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Escalating burden of breast cancer in southern Thailand: Analysis of 1990–2010 incidence and prediction of future trends

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ABSTRACT

Background: Thailand is undergoing an epidemiologic transition, with decreasing incidence of infectious diseases and increasing rates of chronic conditions, including cancer. Breast cancer has the highest incidence rates among females both in the southern region Thailand and throughout Thailand. However, there is a lack of research on the epidemiology of this and other cancers.
Methods: Here we use cancer incidence data from the Songkhla Cancer Registry to characterize and analyze the incidence of breast cancer in Southern Thailand. We use joinpoint analysis, age-period-cohort models and nordpred analysis to investigate the incidence of breast cancer in Southern Thailand from 1990 to 2010 and project future trends from 2010 to 2029.
Results: We found that age-adjusted breast cancer incidence rates in Southern Thailand increased by almost 300% from 1990 to 2010 going from 10.0 to 27.8 cases per 100,000 person-years. Both period and cohort effects played a role in shaping the increase in incidence. Three distinct incidence projection methods consistently suggested that incidence rates will continue to increase in the future with incidence for women age 50 and above increasing at a higher rate than for women below 50.
Conclusions: To date, this is the first study to examine Thai breast cancer incidence from a regional registry. This study provides a basis for future planning strategies in breast cancer prevention and to guide hypotheses for population-based epidemiologic research in Thailand.

1. Introduction

Thailand is undergoing an epidemiologic transition, with decreasing rates of mortality due to infectious diseases and increasing rates of chronic conditions, including cancer. Worldwide cancer incidence is projected to rise 70% by the year 2030, with the largest burden on low- and middle-income countries (LMICs) [1]. Breast cancer poses a particular problem over the next decades as LMICs are increasingly adopting characteristics of a Western lifestyle. There is a strong association between Western lifestyle factors, such as diet and parity, and the incidence of breast cancer [2–5]. Since mammographic screening is often not available in LMICs, accurate incidence predictions are crucial to target resources to prevent and control breast cancer.

Breast cancer incidence rates are increasing throughout Thailand [6]. From 1998 to 2000, the age-standardized incidence rate (ASR) was 20.5 cases and increased to 30.7 cases per 100,000 person-years in 2008 [1,7]. However, the epidemiologic basis of breast cancer in Thailand is not well characterized. The regions of Thailand vary dramatically in terms of population characteristics, risk factor exposures, and incidence rates [6]. Southern Thailand consists of a population of unique ethnic and cultural make-up. The Thai National Statistics office estimates that Muslims make up approximately 30% of the population of southern Thailand [8]. Muslims in the Songkhla province are nonetheless predominantly of Thai ethnicity. This results in a unique population since religiosity is known to be correlated with distinct lifestyle characteristics and potentially distinct risks for cancer and other diseases.

Registry data have been used in other LMICs to identify cancer trends, inform resource planning and guide hypotheses for population-based epidemiologic research [9–13]. A cancer registry was established in the Songkhla Province in 1989 to characterize

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the cancer incidence in southern Thailand. We investigated incidence rates of female breast cancer data from the Songkhla registry from 1990 to 2010 using joinpoint regression and age-period-cohort models. The goal of these analyses was to characterize, for the first time, the breast cancer incidence trends in the province by calendar year, birth-cohort and age of diagnosis and to project female breast cancer rates in southern Thailand to 2029 (Thai calendar: 2572), for all women and separated by pre and post-menopausal women. Each of the main regions of Thailand differ in their cancer incidence profiles and therefore, it is essential to analyze incidence rates by region [612]. This is the first study to utilize Thai cancer registry data in identifying relevant trends in a region-specific manner. Our analyses highlight the utility of carefully collected cancer surveillance data in LMICs, and identify opportunities for breast cancer prevention and future research.

2. Methods

2.1. Region

Songkhla, Thailand is a southern province occupying an area of 7393 km^2 on the eastern side of the Malaysian Peninsula (Fig. 1). Muslims make up approximately 30% of the population of southern

Fig. 1. Map of Thailand. Songkhla province is highlighted.