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ORIGINAL RESEARCH

The Incidence and Mortality of Colorectal Cancer and Its Relationship With the Human Development Index in Asia

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Abstract

BACKGROUND Colorectal cancer is the second most common cancer in women and the third most common cancer among men, and its incidence is increasing in Asia. Awareness about the status of this cancer incidence and mortality is necessary for a better plan.

OBJECTIVES The present study was done with the aim to investigate the incidence and mortality of colorectal cancer and its relationship with the Human Development Index (HDI) in Asia in 2012.

METHODS This study was an ecological study, which was conducted based on the GLOBOCAN project of the World Health Organization for Asian countries. We assessed the correlation between standardized incidence rates (SIR) and standardized mortality rates (SMR) of colorectal cancer with HDI and its components using SPSS software, version 18 (SPSS Inc., Chicago, IL).

RESULTS A total of 592,563 incidences of and 325,752 deaths from colorectal cancer were recorded in Asian countries in 2012. The 5 countries with the highest SIR were Republic of Korea (45 per 100,000), Israel (35.9 per 100,000), Singapore (33.7 per 100,000), Japan (32.2 per 100,000), and Jordan (25.6 per 100,000). The 5 countries with the highest SMR for colorectal cancer were Jordan (15.5 per 100,000), Kazakhstan (12.8 per 100,000), Democratic Republic of Korea (12 per 100,000), Brunei (12 per 100,000), and Japan (11.9 per 100,000). Correlation between HDI and SIR was 0.709 overall ($P \leq .001$)— 0.667 in men ($P \leq .001$) and 0.759 in women ($P \leq .001$). Also, correlation between HDI and SMR overall was 0.517 ($P \leq .001$)— 0.447 in men ($P = .002$) and 0.593 in women ($P \leq .001$).

CONCLUSIONS Cancer incidence and mortality are higher in countries with more development. A positive and statistically significant correlation was found between standardized incidence and mortality rate of colorectal cancer and the Human Development Index and its components.

KEY WORDS Asia, epidemiology, colorectal cancer, incidence, mortality

The authors report no conflict of interest.
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INTRODUCTION

Cancer is among the most important global health problems.[1,2] The number of cancer patients in the world is increasing. Colorectal cancer is among the most common cancers in the world; that this cancer makes up nearly 9% of all cancer incidence numbers by itself.[3] Colorectal cancer is the second most common cancer in women and the third most common cancer among men. In 2012, about 1.4 million people worldwide were affected by colorectal cancer, and more than 694,000 cases led to death.[4] This disease had has prevalence in Australia, New Zealand, Canada, the United States, and Europe and has less incidence risk in countries such as China, India, and South America.[4] Overall, about 60% of diseases cases occur in developing countries.[5]

Although colorectal cancer is common in Western countries, the disease is rising in Asia, and the burden of colorectal disease is increasing in developing countries such as Singapore, Japan, and Republic of Korea. Colorectal cancer affects all races and ethnicities and often occurs in women and men older than 50 years. Unlike some cancers for which the most important risk factors are known, this is not true for colorectal cancer. Multiple risk factors may contribute to the pathogenesis of the disease,[6] such as inflammatory bowel disease, poor sleep patterns, and bad lifestyles that include lack of adequate physical activity; insufficient consumption of fruits and vegetables; low-fiber, high-fat diet; obesity and overweight; alcohol consumption; and tobacco use. About 5%-10% of colorectal cancers have a genetic origin[7,8]; in spite of the hereditary nature of colorectal cancer, most cases are seen sporadically.[9]

The most important fact about colorectal cancer is that, if detected in stage 1, 5-year survival of patients is up to 90%; screening reduces the incidence and mortality of cancer, but it has not been implemented in most countries[7] and only 1.59% of women and men older than 50 years get screened because there is no recommendation for screening in the world.[10]

One of the criteria used for evaluation of diseases and deaths between countries is the Human Development Index (HDI). In fact, this index tracks the incidence and mortality of many diseases and is an appropriate indicator of the status of countries in terms of a specific disease.[11] This index surveys a country from 3 basic aspects of development. The HDI is composed of 3 dimensions of human development, including a long and healthy life (based on life expectancy at birth), access to knowledge (based on a combination of the adult literacy rate and enrollment rates for primary education), and a decent standard of living (based on per capita gross domestic product based on purchasing power). HDI is the arithmetic average of these 3 indices and is a number between 0 and 1.[12] The relationship between HDI and some types of cancer has been studied, and this relationship can lead to a more accurate understanding of cancer distribution and its risk factors.[13,14] Because of this point, that awareness about the incidence and mortality of colorectal cancer can be useful for health programs and research activities. Considering the possible role of the HDI, this study was done with the aim of investigating the incidence and mortality of colorectal cancer and its relationship with the HDI and its components in Asia in 2012.

METHODS

The present study was an ecological study in Asia assessing the correlation between age-specific incidence and mortality rate (ASR) and the HDI and its details, which include life expectancy at birth, mean years of schooling, and gross national income per capita. Data about the ASR for every Asian country for 2012 were retrieved from the GLOBOCAN global cancer project (available at http://globocan.iarc.fr/Default.aspx),[15] and HDI information was determined from Human Development Report 2013,[16] which included information about the HDI and its details for every country in the world for 2012.

Method of Estimating the ASR in Global Cancer Project by International Agency for Research on Cancer. ***Age-specific incidence rate estimate.*** The methods of estimation are country specific, and the quality of the estimation depends on the quality and the amount of the information available for each country. In theory, there are as many methods as countries, and because of the variety and the complexity of these methods, an overall quality score for the incidence and mortality estimates combined is almost impossible to establish. However, an alphanumeric scoring system that independently describes the availability of incidence and mortality data has been established at the country level. The combined score is presented together with the estimates for each country with an aim of providing a broad indication of the robustness of the estimation.

The methods to estimate the sex- and age-specific incidence rates of cancer for a specific country fall into one of the following broad categories, in priority order[1,17,18]: