Review

Breast cancer in Saudi Arabia and its possible risk factors

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ABSTRACT

Breast cancer is the commonest females' cancer and the leading cause of cancer death worldwide. There is a substantial rise in the incidence of breast cancer in Saudi Arabia in recent years, particularly among younger females compared to affected females' in western countries. There have been several factors implicated to the etiology of breast cancer, which differ for different geographical locations. The aim of this review was to discuss the most important etiological factors available in the literature with its possible association in the Kingdom of Saudi Araba (KSA). A number of etiological factors have been involved in the etiology of breast cancer. These factors act independently or together to cause breast cancer. The etiological factors discussed in this review include: age factors, age at first birth, early menarche, gender, dietary factors, tobacco smoking, alcohol consumption, low-dose irradiation, obesity, physical activity, lactation, hormonal factors, hormone replacement therapy, steroid hormone receptors, mammographic density, benign breast disease, and genetic factors. This in addition to the role of Her-2/Neu Antigen and triple negative breast cancer (Tnbc). These factors were discussed in view of the existing literature in general and in KSA in particular, in association with the future scope of the prospective research orientations. Such review can provide necessary information to identify individuals at high risk for prevention, early detection, identifying gaps for future research, and appropriate subsequent management, as well as, caregivers' coordination. The ultimate benefit will be a future dramatic decline in the morbidity and mortality of the breast cancer in KSA.

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1. Introduction

Breast cancer is the second most prevalent cancer worldwide and, by far, the utmost common females' cancer with about 1.67 million new cancer cases (25% of all cancers) diagnosed in 2012 [1]. Incidence rates of breast cancer vary almost four-fold across the world's different regions [2]. Prevention of new cancer cases from beginning, researchers investigate the risk factors and protective factors. Some risk factors for breast cancer can be escaped, but many are un-avoidable.

Several studies have well-established the relationship between breast cancer and etiological factors including; age factors [3], age at first birth [4], early menarche [5], gender [6], dietary factors [7], tobacco smoking [8], alcohol consumption [9], low-dose irradiation [10], obesity [11], physical activity, lactation [4], hormonal factors, hormone replacement therapy [12], steroid hormone receptors [13], mammographic density [14], benign breast disease [15], and genetic factors [16]. This in addition to the role of Her-2/Neu Antigen [17] and triple negative breast cancer (Tnbc) [18]. However, it is still uncertain which of the risk factors has any chief role over others, in the carcinogenesis of the breast cancer. Here, we reviewed linkage studies that have established evidenced based breast cancer risk factors and what was already published in that regard from KSA. Our stress was on the strengths of a particular risk factors and its potential to yield substantially contribution to the etiology of breast cancer in KSA.

2. Epidemiology

Females' breast cancer incidence rates are tremendously increasing in Arab countries in recent years, and a sensible number of cases are still being diagnosed at advanced stages of the disease [19]. An epidemiological records associated with breast cancer cases diagnosed from 2001 to 2008 among Saudi women indicated that, 6922 females with breast cancer were registered in the Saudi Cancer Registry. The highest prevalence was found in eastern region of KSA, representing 26.6 per 100,000 women followed by Riyadh, and Makkah, constituting 20.5, 19.4, respectively [20].

In 2009 breast cancer accounting for 25.1% of all newly diagnosed female cancers and the median age at diagnosis was 48 years. The age-standardized incidence rate (ASR) for females was 19.2/100,000 and the median age at diagnosis was 47 years. Breast cancer constituted 27.4% of all newly diagnosed female cancers in the year 2010. The average age at the diagnosis was 48; weighted average was 49.8, and range 43–52. The ASR was 24.9/100,000 in 2010 representing an increase in 2010 compared to 2009.

The review described the cases of breast cancer among Saudi females during the period from January 1990 to December 2014, indicated that the number of cases is ascendingly increasing. In 2008 there were 1152 cases of females breast cancer compared to 1308, and 1473 in 2009 and 2010 in this order. The proportion distributions of breast cancer was 40.2, 38.7 and 41.2 in 2008, 2009 and 2010, respectively with minor changes of 33.5, 33.9, and 36.1 at the age group 45–59 [21].

2.1. Gender

Globally, female breast cancer incidence have been hugely described compared to slightly male breast cancer incidence rates. The highest male's incidence rate was reported from Israel at 1.24 per 100,000 man-years, and the highest female's incidence rate was reported from the United States at 90.7 per 100,000 woman-years [22]. In study from KSA that reviewed 1005 breast cancer cases, 2.3% were found to be males [23]. Another study investigated 87 specimens obtained from males, (90.6%) were benign and 9 (9.4%) were malignant [24]. So the prevalence of male's breast cancer in KSA is relatively lower compared to international figures.

2.2. Age factors

It was well established that the chance of cancer occurrence increase with the increase with age in general [25], and breast cancer in particular [26]. The prevalence of multiple cancer risk factors is high at midlife and incidence rates start to increase for various cancer types [25]. The alarm in this perspective is the increasing incidence of cancer among younger age groups. In KSA, there is a significant increase in the incidence of breast cancer, which happens at an earlier age than in western countries [27]. The average age at the diagnosis of breast cancer was 48 years; weighted average was 49.8, and range 43–52 [21]. Several factors may be hypothesized for the elevated breast cancer among younger Saudi women including; prolonged light exposure at nighttime, obesity, reduced physical activities, increased awareness programs with availability of early detection.

Habitual night sleep shortage, which associated with the lack of melatonin are prevalent in KSA [28]. Melatonin is a small, highly conserved indole with diverse utilities comprise; circadian rhythm regulation, sleep, and cancer inhibition. Melatonin has the ability to detoxification of the free radicals, is a major function for protecting critical molecules (such as DNA) from the destructive effects of oxidative stress, thereby preventing cancer. A recent study found that melatonin is effective against breast cancer stem cells inhibiting the cell viability through octamer-binding transcription factor 4 (OCT 4) also known as POU5F1 gene. Consequently, melatonin has a high potential to be used as a treatment for breast cancer [29].

2.3. Age at first birth

It was strongly proven that women having their first birth before the age of 18 years old have only about one-third the breast cancer risk of those whose first birth after the age of 35 years. These facts explains the earlier detected reverse link between overall parity and breast cancer risk, since women having their first birth earlier tend to become eventually of high parity. The influence of age at first birth in reducing breast cancer risk involves testing of varieties of etiological hypotheses [30].

There is a lack of literature from KSA regarding the relationship between age at first birth and risk of breast cancer. In study included 786 Saudi women, the mean age at the birth of the first