Global Dental Research Productivity and Its Association With Human Development, Gross National Income, and Political Stability

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Abstract

Objective: The objective of this study is to examine the associations between country level factors (such as human development, economic productivity, and political stability) and their dental research productivity.

Methods: This study is a cross-sectional analysis of bibliometric data from Scopus search engine. Human Development Index (HDI), Gross National Income per capita (GNI), and Failed State Index measures were the independent variables. Outcomes were "Total number of publications (articles or articles in press) in the field of dentistry" and "Total number of publications in the field of dentistry per million population." Non-parametric tests were used to examine the association between the independent and outcome variables.

Results: During the year 2013, a total of 11,952 dental research articles were published across the world. The top 5 publishing countries were United States, Brazil, India, Japan, and United Kingdom. "Very High" HDI countries had significantly higher number of total dental research articles and dental research articles per million population when compared to the "High HDI," "Medium HDI," and "Low HDI" countries ($p < 0.0001$). There was a significant linear relationship between the GNI quartile income levels and outcome metrics ($p \leq 0.007$). Countries which were highly politically stable were associated with significantly higher dental research productivity ($p < 0.0001$).

Conclusions: There appears to be a regional concentration of articles with just five countries contributing to over 50% of all articles. The human development and economic development of a country are linearly correlated with

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dental research productivity. Dental research productivity also increases with increasing political stability of a country.

Keywords: Journal metrics, Dental research, Global research, Bibliometrics, Journal publishing, Human development, Political stability.

INTRODUCTION

The number of research publications is one of the major parameters that are used to measure research productivity or output at the individual, institutional or even at the national level. Research funding, availability of qualified researchers, investment from private firms, influence of policy makers and the brain-drain to developed countries are some of the factors known to affect this parameter at the country level.[1] It is known that developing world contribute significantly less to the growing body of scientific evidence when compared to developed world thus raising serious concerns.[2,3] Lack of resources to conduct research, poor preparation of manuscripts, lack of access to scientific literature, lack of participation in publication-related decision making, inadequate representation in journal review boards, and bias of the journals are listed as some of the contributing factors for this under-representation of developing countries.[3]

Increasing the research output in all parts of the world is extremely important not only for the economic growth and well-being of the population in a country, but also for the reason that the results obtained from studies performed in developed countries cannot always be applied to developing nations.[1] This concern was further elevated by the transatlantic divide that was observed in medical publishing, with leading American medical journals publishing far fewer papers that are relevant to the developing world, compared to the European counterparts.[4]

There has been prior research examining metrics of medical research productivity in developing countries.[5–9] However, to date there are no published data on the distribution of global dental research productivity and factors at a country level that contribute to this productivity. Furthermore the impact of political stability of a country on its research productivity is unknown. The objective of the present study is to provide a snapshot of global dental research productivity and to examine the associations between country level factors (such as human development, economic productivity, and political stability) and their dental research productivity. We hypothesized that countries that are high in human development indices, have higher per capita income, and are politically stable also have high dental research productivity when compared to countries that are low in human development, are economically poor, and are politically unstable.

MATERIALS AND METHODS

Study Design, Database, and Institutional Review Board Approval

The present study is a cross-sectional analysis of bibliometric data from Scopus search engine for research publications.[10,11] Scopus is the largest abstract and citation database of peer-reviewed journals, books and conference proceedings.[10] It provides information on close to 53 million records (including scientific articles, abstracts, book chapters, conference proceedings, etc) and has 21,915 titles in its repository.[10] Scopus indexes articles in the fields of science, technology, medicine, social sciences, and arts and humanities. The present study was granted Institutional Review Board (IRB) "Exempt" status by the College of Dentistry – The University of Iowa Human Subjects Protection Office. IRB protocol number is 201410837.

Search Strategy

The Scopus database was queried using the following strategy: publication year = "2013"; document type = "Article" or "Article in Press"; and subject area = "Dentistry."[11] No restrictions were placed on language of publication, country of publication, affiliation, source title, or source type.

Outcome Measures

The two outcome measures examined in the present study were "Total number of publications (articles or articles in press) in the field of dentistry" and "Total number of publications in the field of dentistry per million population." The two outcome metrics were obtained for each country from the Scopus database.[11] The unit of analysis is the individual country.

Independent Variables

The independent variables of interest included: Human Development Index (HDI), Gross National Income per Capita (GNI), and Failed States Index for the year 2013. HDI was introduced by the United Nations to summarize the achievement of a particular country in key dimensions of human development.[12] This includes a long and healthy life, education, and standard of living. Based on the United Nations Development Programme – Human Development Report, different countries are divided into four groups based on HDI: Very High HDI, High HDI, Medium HDI, and Low HDI.[12,13]