

Risk factors for breast cancer among women attending a tertiary care hospital in southern India

Prince Antonio Harrison, Kavitha Srinivasan, Binu VS, MS Vidyasagar, Suma Nair

Corresponding author: Suma Nair (sumavimal@gmail.com)

Correspondence concerning this article should be addressed to Dr. Suma Nair, Department of Community Medicine, Kasturba Medical College, Manipal, Karnataka 576104, India; Email: sumavimal@gmail.com

International Journal of Collaborative Research on Internal Medicine & Public Health
Vol. 2 No. 4 (April 2010)
Pages 109-116

ISSN 1840-4529

<http://www.iomcworld.com/ijcrimph/>

Paper review summary:

Paper submission: January 01, 2010

Revised paper submission: April 06, 2010

Paper acceptance: April 08, 2010

Paper publication: April 08, 2010

International Journal of Collaborative Research on Internal Medicine & Public Health

Editors-in-Chief:

Asst. Prof. Dr. Jaspreet S. Brar (University of Pittsburgh, USA)

Forouzan Bayat Nejad (Tehran University of Medical Sciences, Iran)

Executive Editor: Mostafa Nejadi (Universiti Sains Malaysia, Malaysia)

Deputy Editor: Dr. Mensura Kudumovic (University of Sarajevo, Bosnia & Herzegovina)

Associate Editors:

Dr. Monica Gaidhane (Virginia Commonwealth University, USA)

Dr. Suresh Vatsyayann (FreeGP, New Zealand)

Risk factors for breast cancer among women attending a tertiary care hospital in southern India

Prince Antonio Harrison

Kasturba Medical College, Manipal University, India
Email: princeaharrison@gmail.com

Kavitha Srinivasan

Kasturba Medical College, Manipal University, India

Binu VS

Department of Statistics
Kasturba Medical College, Manipal University, India

MS Vidyasagar

Department of Radiotherapy
Kasturba Medical College, Manipal University, India

Suma Nair

Department of Community Medicine
Kasturba Medical College, Manipal, India
Email: sumavimal@gmail.com

Abstract

Background: The incidence of Breast Cancer is increasing, particularly in previously low incidence areas such as Asia. In fact in India, it is considered the leading Cancer among women in certain metros such as Mumbai, Bangalore & Thiruvananthapuram. The risk factors responsible for the causation of breast cancer may be population specific. Moreover, there are inherent factors that aid in the late presentation of breast cancer patients to a hospital. Identifying these factors holds great promise in reducing the incidence, morbidity and mortality due to this disease.

Objectives: To study the socio-demographic and risk factors of breast cancer patients presenting to a tertiary care hospital and to determine the stage at presentation and factors contributing to delayed presentation.

Methods: This was a one to four matched case control study with a sample of 315 individuals. The cases were enrolled in the order of their admission into the hospital during a four month study period. For each identified case an age matched control was recruited from the hospital. Cases and controls were personally interviewed by the investigator using a structured questionnaire and the data pertaining to treatment and diagnostic modalities were collected from the medical records.

Results: Most (46%) of the cases belonged to the 45 – 54 age group and only 8% were over the age of 60. Despite a high literacy status (80%), women in this study had poor awareness

pertaining to breast cancer (63%).

Considerable proportions of the cases were detected in stage III (46%) or stage IV (36.5%) of the disease when treatment options are limited and cure a distant probability. Nearly all the cases (98.4%) had accidentally identified the breast lump and none of them had ever performed a breast self examination or undergone any screening procedure. First delivery at age > 30 years [OR = 2.27 (1.02 – 5.05) $p < 0.05$] showed a significant risk association. Menarche < 11 years [OR = 0.321 (0.106 – 0.971) $p < 0.05$] showed a beneficial effect. Nearly 88% of the cases approached more than one primary care practitioner prior to being referred to a cancer detection center, thereby delaying the process of diagnosis.

Conclusion: The risk factor for breast cancer determined by our study was first delivery over the age of 30. Delay in referral of cases was another significant finding which is of concern and needs to be addressed pragmatically. Considering the low awareness levels of the participants and nonexistent screening practices a targeted intervention to tackle this problem seems to be the need of the hour.

Study Limitations: Since the controls were hospital based, generalisability of these findings could be limited. Besides, women in this study were more literate and employed as compared to many in other parts of India. Various factors that affect delayed presentation such as fear of diagnosis and affordability were not studied.

Key Words: Breast cancer, Risk factors, Stage at diagnosis, Breast self examination, Screening

Introduction

Breast cancer incidence has been increasing in the general population all over the world, particularly in areas of low incidence such as Asia. The worldwide incidence of breast cancer has increased from 720,000 cases per year in 1985 to 1,000,000 new cases in the year 2000¹. Nearly 1/3rd (32%) of all cancer cases and 18% of all cancer deaths in women are reported to be due to breast cancer¹. The increase in incidence is more noticeable in regions of the world, which were previously considered to be areas of low incidence such as the Asian continent.

Breast Cancer is second to cancer of the Cervix among women in India, but is considered the leading Cancer in certain metros such as Mumbai and Bangalore. It is estimated that approximately 80,000 cases occur annually; the age adjusted incidence rates varying between 16 and 25/ 100,000 population. Breast cancer ranks first in incidence out of all cancers among females in Mumbai and Thiruvananthapuram and constitutes 26.2% and 25.4% of all cancers respectively². The peak incidence of breast cancer is in the age group of 45-49years in females, as noted from a five year data (1994-1998), in Mumbai, Bangalore, Chennai and Thiruvananthapuram².

Timely diagnosis of symptomatic disease relies on breast health awareness in the potential patient population and in primary health care professionals, and thus increased breast health awareness in terms of risk factors and recognition of symptoms is a key element of

interventions at all resource levels. Although awareness is an elusive concept, it clearly has great potential for improving the outcome of breast cancer patients. It is important to be mindful that the great majority of women in the world in whom breast cancer is diagnosed each year are symptomatic at the time of diagnosis, and that the majority of women in the world do not have access to screening mammography. Thus, based on the observation of the association between tumor size and prognosis, it should be clear that the goal of early detection is not simply the goal of detecting a greater proportion of breast cancers when they are asymptomatic, but also downsizing symptomatic breast cancers as well.³

The risk factors responsible for the causation of breast cancer may be population or region specific. Moreover, there are inherent factors that aid in the late presentation of breast cancer patients to a hospital. It is important to identify these factors in order to bring down the incidence, morbidity and mortality due to this disease. This study reviewed the breast cancer patients at a tertiary care center with respect to their socio-demographic characteristics, risk factors that contributed to the development of the disease and stage at which treatment was sought. We also tried to determine the risk factors that contributed to a delayed presentation.

Methodology

This case control study was carried out as a short term student project funded by the Indian Council of Medical Research (ICMR). Due clearance was obtained from the Institutional Ethics Committee at the Kasturba Medical College, Manipal, India.

Study Population

The study setting was the Kasturba Hospital - a tertiary healthcare facility in Manipal which is situated in southern India. Manipal is a university town flanked by a predominant rural population. Eligible cases were histopathologically confirmed female breast cancer patients admitted to the hospital from June to September 2008. They were included in the order of their admission into the hospital during the study period.

The controls were age matched and selected at random within 2 year age range to cases. They were healthy individuals either caregivers to a case of breast cancer or neighbours, friends or relatives accompanying other patients to the hospital. Caregivers who were first degree relatives (mother, sister, and daughter) of breast cancer cases were excluded. The controls were also required to have no personal history of breast disease.

Considering delayed age at first delivery a risk factor with an expected exposure of 40% in the controls and an anticipated OR of 2.24 the calculated number of cases was 63 for a power of 80% and 5% level of significance. For a 1:4 allocation ratio the required number of controls were 252 and thus a total of 315 individuals were included into the study.

Data Collection & Analysis

The cases and controls fulfilling the above mentioned criteria were personally interviewed by the investigator using a structured questionnaire. The questionnaire included information on socio-demographic characteristics, reproductive factors, type of diet, physical activity, method of identification of the disease and mode of referral. Women were classified as menopausal if they had not had a menstrual cycle in the last one year prior to the date of interview. Physical activity was classified into regular exercise regimen and household activity which was either vigorous or moderate. Vigorous household activity referred to the woman carrying out all activities at home manually without any external help. Data pertaining to stage at presentation, treatment and diagnostic modalities were collected from the medical records. A written Informed Consent was taken from each individual before including them in the study. The data was analysed using SPSS version XI and STATA version IX.

Results

The demographic characteristics of the study population are as illustrated in table 1. There does not appear to be much of a difference between the cases and the controls with regard to these traits. Of the 63 cases, twenty nine (46%) were in the 45 – 54 age range while another 33% was in the 25 – 44 age range. The number of cases over the age of 54 was relatively less (21%)

Most of the cases were detected in stage III (46%) or stage IV (36.5%) of the disease when treatment options are limited and cure may not be possible. Nearly all the cases (98.4%) had accidentally identified the breast lump. It is also noteworthy that none of the cases had ever performed a breast self examination as compared to 8% of the controls who were routinely doing it.

A larger percentage of the controls (25.8%) were vegetarians when compared to the cases (15.9%). There was no difference between cases and controls with respect to physical activity in terms of regular fitness regimen as only 3% in both the groups were involved in it. However, 96.4% of the controls engaged in rigorous household activity whereas only 84% of the cases did so. This suggests that the controls had a more physically active life when we consider rigorous house work to be a form of physical activity.

Risk factors for Breast cancer

Advancing age is considered to be a significant risk factor in the western literature; however women in Asia in particular appear to be at risk at an earlier age as is illustrated from the age distribution of the cases in this study as well. Some of the other notable risk factors are age at first delivery more than 30 years, menarche < 11 years, Body Mass Index (BMI) more than 25 and a predominantly non vegetarian diet. Table 2 shows the association between the cases and controls with respect to these parameters.

First delivery > 30 years and non vegetarian diet showed an association as reported in the literature; however the diet factor was not found to be significant. Interestingly, age at menarche < 11 years and a BMI > 25 were found to have a protective effect contrary to what is reported in literature. It was observed that past history of benign breast disease was present in a few of the breast cancer cases. Menopause after 55 years is another significant risk factor which however could not be demonstrated since the controls were age matched.

Delay in seeking medical help

The study illustrated the fact that most cases reported to the hospital only in stage III or IV of the disease. Almost 98.4% of the cases were self diagnosed. Nearly 88% approached two or more independent primary care practitioners prior to being referred to a cancer detection center thereby delaying diagnosis.

Discussion

Much of the increase of breast cancer in India has been associated with greater urbanization and changing life styles. The population in this study were predominantly from a rural background which sustained on agriculture. This reaffirms the fact that this disease is no longer confined to an urban setting. However, despite the rural status, women in this study were literate and nearly 25% were employed which probably explains the increased risk. Higher education level and income are shown to be significant reasons for an increased risk^{4, 5}. This is because economic independence may encourage women to remain single or marry late thereby increasing their risk of getting the disease.

The Malaysian study¹ illustrated that postponement of first pregnancy to as late as 35 years as well as being menopausal had greater risk to the occurrence of breast cancer. Our study also showed an increased association with increasing age at first delivery.

The Malaysian study¹ concluded that breast cancer tended to occur earlier among Malaysian women¹. This seems to be illustrated in this study as well wherein 33% of the cases were among those below the age of 45 and another 46% were in the age range of 45 to 54 years. A study on Iranian women also reported nearly 30% of cases to be less than 40 years of age⁶. These findings reiterate the fact that Asian women get the disease almost a decade earlier than their western counterpart.

The findings in a study on breast cancer risk within the South Asian female population in England reveal differences in breast cancer risk between South Asian ethnic subgroups, which were not fully explained by reproductive differences, but were partly accounted for by diet and body size⁷. Our study showed more number of controls to be vegetarians as compared to the cases.

Obesity and lack of physical activity are associated with increased risk at various cancer sites, including breast and endometrial cancer. Energy balance, which includes maintaining ideal

weight through physical exercise, has been associated with decreased risk of breast cancer⁸.

However, our study showed a protective factor for BMI > 25. This is probably because the BMI for the cases were the current estimates and they are likely to have lost a lot of weight due to the illness and treatment.

Case-control studies that compared non-vegetarian and vegetarian diets and alcohol and tobacco use in India have reported that vegetarians have a reduced risk of oesophageal and breast cancers⁹. Large epidemiological studies have identified a possible association between increased dietary fiber and a decreased risk for cancers of the colon and breast.⁸ In this study non vegetarian diet did show a risk association with an OR of 1.94, which was however statistically not significant.

Late presentation of Breast cancer is a major concern, as large numbers of patients are still diagnosed in clinical Stage III or IV. It was found that the proportion of late-stage cancer was clearly decreased when tumors were detected by screening¹⁰. Education/awareness campaigns, better access to diagnostic resources, availability of higher standards of health care, use of breast self-examination, and screening mammography if implemented rationally would go a long way towards increasing early diagnosis and improved survival with a consequent possible rise in detection of early cases as is seen in the West¹¹. Our study showed late presentation to the hospital to be an area of concern. One factor contributing to this is the fact that there is no organized screening program in place for early detection. Almost 98.4% of the cases were self diagnosed. Almost all of these were accidental discovery and not secondary to any systematic self examination. Secondly, awareness regarding the disease was noted to be uniformly poor amongst the cases and controls. Only 40% of the total subjects were aware. The third factor is the delay in referral and diagnosis of these cases by the health care providers. This is reflected by the fact that nearly 88% of the cases had to approach two or more primary care practitioners prior to being diagnosed of the disease.

There are some inherent limitations of this study. The findings noted here may not be generalisable since the women in this study were notably more literate and employed as compared to a majority of rural population elsewhere. Moreover, care should have been taken to include the relevant weight for the cases as this would have enabled more accurate calculation of the BMI. As regards delay in presentation factors such as fear of diagnosis, cultural inhibitions and affordability could have played a role which was not specifically looked for.

Conclusion

Although the literacy rate of the women in this study was over 80%, their awareness pertaining to breast cancer was not as good. Nearly all the cases had self detected the breast lump and breast screening was not a widespread term. Delay in referral of the cases was another noteworthy finding.

A targeted intervention creating more awareness is the need of the hour. The awareness campaigns should not only target the community but also health care providers stressing on

them the need for early referral to appropriate care centers. Facilities for early detection and diagnosis are the areas that need to be worked on. Further studies evaluating an organized screening modality suitable for a developing country may throw more light in this direction. It would also be worthwhile to see if women identified with the specific risk factors noted in this study would benefit from frequent screening.

References

1. Ahmad M. Risk factors for breast cancer among women attending breast clinic in University Malaya Medical Centre Kuala Lumpur. *NCD Malaysia*, 2003; 2(4): 23-31.
2. Indian Council of Medical Research. *National Cancer Registry Programme of India – an Overview*. Bangalore: NCRP; 2002.
3. Smith RA, Caleffi M, Albert US, et al. Breast cancer in limited-resource countries: early detection and access to care. *Breast J*, 2006;12 (Suppl 1):S16-26.
4. Singh MM, Devi R, Walia I, Kumar R. Breast self examination for early detection of breast cancer. *Indian J Med Sci*, 1999;53:120-6.
5. Tavani A, Gallus S, La Vecchia C, Montella M, Dal Maso L, Franceschi S. Risk factors for breast cancer in women under 40 years. *Eur J Cancer*,1999;35:1361-1367.
6. Abbasi S, Azimi C, Othman F, et al. Risk factors for breast cancer in Iranian Women: A case control study. *International J of Cancer Research*,2009;5(1):1-11.
7. V A McCormack, P Mangtani, D Bhakta, A J McMichael, I dos Santos Silva. Heterogeneity of breast cancer risk within the South Asian female population in England: a population- based case–control study of first-generation migrants. *British Journal of Cancer*,2004;90(1):160–66.
8. Glade MJ. Food, nutrition, and the prevention of cancer: a global perspective. American Institute for Cancer Research / World Cancer Research Fund, American Institute for Cancer Research, 1997. *Nutrition*, 1999;15(6): 523-6.
9. Rao DN. *Role of vegetarian diet in cancers of the oesophagus and female breast in India*. Vegetarian Congress Research Presentations, Section I: Diet and Chronic Disease. Loma Linda University Press; 1997. pp. 4, 2003.
10. Arndt V, Stürmer T, Stegmaier C, Ziegler H, Dhom G, Brenner H. Socio-demographic factors, health behavior and late-stage diagnosis of breast cancer in Germany: a population-based study. *J Clin Epidemiol*, 2001;54(7):719-27.
11. Raina V, Bhutani M, Bedi R, et al. Clinical features and prognostic factors of early breast cancer at a major cancer center in North India. *Indian J Cancer*, 2005;42:40-45.

Table 1: Socio-demographic characteristics of the study population (N= 315)

Characteristics	Cases	Controls
<u>Occupation</u>		
Housewife	48 (76.2)	162 (64.3)
Unskilled worker	11 (17.5)	73 (29)
Skilled worker	04 (6.3)	17 (6.7)
<u>Socio-Economic Status (SES)</u>		
Low	18 (28.6)	70 (27.8)
Middle	41 (65.1)	173 (68.7)
High	04 (6.3)	09 (3.6)
<u>Literary Status</u>		
➤ 10 years of Schooling	13 (20.6)	25 (9.9)
5 – 10 years of Schooling	34 (54.0)	150 (59.5)
1 – 4 years of Schooling	04 (6.3)	26 (10.3)
Illiterate	12 (19.0)	51 (20.2)
<u>Marital Status</u>		
Married	62 (98.4)	247 (98)
Unmarried	01 (1.6)	05 (2)
<u>Family Type</u>		
Joint	11 (17.5)	48 (19)
Nuclear	52 (82.5)	204 (81)
<u>Religion</u>		
Hindu	52 (82.5)	185 (73.4)
Muslim	09 (14.3)	47 (18.6)
Christian	02 (3.2)	20 (7.9)

Table 2: Risk factors for Breast Cancer (N= 315)

Risk Factors	Cases N (%)	Controls N (%)	Adjusted OR (CI)
Age at first delivery > 30 years	14 (22.2)	24 (9.5)	2.27 (1.02 – 5.05)*
BMI > 25	15 (23.8)	99 (39.2)	0.474 (0.237 – 0.946)*
Non vegetarian diet	54 (85.7)	187 (74.2)	1.94 (0.763 – 4.943)
Age at menarche < 11 years	04 (6.3)	56 (22.2)	0.321 (0.106 – 0.971)*

* Signifies $P < 0.05$