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Quantitative Study of Factors Associated with Breast Cancer among Women Reporting to a Tertiary Care Hospital in Karnataka

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ABSTRACT

Introduction: Numerous epidemiological studies performed throughout the world have confirmed the role of many risk factors. However, evidence suggests that international variation in the burden of breast cancer reflects differences in the patterns of risk factors. Hence this study is undertaken to assess the risk factors associate with breast cancer in a district in Karnataka.

Method: This is a Case control study to assess the risk factors associated with breast cancer among cases attending radiation unit of Hassan institute of medical sciences during 2019.

Results: There was a significant association of breast cancer with menarche attained at or less than age 13 years (OR=2.43, CI: 1.09-5.4, p<0.029), usage of oral contraceptive (OR=2.04: CI 1.61-2.42; p<0.1), and menopause attained before age 50 (OR=5.2: CI2.2-12.2; p<0.00). Our study also found that for every year increase in age for 1st birth, controls not being diseased decreased by 26% was statistically significant (OR=0.76; CI:0.61-0.89; p<0.002) and for every parity added, controls not being deceased increased by 1.13 time (OR=1.13; CI:0.69-1.8;p<0.6).

Conclusion: District cancer control programme should advice women, to consume non-vegetarian food in moderation, promote physical activity form early age to maintain ideal body mass index.

Key Words: Breast Cancer, menarche, parity, age at 1st birth.

INTRODUCTION

Breast cancer is the most common female cancer in the world with an estimated 2.08 million (24.2%) new cancer cases diagnosed in 2018.[1] With age standardised incidence rate of 46.3/100000 women and age standardised mortality rate of 13/100000 women. While in India also it has now become the most common female cancer with 162 468 (27.7%) new cases reported in 2018. Whereas the age standardised incidence rate was 24/100000 women, 87090 women died from breast cancer in 2018 giving an age adjusted mortality rate of 13 per 100000 of population. And is estimated to increase to 261850 by 2040 [1]. Numerous epidemiological studies performed throughout the world have confirmed the role of many risk factors include increased age, genetic mutation, early menstrual period, late or no pregnancy, starting menopause after age 55, not being physically active, being overweight or obese after menopause, having dense breast, using combination hormone therapy, taking oral contraceptives, personal history of breast cancer, a family history of breast cancer, previous treatment using radiation therapy and drinking alcohol [2-6].

Need for the study

However, evidence suggests that international variation in the burden of breast cancer reflects differences in the patterns of risk factors [7]. In our population context, the role of well-known factors in breast cancer remains poorly documented, and

it is probable that exposures specific to district may play an important role. Hence this study is undertaken to assess the risk factors, and protective factors, associate with breast cancer in a district in Karnataka.

METHODOLOGY

This is a Case control study to assess the risk factors associated with breast cancer among cases attending radiation unit of Hassan institute of medical sciences and controls accompanying the diseased during 2019. With 95% confidence interval and 80% power and 1-2% nulliparity prevailing in the population 45 cases and 45 controls were to be recruited as per Kelsey sample size calculator in our study. A pretested questionnaire was used to collect the data. The questionnaire included information on the following demographic variables, age, educational level (literate, Primary, Secondary, Graduate, Post graduate), Occupation (House Hold / Agriculture / Office), Income (SES Classification), Diet (Veg/Predominantly Non Vegetarian), age at menarche (<13 years or ≥13 years); parity (≤ 3 or >3 pregnancies); marital status (single, married/stable, and widowed/divorced), Contraceptive use (Oral Contraceptive, Tubectomy, Condom, IUD), age at first birth (<23 or ≥23 years), breastfeeding history (<12 or ≥12 months), abortion history (yes or no), menopause, age at menopause (<50 or ≥50 years), hysterectomy (age at hysterectomy), family history of breast cancer (first-, second-, and third-degree relatives), prediagnosis weight (self-reported weight during the last six months prior to diagnosis) or current weight for the control subjects, Physical activity (at least 150 minutes of physical activity of moderate intensity or 75 minutes of vigorous aerobic physical activity in a week), women are considered to be moderate active if they met this requirement and mild active if they do not. consumption of alcohol and smoking history among women was also recorded. The study was approved by the Institutional ethics committee.

Statistical analysis: The data obtained was entered to Ms excel and analysed using SPSS software. The data measured on continuous scale are analysed using means and standard deviation. However, the data measured on nominal and ordinal scales are statistically analysed using proportions and compared using Chi-square test. Binary logistics regression was used to analyse the association between variables.

RESULTS

Sociodemographic: The mean age of the study subjects was 54 (10) years with minimum of 33 years and maximum of 67 years. Majority (50%) were in the age group of 41 to 50 years. However, 54 % were illiterate, 55% were housewives and 54% were in middle and lower middle-class socioeconomic status. Moreover 80% of the population consumed non-vegetarian food and only 4 % had family history of breast cancer. 69% of Women were doing moderate physical activity and 58% had normal body mass index.

The case and control were similar with respect to age but varied with respect to education (p<0.08), occupation ((p < 0.021), income (p<0.001) and body mass index (0.001) The odds of consumption of nonvegetarian food was 1.54(OR= 1.54, CI:0.61-3.89, p>0.3) and mild physical activity was 7.2 (OR=7.2; CI:2.8- 19.6; p<0.00), times more among cases as compared to controls. **Table-1**

Reproductive History: Around 61% attained menarchy by age 13 years and 89% were married and only 4% used Oral contraceptives.

Table 1: Sociodemographic distribution of study subjects

Variable	Case (N=52)	Control (N=52)	p-value
Age in years			
31-40	10(19)	10(19)	1
41-50	11(21)	11(22)	
51-60	14(27)	14(26)	
61-70	17(33)	17(33)	
Mean (sd)	54(10)	54(10)	
Min - Max	33-67	33-67	
Education			
Illiterate	19(36)	27(52)	0.08
Primary	18(35)	09(18)	
Secondary	13(25)	16(31)	
Graduate	02(04)	00(00)	
Occupation			
Teacher	03(06)	00(00)	0.021
Farmer	11(21)	12(23)	
Housewife	27(52)	28(54)	
Business	00(00)	06(12)	
Labour	11(21)	06(12)	
Income			
Upper Class	05(10)	00(00)	0.001
Upper Middle Class	10(19)	11(21)	
Middle Class	16(21)	16(31)	
Lower Middle Class	10(19)	12(23)	
Lower Class	11(21)	13(25)	
Diet			
Non-vegetarian	42(80)	38(73)	0.3
Vegetarian	10(20)	14(27)	
Physical Activity			
Mild	28(54)	7(14)	0
Moderate	24(46)	45(86)	
Body Mass Index			
18-24	20(38)	38(73)	0.001
24-30	26(50)	14(27)	
30-34	06(12)	00(00)	

Moreover, 90% delivered at less than 23 years of age and 94% had about 3 children and all mothers breast fed their babies but only 36% fed their babies for more than 12 months and 58% attained menopause by 50 years of age.

There was a significant association of breast cancer with menarche attained at or less than age 13 years (OR=2.43, CI:1.09-5.4,p<0.029), usage of oral contraceptive (OR=2.04: CI 1.61-2.42; p<0.1), and menopause attained before age 50 (OR=5.2: CI2.2-12.2; p<0.00). Also, association of breast cancer with parity less than 3 (OR=2.54: CI 0.61-10.42; p<0.18) was 2.5 times more but not statistically significant. However, marriage (OR=0.62: CI 0.2-1.8; p<0.70), giving birth at age <23 years (OR=0.7: CI 0.2-2.2; p<0.56) and breast feeding (OR=0.63:CI 0.27-1.4; p<0.27), decreased the risk of developing breast cancer by 38%, 30% and 37% respectively but the association were not statistically significant. **Table-2**

Our study also found that for every year increase in age for 1st birth, controls not being diseased decreased by 26% was statistically significant (OR=0.76; CI:0.61-0.89; p<0.002) and for every parity added, controls not being deceased increased by 1.13 time (OR=1.13; CI:0.69-1.8;p<0.6). **Table-3**

Table – 2: Distribution of study subjects according to reproductive characteristics

Variables	Case (N=52)	Control (N=52)	OR (95%CI)	p-value
Age at Menarche				
<13	36(70)	25(48)	2.43(1.09-5.4)	0.029
>13	16930)	27(52)		
Oral Contraceptive Use				
Yes	2(4)	00(00)	2.04(1.67-2.48)	0.10
No	50(96)	52(100)		
Marital Status				
Married*	43(83)	46(88)	0.62(0.20-1.8)	0.7
Widowed	09(17)	06(12)		
Age at 1st Birth				
<23	44(84)	46(86)	0.70(0.2-2.2)	0.18
>23	08(16)	06914)		
Breast Feeding in Months				
>12	31(60)	35(70)	0.63(0.27-1.43)	0.27
<12	21(40)	15(30)		
Parity				
<3	49(94)	45(37)	2.54(0.61-10.42)	0.18
>3	03(06)	07(13)		
Age at Menopause				
<50	39(75)	19(37)	5.21(2.2-12)	0.0
>50	13(25)	33(63)		
Family History				
No	50(96)	50(96)	1.0(0.13-7.3)	1.0
Yes	02(04)	02(04)		

*Currently married; Figure in bracket indicate percentage.

Table -3: Logistic regression analysis for age at 1st birth and parity

	B	S.E.	Wald	df	Sig.	Exp(B)	95% CI for EXP(B)	
							Lower	Upper
age at 1st birth (in years)	-0.302	0.097	9.651	1	0.002	0.74	0.611	0.895
parity	0.129	0.251	0.262	1	0.609	1.137	0.695	1.86

DISCUSSION

Our study population represents those cases reporting to hospital for cancer and controls represents women coming to hospital for non-cancerous conditions. Cases are comparable to controls but significant differences were appreciated with occupation, education, and income.

It is appreciated in our study that women with mild or no physical activity , consuming non-vegetarian food , being obese , developed menarche at age less than 13 years , consuming oral contraceptive pills, and attaining menarchy before age 50 years had significant association with development of breast cancer. Whereas, women who were married, having 1st child delivered at age 23 years, giving birth to more than 3 children, breast feeding their babies for more than 12 months were protected against developing breast cancer though it was not statistically significant

Leon Guerrero et al [8], reported that waist circumference was significantly associated with breast cancer (OR=1.65; 95% CI 0.87-3.14, P= 0.04). and other factors like body mass index, hormone use and physical activity, were positively associated with breast cancer but were not statistically significant. Whereas, Park B et al [9] in their study reported that usage of oral contraceptive increased the risk of breast cancer (HR=3.99, 95%CI=1.65-9.67). Also, Terry MB et al [10] reported in their study found that oral contraceptive use was significantly associated with breast cancer among Asian women (OR = 1.58; 95% CI = 1.18 to 2.11), and the association was also significant among oral contraceptive users with low or normal BMI individuals as compared to nonusers with low or normal BMI (OR = 1.49; 95% CI = 1.21 to 1.83). This can be because all this factor significantly contributes to increase in oestrogen levels which is a known causative factor for breast cancer.

Se-Eun Lim et al [11] in their study concluded that late age at menarche >15 years and late age at menopause showed significant decreased association with breast cancer. Conversely, park B et al [9] and Khalis M et al [12] in their study found that odds of developing breast cancer among women who had early menarche was significant with odds ratio

of 1.60 and 3.49, respectively. But in contrast to Se-Eun Lim et al [11], shuyuasa et al [13] in their study recorded that the relative risk for breast cancer among women reporting menopause at 50 years of age or over was 1.40. However, in our study we found that 70% of cases developed breast cancer before 50 years of age.

Khalis M et al [12] in their study found that early age at first full-term pregnancy was associated with a decreased risk of breast cancer (OR = 0.41, 95% CI: 0.25-0.65) and Leon Guerrero et al [8] in their case control study documented that age at first live birth, was higher among cases (mean 24.9 years) than controls (mean 23.2 years); with cancer risk (OR=2.53; 95% CI, 1.04-6.19). Also, Se-Eun Lim et al [11] reported form their study that late age at first birth (>28years) significantly increased the risk of breast cancer (aOR = 1.198, 95% CI=1.031–1.392). Our study also found that for every year increase in age for 1st birth, controls not being diseased decreased by 26%

Park B et al [9] reported that higher parity decreased cancer risk (HR=0.23, 95%CI=0.05-1.00 for ≥3 parity). Similar report was given by shuyuasa et al [13] that who had 5 or more births had only 38 % of the risk experienced by nulliparous women. which were comparable to our study results. Our study also found that for one increase in parity, controls not being diseased increased by 1.137 times though it was statistically not significant.

However, Ambrosone CB et al1[14] reported that having children reduced the risk of breast cancer among ER+ cases (OR=0.82, 95% CI; 0.58–1.16), but increase the risk among ER- cases (OR=1.81, 95% CI 0.93–3.51).

Limitation: As it is a hospital-based study the cases may not be representative of the population and as the study was done over short time of 3 months there might be recall bias. We could not study the estrogen receptors status of the patients, this might have added to our understanding of association of risk factors.

CONCLUSION

Our study found that body mass index, consumption of nonvegetarian food, and mild physical activity increased the risk of occurrence of breast cancer, however reproductive factors like having the first child early, breast feeding the babies for not less than12 months and having more babies could reduce the occurrence of breast cancer. Hence, we recommend that the District cancer control programme advise women in early age to consume non-vegetarian food in moderation and promote physical activity to maintain ideal body mass index.

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