RESEARCH ARTICLE

Age Distribution of Breast Cancer from a Thailand Population-Based Cancer Registry

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Abstract

Background: Breast cancer is a common cancer worldwide. With the establishment of Thailand's population-based cancer registry and availability of complete data from 2002-2011, it is of interest to investigate the epidemiologic and clinic-pathological profiles of breast cancer based on the population-based registry data. Methods: The data of all breast cancer patients in the registry for the period of 2002-2011 were included. All medical records of the patients diagnosed from documents of National Cancer Registry of Thailand were retrieved and the following information abstracted: age, clinical characteristics, and histological variables. Thailand census data for the period of 2002-2011 were used to provide the general population's statistics on age, gender, and other related demographic factors. Results: Over the 10 year-period, 7,711 breast cancer cases were included. The disease incidence under age 40 years was relatively low (4.13/10^5) while the incidence in the age groups 40 and older was very high (39.2/10^5). The vast majority of breast cancer cases (88.8%) were diagnosed by histology as primary lesions in the breast. The most common of patients with breast cancer (36.4%) had regional lymph node involvement and the most common of histopathology diagnosed in patients (84.2%) was an infiltrating duct carcinoma. Conclusions: This study showed a high incidence of breast cancer in older subjects, and high rate of breast cancer in Thailand. Future studies should explore clinical and molecular disease patterns.

Keywords: Breast cancer - incidence rates - age distribution - Thailand

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Introduction

Breast cancer is a common cancer worldwide. In 2008, Globocan estimated that there were 1.3 million new cases diagnosed (Ferlay et al., 2010). With a combined approximately 458,000 deaths worldwide, breast cancer represents the fifth cause of death from cancer overall. There is a wide variability in the incidence rates of breast cancer, with most incidence and mortality cases is still occurring in women in both developing and in developed countries (Ferlay et al., 2010). Incidence rates of breast cancer range from 8/10^5 in Mongolia to 99.7/10^5 in France (Ferlay et al., 2010). Rates for the United States are 76/10^5 (Ferlay et al., 2010). Westernization is often associated with higher incidence rates of breast cancer. Diet and lifestyle factors are implicated risk factors for the breast cancer. Low fiber diet, high intake of caloric foods, physical inactivity, obesity, and smoking can increase the risk for developing breast cancer (Pierce et al., 2007; Hauner et al., 2011; Ligibel et al., 2011; Luo et al., 2011). While some developing countries historically have a low rate of breast cancer, the transition to a more Western diet has been associated with increasing rates of this disease (Stoll, 1998). With the establishment of Thailand's only population-based cancer registry and availability of complete data from 2002-2011, it is interesting to investigate the epidemiological and clinico-pathological profiles of breast cancer based on the population-based registry data.

Materials and Methods

Thailand is a country located at the centre of the Indochina peninsula in Southeast Asia with around 64 million people (National Statistical Office of Thailand, 2012). The Thailand population-based cancer registry was founded in 1968 (National Cancer Institute, 2013). It actively collects information on all cancer cases in the all province from several hospitals. In addition, information on cancer patients is collected from annual health check up. The registry receives support and training from the National Cancer Institute (NCI) in Thailand. The arrangement, quality, and publishing of data are periodically conducted by Department of Medical Services, Ministry of Public Health, Thailand (National Cancer Institute, 2013). All breast cancers diagnosed from 2002 to 2011 were included in the study. The following information including age, gender, clinico-pathological

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variables were extracted and entered to spreadsheets. Forecasting Bureau, National Statistical Office data were used to provide the general population's statistics on age and gender (National Statistical Office of Thailand, 2012). The Excel Spreadsheet Program used to describe data in frequency distributions and proportions of variables.

Results

The results of the study provided a comprehensive profile of breast cancer in this population. The profile is highlight on the epidemiological, clinico-pathological of breast cancer in this population. The results also demonstrated the breast cancer incidence of the population-based registry of Thailand. A total of 7,711 breast cancer cases were included in registry from 2002-2011. The summary characteristics for the breast cancer patients and ten years trend were showed in Table 1. A majority of the cases were females (99.3%), giving a male:female ratio of 0.007:1. The year that breast cancer most commonly diagnosed was during 2004. The clinico-pathological characteristics of the breast cancer patients included in the study were illustrated in Table 2. Age distribution of cases showed that 14.6% of all cases were under the age of 40 and 85.4% of cases were age of 40 and older. Patients had been diagnosed with 88.8 percent of cases having primary lesions in the breast. In 2009, there was no basis of diagnosis information. The majority of tumor extensions was regional lymph nodes (36.4% of cases) followed by localized (29.7% of cases). The vast majority of patients present with infiltrating duct carcinoma histopathological type of tumors (84.2%) other carcinomas were present in a small number of cases (15.8%). Table 3 showed breast cancer incidence rates for both male and female patients, which increased the risk of developing breast cancer when older age especially the age of 40 years and older. In among age group of patients, older patients were significantly associated with increased risk of developing breast cancer as shown in Figure 1.

Table 1. Characteristics of Study Population and Breast Cancer Patterns in Thailand (2002-2011)

Variable		n	(%)
Total cases		7711	100
Gender:	Male	57	0.7
	Female	7654	99.3
Year of diagnosis:	2002	809	10.5
	2003	633	8.2
	2004	890	11.5
	2005	686	8.9
	2006	749	9.7
	2007	793	10.3
	2008	801	10.4
	2009	768	10.0
	2010	821	10.6
	2011	761	9.9

Table 2. Age and Clinical Characteristics of Study Population in Thailand (2002-2011)

Variable		n	(%)
Age (yr)	<40	1126	14.6
	≥40	6573	85.4
Basis of diagnosis*	Histology of Primary	6154	88.8
	Cytology or Hematology	353	5.1
	History & Physical exam	269	3.8
	Histology of Mestastatic	103	1.4
	Endoscopy & Radiology	50	0.7
	Others	13	0.2
Type of Extension	In situ	3	0.1
	Localized	2294	29.7
	Direct extension	1021	13.2
	Regional lymph nodes	2809	36.4
	Distant metastasis	684	8.9
	Not applicable	4	0.1
	Not known	896	11.6
Histopathology	Infiltrating duct carcinoma	6494	84.2
	Other carcinoma	1217	15.8

*Basis of diagnosis cannot be obtained in year 2009

Table 3. Incidence Rates (per 100,000) for Breast Cancer Patients in Thailand (2002-2011)

		Male	Female
Age (year)	0 - 4	0	0
	5 - 10	0	0
	10 - 14	0	0
	15 - 19	0	0.01
	20 - 24	0	0.07
	25 - 29	0	0.37
	30 - 34	0.01	1.13
	35 - 39	0.02	2.52
	40 - 44	0	4.47
	45 - 49	0.05	6.45
	50 - 54	0.04	6.67
	55 - 59	0.05	6.65
	60 - 64	0.07	6.16
	65 - 69	0.08	4.74
	70 - 74	0.05	3.71
	≥75	0.07	2.23

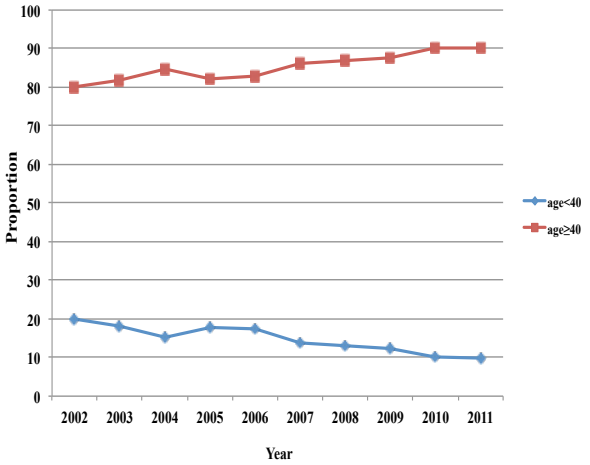

Figure 1. The Proportion of Breast Cancer in Different Age Groups

Discussion

Analysis of the 7,711 cases of breast cancer collected from the document of Thailand population-based cancer registry during 2002-2011 revealed a relatively high incidence of breast cancer in older patients age of 40 years

and older and significantly lower incidence in patients under age of 40 years. The high rates of breast cancer in this population of Thailand were reported for the short period of 1989-2000 (Sriplung et al., 2005; 2006). It is unclear if the high young-onset rate is due to adoption of a more "westernized" lifestyle and diet, particularly in the younger generation or due to intense environmental exposures with more susceptibility among the younger generations. The proportion of breast cancer increased in the patients age group of 40 and older perhaps due to the inaccurate or under reported nature of the population-based studies from hospital registry. Furthermore, the changing lifestyle patterns with westernization or the higher rate of older population leading to higher proportions of this disease in Thailand. For all reasons, breast cancers will become increasingly important in the next decade.

Most of patients diagnosed with breast cancer having primary lesions in the breast, this may suggest that some factors of individual may predispose to breast cancer. Several recent studies suggested the possible of gene polymorphism (Bielinska et al., 2013; Liu et al., 2013; Ramalhinho et al., 2013) or JAK2/STAT3 pathway alteration (Teng et al., 2013) as the risk of breast cancer in population. In addition to genetic factors, there are a number of distinctive environmental that may contribute to the variable rates of incidence in this population. Not only Thailand is an agricultural country but also is going on as an industrialized country. A variety of working places both in industrial, agricultural and/or others service sectors, has been identified as having some evidence of higher risk of breast cancer (Peplonska et al., 2001). Several health hazards environment that are potential risk of cancer including occupational carcinogens that are potential to cancer risk such as non-ionizing radiation (Caplan et al., 2000) and polycyclic aromatic hydrocarbon (PAHs) (Petralia et al., 1999). A most resent study revealed that women who have lifetime occupation in an industrial setting may have higher risk to develop breast cancer (Ekpanyaskul et al., 2010). The higher incidence rate of breast cancer in Thailand was especially in central regions of the country that may suggest the differences in environmental exposures and/or variable access to medical care for breast cancer screening or diagnosis or may due to this region had the high population intensity (Sriplung et al., 2006). This study provided the population-based data from the Thailand population-based cancer registry and the large sample size gave an accurate picture of the patterns of breast cancer in Thailand. Weaknesses included inherent nature of population-based cancer registries of limited information for analysis of the association between age, others clinico-pathological factors and risk of breast cancer.

In conclusion, this study showed a relatively high incidence of breast cancer at age of 40 years and older with a significantly low incidence in the age group under 40 years in this population of Thailand. Future analytical studies should focus on understanding of the etiology and pathogenesis of the disease with extensive environmental exposures and possible genetic factors that may modulate the risk of breast cancer in this population.

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