

# Assessing Breast Cancer Incidence and Risk Factors from 2005-2015 in Pakistan

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**ABSTRACT:**

Carcinoma of the breast is the commonest malignancy in females all over the world and second leading cause of death due to cancer among females. In Pakistan, it is more common at a young age contrary to the west where it is more common after 60 years. Approximately one in every nine Pakistani women is likely to suffer from breast cancer showing an incidence rate of 50/100,000. Incidence of breast cancer is growing at an alarming rate in Pakistan. The main causative elements remain unknown yet primary risk factors identified are sex, age, parity, genetics, lack of child bearing, breast feeding, higher hormonal levels individual lifestyle etc. Appropriate planning, prevention and cancer control measures for determination of breast cancer incidence and risk factors must be undertaken.

**Keywords:** Breast cancer, Incidence, Environmental factors, Genetic factors, Pakistan.

**INTRODUCTION:**

Breast cancer is a tumor originating from breast tissue, most commonly from the inner lining of milk ducts or the lobules supplying ducts with milk. Breast cancer is differentiated into different types on basis of staging, genetic makeup and aggressiveness. However the exact causative agents remain unknown yet primary risk factors identified are sex, age, genetics, lack of child bearing, breast feeding, higher hormonal levels and individual lifestyle.<sup>1</sup> Carcinoma of the breast is the commonest malignancy in females all over the world and second leading cause of death due to cancer among females. In Pakistan, it is more common at a young age contrary to the west where it is more common after 60 years.<sup>2</sup> All women regardless of their racial or ethnic origin or heritage are at risk of developing breast cancer. Approximately one in every nine Pakistani women is likely to suffer from breast cancer. This is one of the highest incidence rates in Asia. Pakistani women show an incidence rate of 50/100,000 and in the neighboring country India, with similar socio-cultural background the incidence rate is 19/100,000.<sup>3</sup> A pattern of rapid premenopausal increase in breast cancer is also seen in Pakistan, but breast cancer risk plateaus after the age

of 45 years.<sup>4</sup> The most pragmatic solution to early detection lies in breast cancer education of women.

**METHODOLOGY:**

Using the keywords, breast cancer, risk factor, incidence and Pakistan on search engines google scholar and PakMedinet.com from 2005-2015, a total of 30 studies were found related to breast cancer incidence in Pakistan. Refining the search by using phrases breast cancer epidemiology and incidence of breast cancer in Pakistan curtailed the available number of articles to seven that is 2005(0), 2006(2), 2007(1), 2008(1), 2009(0), 2010(0), 2011(0), 2012(0), 2013(2), 2014(1) and 2015(1).

**LITERATURE REVIEW:**

GLOBOCAN is a comprehensive cancer surveillance database managed by the International Association of Cancer Registries (IARC), whose aim is to calculate incidence and cancer mortality worldwide and prevalence from major type of cancers for 184 countries of the world.<sup>5</sup> According to this worldwide project GLOBOCAN 2012 study, since 2008 breast cancer incidence has increased by more than 20%, while mortality has increased by 14%. Generally, trends show that in developing countries going through rapid societal and economic changes, the shift towards lifestyles typical of industrialized countries is leading to rising burden of cancers associated with reproductive, dietary, and hormonal risk factors. Incidence has been increasing in most regions of the world, but there are huge inequalities between rich and poor countries. Incidence rates remain highest in more developed regions, but mortality is relatively much higher in less developed countries due to a lack of early detection and access to treatment facilities. For example, in Western Europe, breast cancer incidence has reached more than 90 new cases per 100 000 women annually, compared with 30 per 100 000 in eastern Africa. IARC WHO has estimated incidence, mortality and prevalence of breast cancer worldwide in the year 2012 (Table 1).

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Table: 1  
Breast cancer estimated incidence, mortality and prevalence worldwide in 2012 (IARC WHO)<sup>6</sup>

| Estimated numbers (thousands)        | Cases | Deaths | 5-year prev. |
|--------------------------------------|-------|--------|--------------|
| World                                | 1671  | 522    | 6232         |
| More developed regions               | 788   | 198    | 3201         |
| Less developed regions               | 883   | 324    | 3032         |
| WHO Africa region (AFRO)             | 100   | 49     | 318          |
| WHO Americas region (PAHO)           | 408   | 92     | 1618         |
| WHO East Mediterranean region (EMRO) | 99    | 42     | 348          |
| WHO Europe region (EURO)             | 494   | 143    | 1936         |
| WHO South-East Asia region (SEARO)   | 240   | 110    | 735          |
| WHO Western Pacific region (WPRO)    | 330   | 86     | 1276         |
| IARC membership (24 countries)       | 935   | 257    | 3591         |
| United States of America             | 233   | 44     | 971          |
| China                                | 187   | 48     | 697          |
| India                                | 145   | 70     | 397          |
| European Union (EU-28)               | 362   | 92     | 1444         |

In 2006 a study was conducted by the Department of Community Health Sciences, The Aga Khan University Karachi on Breast cancer risk factor knowledge among nurses in teaching hospitals of Karachi.<sup>7</sup> They used cross-sectional stratified random sampling with proportional allocation and interviewed a total of 609 registered

female nurses with the help of a structured questionnaire adapted from the Stager's Comprehensive Breast Cancer Knowledge Test.<sup>8</sup> Whereas Knowledge of breast cancer risk factors was categorized into good, fair and poor categories by Streiner's method.<sup>9</sup> (Table 2)

Table: 2  
Individual items and respective scores assessing knowledge of breast cancer risk factors with percentage of correct responses:

| Sr # | Items  | Correct Answer | Score | Correct Response % |
|------|--|----------------|-------|--------------------|
| 1    | Breast cancer is a communicable disease  | No             | 1     | 99.2               |
| 2    | The irritation of a tight bra can over time cause breast cancer  | No             | 1     | 59.4               |
| 3    | In some women being overweight increases the risk of developing breast cancer                              | Yes            | 1     | 27.6               |
| 4    | A woman who bears her first child after the age of 30 years is more likely to develop breast cancer*       | Yes            | 3     | 50.2               |
| 5    | Use of oral contraceptives increase a woman's risk of breast cancer  | Yes            | 1     | 49.6               |
| 6    | A hard blow to the breast may cause breast cancer later in life  | No             | 1     | 24.6               |
| 7    | Most breast lumps are cancerous  | No             | 1     | 73.7               |
| 8    | A woman, who has a first blood relative with breast cancer, is at higher risk of developing breast cancer* | Yes            | 3     | 57.8               |
| 9    | Breast feeding increases the chance of breast cancer   | No             | 1     | 96.4               |
| 10   | Breast cancer can be a result of a curse/evil eye*   | No             | 2     | 94.9               |
|      | Total  |                | 15    |                    |

\*Key items

This study was undertaken thinking that nurses are the main component for disseminating breast cancer information to the women.<sup>10</sup> They identified whether selected factors among nurses were associated with their knowledge of breast cancer risk factors, so that relevant measures to improve knowledge of nurses could be implemented. It was found that thirty five percent of

nurses had good knowledge of risk factors. Graduates from private nursing schools, nurses who had cared for breast cancer patients, those having received a breast examination themselves or those who ever examined a patient's breast had good knowledge in comparison to others. Since only about one-third of the nurses had good knowledge about risk factors, they deduced that

there was a need to introduce breast cancer education in nursing schools apart from medical students particularly in the public sector. Thus continuing nursing education at the workplace can be of additional benefit apart from continuing medical education of doctors.<sup>7</sup> In 2006, Jamal worked in detail on 141 cases of diagnosed carcinoma (1992-2001), belonging to northern Pakistan. He concluded that 5.9% of these cases had carcinomas in both genders. A male to female ratio of 1:16 was observed. The age group between 50- 60 years was at higher risk. Comparison with their previous similar data showed highly significant increase in breast carcinoma cases in both sexes.<sup>11</sup>

In 2008, Zeb evaluated incidence of cancer in districts of Dir. by tracing the medical records of 1,105 patients registered at the Institute of Radiotherapy and Nuclear Medicine in Peshawar. Zeb concluded that the incidence of cancer was alarmingly increasing, with a mean incidence of 15.04 per 100,000 in 2000-2004. Of the 1,105 patients, 62% were male and 38% were female with affected age range of 41-60 in females.<sup>12</sup> In 2013, a mini review survey on epidemiology, major risk factors and genetic predisposition for Breast Cancer in the Pakistani population documented that the occurrence of breast cancer is related to genetic as well as cultural, environmental and life-style factors.<sup>13</sup> The mini review narrated that the initial data regarding breast cancer incidence was published by Karachi Cancer Registry in 2000, for population of the Karachi South district from 1995-1997. This data indicated incidence rate for all cancers in Karachi as 91.8 per 100,000 for males and 163.2 per 100,000 for females.<sup>14</sup> The review also mentioned the work conducted by Jamal and Zeb as previously mentioned in their years.

In 2013, another observational study was conducted from the period of 2013-2014. This study described the demographic and clinical features of females presenting with breast malignancies at the Shaikat Khanum Memorial Cancer Hospital and Research Center (SKMCH & RC), Lahore, Pakistan.<sup>15</sup> This observational study was done through a retrospective review of the medical records of the registered patients. Information was collated on variables recorded from January 2008 to December 2012 (5-years). The clinical features regarding breast cancer included were age at disease presentation, histology, tumor grade, stage of the disease, and hormone receptor status. Grade was classified according to the ICD-O-3 classification.<sup>16</sup> Stage was grouped using the American Joint Committee on Cancer staging schemes.<sup>17,18</sup> In this study, if any other family member had breast cancer, regardless of whether it was a first degree or a second-degree relative, family history of breast cancer was taken as being positive. According to this study 4366 female breast malignancies were recorded. Nearly 80.4% of the patients belonged to Punjab. Mean age at presentation was  $48.6 \pm 12.2$  years, at menarche was  $13.2 \pm 1.2$  years, and at first childbirth was  $23.7 \pm 4.8$  years. Mean Body Mass Index (BMI) was  $29.0 \pm 5.7$  kg/m<sup>2</sup>. In 60.1%, history of breast feeding was positive. In 55.7%, there was no history of use of

any Oral Contraceptive Pills (OCP)/Hormone Replacement Therapy (HRT). Nearly 42.7% were postmenopausal, 85.2% had infiltrating ductal carcinoma, 49.6% had grade 3 tumor, 60.7% had stage II disease, and 37.3% were Estrogen Receptor (ER)/Progesterone Receptor (PR) positive, Human Epidermal Growth Factor Receptor 2 (HER2) negative. Family history of breast cancer was positive in 16.9% of the cases. This is not representative of the population of the country but this large cohort of breast cancer patients from SKMCH and RC represents one of the largest cohorts of breast cancer patients from any single institution in Pakistan. Country wise Age-Standardized Incidence Rates (ASIR) showed that in Iran, the mean age has been reported to be around 51.3 years,<sup>19</sup> whereas, in India, it has been stated to be about 51 years.<sup>20</sup> The mean presenting age in American studies has been documented to be around 54.2 years (African-Americans) and 60.4 years (Caucasians).<sup>21</sup> Additionally, in the United Kingdom, one study has reported the mean age for women to be around 64 years, while in Australia, it has been confirmed to be 60.7 years.<sup>22</sup> Thus it can be concluded that the mean presenting age in this study was found to be lower than what has been recorded in the west.

In 2014,<sup>23</sup> another researcher evaluated the data of breast cancer from various hospitals in Karachi such as Jinnah Hospital, KIRAN (Karachi Institute of Radiotherapy and Nuclear Medicine), and Civil hospital. The data was available for the years 2004-2011. It was found that a total of 5331 new cases of female breast cancer were registered during this period. They analyzed the data in 5-year age groups 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75+. Nonparametric smoothing were used to obtain age-specific incidence curves, and then the curves were decomposed using principal components analysis to fit FTS (functional time series) model<sup>24,25</sup> followed by exponential smoothing state space models to estimate the forecasts of incidence curve and construct prediction intervals. Analysis on the result showed that the breast cancer incidence rates in Karachi increased with age for all available years. The rates increased monotonically and were relatively sharp with the age from 15 years to 50 years and then they showed variability after the age of 50 years. 10-year forecasts for the female breast cancer incidence rates in Karachi showed that the future rates are expected to remain stable for the age-groups 15-50 years, but they will increase for the females of 50-years and over. Hence in future, the newly diagnosed breast cancer cases in the older women in Karachi are expected to increase.<sup>23</sup>

In 2015, The Pakistan Atomic Energy Commission Cancer Registry (PAECCR) program made the availability of cancer incidence database. Cancer incidence data from nuclear medicine and oncology institutes were gathered and presented for the last 30 years 1984-2014. The data analysis concerning occurrence, trends of common cancers in male and female patients, stage-wise distribution, and mortality/follow-up cases was

also incorporated for the last 10 years (2004-2014). It was found that the incidence of breast cancer was 46.7%. Overall cancer incidence of the thirty years demonstrated that head and neck and breast cancers in males and in females accounts for most of the cases in Lahore, Punjab.<sup>26</sup> This data from a major population of Punjab province could be helpful for implementation of appropriate planning, prevention and cancer control measures and for determination of risk factors within the country. In 2015, another study<sup>27</sup> aimed at finding out the association of various risk factors with breast cancer. They have documented that breast cancer is a health problem with increasing incidence and identification of the risk factors may help in chalking out the future health policies for the prevention of breast cancer. Age was considered as one of the major risk factors for breast cancer with advancing age amplifying the risk of breast cancer<sup>28</sup>. After every ten years the risk for breast cancer doubles until menopause when it declines<sup>29</sup>. Breast cancer patients in this study were comparatively young. The most affected age group at diagnosis for cancer of the breast was 36 to 45 years with median age 43 years which is in accordance with studies carried out in other Asian subgroups i.e., Iranian<sup>30</sup> and Indians<sup>31</sup>. This study data showed that the breast cancer patients and the controls did not differ in age at menarche and menopausal status. Early menarche was considered a risk factor that was not statistically significant in Asian studies.<sup>32, 33</sup> This type of result for Asian studies may be due to the recall bias as most women are illiterate and poor who do not remember their age at menarche. Gajalakshmi<sup>34</sup> and Pakseresht<sup>35</sup> carried out studies on Indians and found no relationship between age at menarche and breast cancer risk. A study on Pakistani females by Gilani<sup>36</sup> demonstrated that early age menarche and menopause at late age are protective. Women with natural menopause at age more than 50 years compared to those having menopause at less than 50 years are at increased risk of developing breast cancer. Ewertz and Duffy<sup>37</sup> also demonstrated an increased risk for women with late menopause. However early age at menopause has also been associated with breast cancer risk<sup>38</sup>. An increase in risk of breast cancer is associated with women who use oral contraceptives<sup>28</sup>. Pervaiz<sup>39</sup> also documented in another Pakistani study that oral contraceptive use is significantly associated with breast cancer. This study is in agreement with the studies mentioned above and it shows that nulliparous women have more risk of breast cancer as compared to parous women. Earlier local studies mentioned above have established conflicting results contradictory to well-established protective effect of parity concerning breast cancer risk and parity.<sup>36, 40</sup> Our females have more children than do western women, and this is one of the major causes of somewhat low incidence of breast cancer in our women as compared to women in west.

#### CONCLUSION:

Very few studies have been documented as per available on the specified search engines from 2005-2015 regarding

assessment of breast cancer incidence and its risk factors among Pakistani population. Assessment of literature from 2005-2015 showed that breast cancer incidence rates in Karachi is increasing with age for all available years but overall cancer incidence of the last thirty years demonstrated that breast cancer in females accounted for most of the cases in Lahore, Punjab. Appropriate planning, prevention and cancer control measures for determination of breast cancer incidence and risk factors must be undertaken.

It is suggested that the awareness of breast cancer among people should be spread through electronic media, health campaigns, seminars and symposiums. Females should be counseled regarding self-examination of breast, especially all females attending gynecology out-patient departments must be provided awareness regarding breast cancer. Moreover they must be given advice for urgent access to doctor in case they notice any signs of malignancy.

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