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Cancer research priorities and gaps in Iran: the influence of cancer burden on cancer research outputs between 1997 and 2014

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ABSTRACT

Objectives: As a developing country, Iran is experiencing the increasing burden of cancers, which are currently the third leading cause of mortality in Iran. This study aims to demonstrate that cancer research in Iran concentrates on the cancer research priorities based on the global burden of disease (GBD) reports.

Study design: Descriptive evaluation of all cancers disability-adjusted life years (DALYs) was performed using GBD data. Also a comprehensive search was conducted using cancer-associated keywords to obtain all cancer-related publications from Iran, indexed in Web of Science.

Method: Multiple regression analysis and correlation coefficients (R^2) were used to evaluate the possible associations between cancer research publications and GBD.

Results: During 1996–2014, the majority of cancer-related publications in Iran focused on breast cancer, leukaemia and stomach cancer, respectively. This study found hypothetical correlations between cancer publications in Iran in line with the burden of cancer as reported by GBD. Particularly, correlations between years lived with disability (YLD) and cancer-related publications were more obvious.

Conclusion: This study introduces a new outline in setting cancer research priorities in the region.

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Introduction

Cancer is the third leading cause of mortality in Iran.[1] Based on the Globocan 2012, breast cancer, colorectal cancer (CRC), bladder cancer, stomach and prostate cancers were respectively five most common cancers in the Iranian population (the highest 5-year prevalence). Also, stomach and breast cancers with the highest incidence rates among all other cancers, were the most common causes of mortality from cancer.[2]

The United Nations announced non-communicable diseases including cancer as a crisis which requires global actions. In this regard, implementation research was introduced among strong actions to combat this crisis at national and global levels.[3] It improves health condition via innovative yet cost-effective programs, specifically useful in low- and middle-income countries.[4] Without doubt, setting health research priorities in concordance with health policies and healthcare systems would enhance the quality of care and public health. Establishment of appropriate cancer research, particularly in priority areas is necessary, and performing systematic reviews to synthesis already existing evidence is inevitable.[5]

The global burden of disease (GBD) study provides information on burden of diseases including cancer every 4–5 years,[6–12] which could guide resource allocations to the most relevant concepts of cancer control programs. Research and cancer research in particular, is an inseparable part of public health. Cancer research needs to take the most accurate steps to meet the requirements of appropriate screening, prevention and treatments for cancers.[12]

Assuming the burden of cancer as an important indicator showing cancer status in the country, we tried to provide a depiction from the path in which cancer research went through. We hypothesized that the highest volume of cancer research goes to cancers which impose the largest burden on Iranian public health.

Methods

In this study first, information related to the burden of cancer in Iran was extracted from five GBD reports (1995, 2000, 2005, 2010 and 2013).[13] Methodology of GBD is detailed elsewhere.[6] Disability-adjusted life year (DALY) quantifies the financial costs, mortality, morbidity and disability due to cancer. The advantage of this study can be its practical usage in prioritizing research activities. Observing the correlation between cancer DALY and cancer publications' volume provides a clear image from the implication of burden of cancer on Iranian cancer researchers. Regular preparation and publication of the results of GBD studies usually takes approximately 1–3 years. The publication timespans between every two consecutive GBD studies were defined as: 1996–2001 (publications between GBD 1995 and 2000), 2002–2006 (publications between GBD 2000 and 2005), 2007–2012 (publications between GBD 2005 and 2010) and 2013–2014 (publications between GBD 2010 and 2013).

Oncology publications

All types of documents by cancer topic, published during 1996–2014, were extracted and considered for classifications and more analysis. The list of Iranian cancer research publications were gathered from the Web of Science database, which cover journals included in ISI, as a verified source of the high-quality research publications. To define the most inclusive search terms, we used a sensitive filter. The full information about specifying oncology terms and determining appropriate journals were discussed by Lewison (2011).[14]

The principal objective of this study was to find the key index of cancer occurrence (years lived with disability [YLD] or death rate) which inspires research questions among Iranian oncology researchers. We performed multiple regression analysis (number of publications as outcome variable and YLD and death rate as covariates). Also, after the documents were divided according to both cancer and publication period, we developed specified scatter plots depicting the correlation between cancer publications and covariates of cancer burden. The regression coefficient, R^2 (R squared) was computed for plotted figures. Higher values of R^2 specify the degree of concordance between measures.

We used SPSS software (IBM Corp. Released 2013. IBM SPSS Statistics for Windows, version 22.0. Armonk, NY: IBM Corp.) for all statistical analysis.

Results

According to GBD reports, stomach cancer has been the leading cause of cancer burden (the highest DALYs) in 1995, 2000, 2005, 2010 and 2013, in Iran. Leukaemia, as well as cancers of TBL (trachea, bronchus and lung), oesophagus, brain and nervous system, breast and CRC were the other six cancers behind stomach cancer that imposed the highest burden (Table 1). Trends of YLD and death rates are depicted in Supplementary Tables 1 and 2.

Overall, our search resulted in 10,089 records, consisting of all types of documents published during 1996–2014. The highest proportion of oncology records was attributed to breast cancer with about 16.5% of total publications (1660 out of 10,089). After that, publications with focus on leukaemia and stomach cancer were the second and third most frequent research areas, after breast cancer (8.07% and 8.04%, respectively). Nearly, a quarter of all cancer publications were attributed to basic sciences, such as pathophysiology, therapy methods and pharmacology, immunology and genetic (Table 2).

Supplementary Fig. 1 depicted the linear correlation between cancer-related DALY and relevant publications (R^2 values were 0.37, 0.48, 0.34 and 0.27, respectively). When we plotted the correlation between the two elements of DALY (i.e. YLD and death rate) with cancer publications over the defined timespans, YLD was more likely to predict the volume (number) of publications. As depicted in Fig. 1 and Supplementary Fig. 2, the correlation between YLD and publications volume were stronger compared to that of death rate (R^2 values were