Chapter 37
Mapping Women's World:
GIS and the Case of Breast Cancer in the US

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ABSTRACT

Feminist geography and geographic information system(GIS) have been the most dynamic research areas over the last decade. Unfortunately, high breast cancer mortality rates have been reported in the northern part of the United states, with recent attention focused on the northern part of the United States. In this article, the authors investigate whether such a high rate of breast cancer is evenly spread in northern parts. The purpose of this article is to provide a more detailed analysis of the breast cancer distribution in the United States by comparing the spatial distribution of breast cancer cases against physical environmental factors using Geographic Information System (GIS). Further, it gives background information to the GIS and its applications in health-related research.

INTRODUCTION

Cancer is the second most common cause of death in the USA, exceeded only by heart disease, and accounts for nearly one of every four deaths (Mobley & Kuo, 2016). Breast cancer, to be more specific, is a major health issue in all countries affecting thousands of women (Tazzite et al., 2013; Dube & Gupta, 2015). So far, its causes are unknown and the national and international strategies to reduce its morbidity and mortality levels are based on early detection of cancer through screening and treatment according to clinical guidelines. Thus, knowledge of which women are at risk and why they are at risk is therefore essential component of disease prevention and screening. In 2015, an estimated 231,840 new cases of invasive breast cancer are expected to be diagnosed in women in the United States, along with

60,290 new cases of non-invasive (in situ) breast cancer (Siegel et al., 2015). However, all locations are not equal for breast cancer risk and thus support a major role of the geography in breast carcinogenesis (Akram & Nanna, 2003).

The purpose of this work is to provide a more detailed analysis of the breast cancer distribution in the United States by comparing the spatial distribution of breast cancer cases against physical environmental factors using Geographic Information System (GIS) (Figure 1). Further, it gives background information to the GIS and its applications in health-related research.

BACKGROUND

Breast Cancer Facts/Spatial-Based Patterns

Previous reports have shown that the Northeast United States has a 16% higher breast cancer mortality rate than the rest of the country (Kulldorff et al., 1997). The probability of breast cancer risk is not equal for all locations which indicate that geography plays a very important role in the etiology of breast cancer. Even in some other areas like Australia and New Zealand, the incidence rate is quite high (Baade, 2017).

There are geographic patterns of high cases of breast cancer, and the analysis of these patterns is very important in the formulation of hypotheses about risks and focus investment more effectively in research and intervention on the most significant areas (Laden et al., 1997).

In general, breast cancer incidence rates have continued to increase since 1980, although the rate of increase slowed down in the 1990s, compared to the 1980s (American Cancer Society, 2004). Even in those who have had regular check-ups, a decline is observed (Tabar et al,2017). Furthermore, during the

Figure 1. Medical-based GIS
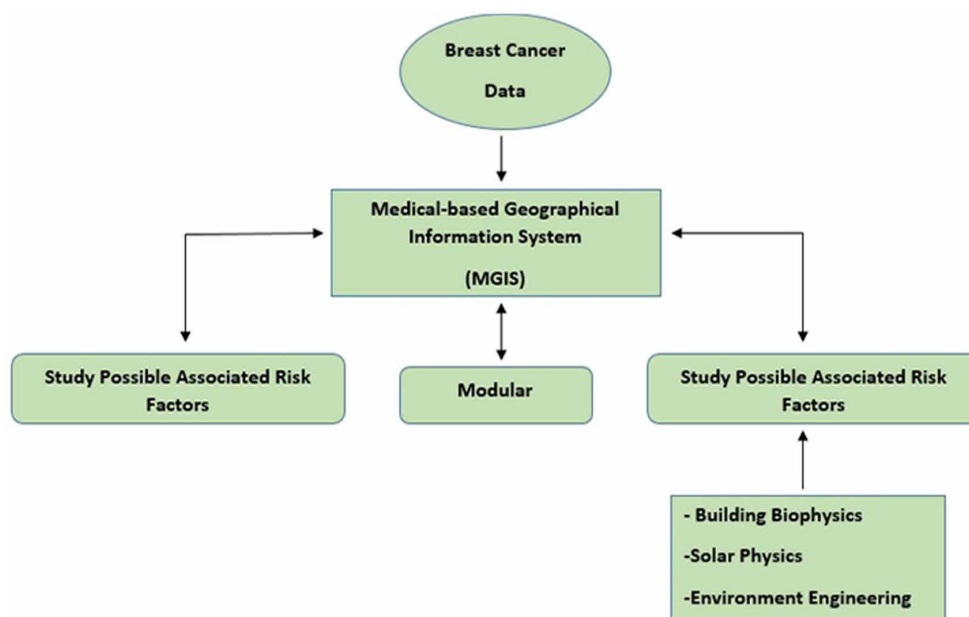
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