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Original Article

Risk Factors of Carcinoma Breast and their Changing Trends

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ABSTRACT

Introduction: Carcinoma breast (Ca Breast) is a multifactorial disease having various factors that contribute to its risk or occurrence.

Objective: To investigate the frequency and changing trends of different known risk factors of Ca Breast.

Materials and Methods Quantitative descriptive cross-sectional study was conducted at Abbas Institute of Medical Sciences (AIMS) Muzaffarabad, from July 2020 to June 2021. Seventy-five biopsy diagnosed patients of Ca breast in different stages of treatment presenting to Surgical OPD or admitted in wards in AIMS Hospital Muzaffarabad were included. The data was collected by using Questionnaire and was analyzed using SPSS version 25.

Results: All patients were females 25-80 years of age. Out of these, 8 patients were in age group of 25-35 years, 35 in 36-55 while 32 in 56-80. 71 patients were married. Five cases were nulliparous. 6 patients had family history of Ca breast in first degree relatives. Females 29/32 in age group (56-80y) breastfed up to 2 years while remaining females only for< 6 months. BMI showed 12 obese, 26 overweight, 20 normal and 17 underweight females. Total number of children was 1-3 in17 females, 4-5 in 30 and 6 or more in19 females. Average age at menarche and menopause was 11 and 52 years respectively. Only 8 females used oral contraceptive pills. 42 females described low Physical activity, 33 moderate and none vigorous activity. Out of 15 working women, 5 were having history of night - shift work during whole period of job mostly related to medical profession.

Conclusion: Risk of Ca breast is increasing in younger age group. Being married, Parity, exercise and breast feeding appears to be protective while obesity, overweight family history and night-shift work appear to be the contributing.

Key Words: Carcinoma Breast, Risk Factors, modifiable contributing factor

Introduction

Carcinoma Breast (Ca Breast) is the most common cancer. It is the second leading cause of death among women in the world[1]. It exists anywhere in the world but its incidence is higher in developed countries[2]. Accounting for 25% of all types of cancers in women, in 2012, 1.67 million new cases of Ca breast were identified worldwide[1,3].Ca Breast occurs predominantly in women, but 1% of patients with Ca breast are men[4]. Ca Breast can often be seen on an x-ray (mammography) or felt as a lump, in late stages, symptoms are breast and bone pain, ulcer of skin, swelling and loss of weight[5].

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Ca Breast is a multifactorial disease having various factors contributing to its risk or occurrence[6]. In some developed countries, the 5-year relative survival rate of breast cancer patients is above 80% by the identification of risk factors and early prevention[7]. Risk factors may be Non-modifiable as according to ACS (American cancer society) including gender, advancing age, race, genetic factors, family history, certain benign breast conditions and previous chest radiations or modifiable including number of children , hormone therapy, birth control, breastfeeding, tobacco smoke, alcohol use, physical activity and overweight or obesity Certain Controversial risk factors have uncertain or unproven effects including diet, vitamin intake and night-shift works[8].

Age remained the strongest risk factor for breast cancer as previously, being older is the well-recognized factor in the causation of Ca breast[9]. Also women of higher socioeconomic status who usually

experience early age of menarche, late menopause and those conceiving in their 30s are at higher risk[10].Women above 40 with higher social class carry an elevated risk for breast cancer development[11]. There is 3% increase in risk of Ca breast with each 1-year delay in menopause while there is decrease in the risk of Ca breast by 5% and 10% with each 1-year delay in menarche or each additional birth, respectively[12].

There is a 30% reduced risk in women who have had children in comparison to nulliparous women .With each full-term pregnancy overall risk reduces by 7%. Similarly, a woman with single issue is at 15% higher risk than a woman with two issues. [13]. Radiation Exposure like X-rays, CT scan and women who had been treated with radiation to the chest for a childhood cancer, also have a higher risk of Ca breast[14]. Breastfeeding and its longer duration is a protective factor for Ca breast [15]. Risk of Ca breast increases due to the use of oral contraceptives (OC) pills but the risk is not significant .[16] Women taking Hormone Replacement therapy(HRT) have 66% higher risk in comparison with the non-users.[17]

Mutations of *BRCA1* and *BRCA2gene* are responsible for inherited susceptibility to Ca breast in about a quarter of all cases.[7, 18.] Risk is about double with family history of Ca breast in first-degree relatives and it increases if the diagnosis of the disease occurs below 50 years of age[19]. Overweight and Physical activity are determined by high body mass index (BMI). More active women are at 15-25% decreased risk as compared to the least active women[20]. Sex hormones, adipokines, adiposity, insulin resistance, and chronic inflammation are few interrelated biologic pathways. There should be at least 150 minutes of physical activity per week as per recommendations[21].

Alcohol Consumption in west is an increased risk of breast cancer. In UK, more than 6% breast cancers are alcohol-linked due to higher level of sex hormones in the blood stream[22]. Modern studies prove that women who started smoking before delivering the first baby or before the age of 20 have higher risk of Ca breast[23]. Smokers have 10- 20% increased risk than non-smokers. Women who have had some types of benign (non-cancerous) breast lumps are more likely to develop cancer later on.[20] Sleep routine and working in the night shifts also influences the incidence of breast cancer adversely. By IARC, Night-time shift is classified as carcinogenic to humans. In the UK, more than 4% Ca breast are associated with shift workers[24].

In Asia, striking difference from rest of the world is not only rising incidence and mortality Ca breast but the peak age for Ca breast is younger between 40 and 50 years. Peak age in the Western countries is between 60 and 70 years.[25]

According to the World Health Organization, incidence rates in developing countries will rise because of increasing life expectancy, growing urbanization and greater adoption of Western lifestyles[26]. Most common cancer in Eastern Mediterranean countries is Ca Breast where 76% Iranian women are suffering from breast cancer [27] In Chinese women, Breast cancer is the sixth leading cause of cancer-related death that accounted for 12.2% of global cases and 9.6% of related deaths.[28]

. In Asia, Pakistan has the highest rate of Ca breast. At some stage of life, 1 in 9 Pakistani women has become the patient of breast cancer. Pakistan is a developing country, it is creating severe financial and social problems for families due to poor infrastructure .There is a need to take prompt steps for prevention and early detection of disease to reduce the morbidity and mortality related to Ca breast.

Material and Methodology

A total of seventy-five female patients were included in this quantitative descriptive cross-sectional study .Patients presenting in surgical Out Patient Department or already admitted in surgical ward for treatment at Abbas Institute of Medical Sciences (AIMS) Muzaffarabad Azad Jammu & Kashmir were included. Duration of study was from July 2020 to June 2021. All these female patients gave consent to be part of this study, aged between 25 to 80 years, were already diagnosed through fine needle aspiration cytology or tissue biopsy. Male patients with Ca breast, patients with benign breast lumps, age above 80 and below 25 years, those who refused to consent, were excluded. Approval from Ethical Review Committee of hospital was taken. Sampling technique used was Convenient sampling. Detailed history and examination was done for each individual patient by surgical team members and data entered on the predesigned observational Questionnaire designed by researcher. Relevant documents were collected.

Patients were asked about their ages, genetic factors, marital status, family history, age at the time of first child birth, address, past history of benign breast conditions, previous chest radiations, number of children, birth control, hormone therapy, breastfeeding and duration of breast feeding, tobacco smoke, alcohol use physical activity, diet and night-shift works along with their professions. Also, their

BMI calculated and recorded. Age of patients was further divided into three groups of young (18-35 years), middle (36-55 years) and old (56-85years) age groups. Socio-economic groups were classified as low, middle and high classes. Diet was classified as high fat diet, balanced diet and vegetable diet only. Physical activity was divided as low, moderate and vigorous activity. Variables were identified. Data was entered and analyzed by using SPSS Version 25. Frequencies and percentages were recorded. Data was represented by designing tables.

Results

In our study, 75 female patients were in the age group of 25-80 years. Out of these, 8 patients were in age group of 25-35 years, 35 in 36-55 while 32 in 56-80. 71 patients were married. Average age at the time of first child birth was 25 years. Five cases were nulliparous. 6 patients had family history of Ca breast among first degree relatives. 29/ 32 females in older age group (56-80y) breastfed up to 2 years while younger females (25-55y) tend to breastfed only for less than 6 months. BMI showed 12 obese, 26 overweight, 20 normal and 17 underweight females. Seventeen females had 1-3 children, 30 females had 3-5 while 19 females had 6 or more children. Average age at menarche and menopause was 11 and 52 years respectively. Only 8 females have used oral contraceptive pills. None of the patients had history of benign breast lumps, radiation exposure, hormone replacement therapy, tobacco smoking or alcohol intake. 42 females described low Physical activity, 33 moderate and none vigorous activity. Among socio-economic groups there were 26, 27 and 22 cases from each low, middle and high classes respectively. Among dietary habits, females using high fat diet, balanced diet and only vegetable diet were 22, 23 and 30 respectively. Out of 15, 5 working women were having history of night - shift work mostly related to medical profession. (Table 1&2).

Table No-1: Risk Factors with Further Division

Risk Factors	Total Number (n)	Percentage (%)
1. Age		
(20-35) years	8	11
(36-55) years	35	47
(56-80) years	32	43
2. Total Number of Children		
(1-3)	17	23
(4-5)	30	40
(6 or more)	19	25
3. Physical Activity		
Low	42	56
Moderate	33	44
Vigorous	0	0
4. Basal Metabolic Rate (BMI)		
Obese	12	16
Overweight	26	35
Normal	20	27
Underweight	17	23
5. Socio-economic groups		
High class	26	35
Middle class	27	36
Low class	22	29
6. Dietary Habits		
High Fat	22	29
Balanced	23	31
Vegetarian	30	40

Table 2. Percentages of Different Risk Factors

Risk Factors	Total Number (n)	Percentages (%)
Married	71	95
Unmarried	4	5
Family History	6	8
Nulliparous	5	7
Breast Feeding For 2 Years	32	43
Breast Feeding For 6 Month	34	45
Average AGE OF MENARCHE	11Y	
Average AGE OF MENOPAUSE	52Y	
Average AGE AT FIRST CHILD BIRTH	25Y	
Working Women	15	20
Night-Shift	5	7
Oral Contraceptive Pills	8	11

Discussion

Ca breast is the most common malignancy among females all over the world. Due to lifestyle changes and urbanization, the incidence of Ca breast is persistently being rise.[29]

In our study, most of cases of Ca breast presented in middle age group from 36-55 years that is comparable with another study held in Karachi Pakistan. According to them, cases of Ca breast were diagnosed in younger women, aged 30–34 years; also the incidence of Ca breast will further increase up to 130.6% by 2025 as compared to 2015[30]. While these results are not matching to the figures described in studies in past times and in studies from western

countries where higher incidence of Ca breast is described in older ages[31]. This age shift might be the cause of the early age of menarche in Asia, prevailing trends of less frequent and short duration of breast feeding due to wrong concepts of modernity and rising rates of literacy resulting in working mothers who are short of time and manage this shortage of time with bottle feeding. It is also due to lack of awareness about the benefits of breast feeding, prevailing trends of smaller number of children due to low economy and fear of shortage of quality time given to children, due to unhealthy increasing BMI with rising obesity mainly because of sedentary life style and less than required physical activity as most women are not aware of significant role of exercise in life.

Both marriage and parity are encouraged socially as well as religiously in Muslim countries like Pakistan so most of women in our study were married (95%) and multiparous (87%). These results are comparable to other studies where total of 98.8% women participated in study were married and 90% women were multiparous.[32] Only five (7 %) women were nulliparous while nulliparity described in other studies is up to 10% and it is even more 16.2% in a study carried out at Civil Hospital, Karachi.[33]

Our study showed that the average age at first child birth is 25 years, while in another study the first pregnancy after 20 years of age was in 41% women.[34] Also, in our study, average age at first menarche remained less than 11 years acting as a contributing risk factor for development of Ca breast as prolonged exposure to hormones led to development of Ca breast in these women while in another study, only 19% women experienced their first menstrual cycle at the age less than 11 years.[34]

One of the contributing factors appeared to be inadequate breast feeding. Total percentage of breast feeding was 77.5% in study, while breast feeding lacks in 21.9% women in another study. Only 8 women used oral contraceptive pills in their life while their use remained in the life of 18.8% and 10.5% women in two different studies. [35, 36]

Smoking, alcohol, hormone replacement therapy, radiation exposure, benign breast lumps, early menopause were absent in 100% of our cases, in another study HRT was absent in 100%[35]. Another study reported smoking only (4.7%), use of hormone replacement therapy only (4.7%) and radiation only (0.96%).[38] In our study diet is not a major contributor rendering it an uncertain factor in the development of Ca breast while dietary intake of high fat was documented in 40% women and 15.2 % women in two studies.[36, 37]

Both the BMI and Exercise are included in modifiable contributing factors. Sedentary life style, a dilemma of this era prevailing all over the world and contributing to the development of Ca breast. A case–control study concludes that Waist size and Waist to hip ratio are the major risk factors for Ca breast.[38]. While another study showed frequency of Ca breast (28%) in less active, (68%) in moderately active and only (4%) in more active[5]. Also, in a study an average risk decrease of 25-30% was found when evidence for a risk reduction was found in 76% among 62 studies in this review. In this study, women with normal BMI, vigorous activity, recreational activity and lifetime or later life activity were found to be the protective factors.[39]

In other studies conducted in Pakistan, family history of breast cancer was only 17.5% and 9.5% respectively[32,33]. This shows that genetic predisposition is not an established risk factor but associated family history of Ca Breast is patchy in different parts of the world.

Night-shift work is also a factor contributing to the development of Ca breast .Out of 20%working females, 7% women were found to be working in night shifts. Positive statistical relationship between night work and breast cancer risk was found in the systematic review [40]. A study included 142 published articles showing that in women who have been working for more than 20 years, results in an increased moderate risk of developing breast cancer. This is because the level of melatonin reduces in artificial light of night leading to an increase in reproductive hormones such as estrogen thus causing hormone-sensitive breast tumors. Factors in one region of the world may not be the contributing factor in other regions so risk factors of Ca Breast show a great diversity that leads to the consideration of different health policies in different regions with special interest including screening programs, awareness programs, and education programs, dietary advises, lifestyle changes and health care policy.

Conclusions

We concluded that trends for age as contributing factor are being changed from old to younger age. Physical Activities have inverse relation with the frequency of Ca breast. Obesity and overweight have direct relation with frequency of Ca breast. Longer breastfeeding for whole or more than 2 years is

protective factor. Multiparty as well as early age at first child birth protect against Ca Breast. Diseases that could be prevented by decreased exposure to modifiable risk factors can help to recognize areas and population where preventative strategies need to be dedicated.

Competing interests

The authors of the study have no conflict of interest.

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