 2 requested and received wide local excision. 49surgery patients (67%) had chemotherapy and 16 (22%) had chemotherapy plus radiotherapy. Only 23 patients received radiotherapy; of these, 16 received radiotherapy in conjunction with surgery while 7 received radiotherapy for locally unresectable lesions. Of the four functional radiotherapy units in Nigeria, the nearest was 600 km from the Breast Clinic on poorly maintained roads. For those patients accepting treatment, the most common reasons for discontinuation of treatment were cost of the treatment,no bed space in the hospital and lack of a relative to care for them.

Peto et al. (2000) in a study in UK and USA shows Improved treatment of women who develop breast cancer also is essential to reducing breast cancer mortality. Along with mammography screening, advances in the treatment of breast cancer have fueled a sharp drop in breast cancer mortality over the past 15 years in the United States and the United Kingdom

Jussawalla et al. (1981), in a study in greater Bombay in 1981 points out the distribution of breast cancer according to histologic types of breast cancer in India is characterized by a high frequency of infiltrating duct carcinoma. Medullary, lobular, and squamous cell carcinoma were typical histological varieties of the older age groups, whereas ductal carcinoma was encountered mostly in

premenopausal women. According to histopathological classification, the commonest type was ductal cancer in all years here.

A study on survival of breast cancer in 1995 in Bangalore by Nandakumar et al. (1995) reflects the aggressiveness of the disease, the effectiveness of treatment and host factors such as age. There have been very few reports on survival from cancer in India, mainly because of poor patient follow-up and inadequate system of registration of death. Dhar et al. (2008) in a study in shows the numerous difficulties in the conduct of a population-based survival study in the context of developing countries, including India. Loss to follow-up is a typical problem encountered, causing biased estimates. In view of this difficulty with the classical approach, the objective of this study was to propose an indirect methodology for the study of survival. The proposed methodology is based on life table techniques and uses current data on incidence and mortality from the disease.

In this eight year study in CNCI, status of patients on last day of the respective year was assessed. The percentage death gradually increased to 56.45% in 2001 and again fell to 55.01% in 2001 and gradually came down to 47.4% in 2004.There was overall rise in percentage of alive patients. Also with every passing year, percentage of death gradually decreased. Better pattern of care(diagnosis and treatment) was reflected in this picture. However, lost to follow up which also implies non compliance to treatment was basically unchanged.

Despite much research, breast cancer persists as a major health burden. The observed improvement in survival of breast cancer patients during the last three decades is impressive. It is likely that the descriptive epidemiology of breast cancer will continue to provide insights into the etiology of the disease and will allude to the role of primary prevention, early diagnosis and treatment. There have been few reports on survival from cancer in India, mainly because of poor patient follow-up and inadequate system of registration of death. The implementation of cancer as a Notifiable disease in India is the only solution to assess the proper burden of breast cancer and can be helpful to conduct survival studies. The combination of increasing incidence and improved survival rates implies that the number of prevalent cases will continue to increase considerably in the next 10 years. The survival studies can pinpoint the lacunae in treatment modalities and can guide us to do basic and translational research so the preventive strategies cmulated.

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