

Contribution of Health Researches in National Knowledge Production: A Scientometrics Study on 15-Year Research Products of Iran

Abstract

Background: Researchers, practitioners, and policymakers call for updated valid evidence to monitor, prevent, and control of alarming trends of health problems. To respond to these needs, health researches provide the vast multidisciplinary scientific fields. We quantify the national trends of health research outputs and its contribution in total science products. **Methods:** We systematically searched Scopus database with the most coverage in health and biomedicine discipline as the only sources for multidisciplinary citation reports, for all total and health-related publications, from 2000 to 2014. These scientometrics analyses covered the trends of main index of scientific products, citations, and collaborative papers. We also provided information on top institutions, journals, and collaborative research centers in the fields of health researches. **Results:** In Iran, over a 15-year period, 237,056 scientific papers have been published, of which 81,867 (34.53%) were assigned to health-related fields. Pearson's Chi-square test showed significant time trends between published papers and their citations. Tehran University of Medical Sciences was responsible for 21.87% of knowledge productions share. The second and the third ranks with 11.15% and 7.28% belonged to Azad University and Shahid Beheshti University of Medical Sciences, respectively. In total fields, Iran had the most collaborative papers with the USA (4.17%), the UK (2.41%), and Canada (0.02%). In health-related papers, similar patterns of collaboration followed by 4.75%, 2.77%, and 1.93% of papers. **Conclusions:** Despite the ascending trends in health research outputs, more efforts required for the promotion of collaborative outputs that cause synergy of resources and the use of practical results. These analyses also could be useful for better planning and management of planning and conducting studies in these fields.

Keywords: Health services research, Iran, scientometrics

Introduction

Evidence-based health policy strongly depends on the quality of evidence that mostly driven from scientific productions.^[1,2] In these interactive complex cycles, ongoing monitoring provides the maximum level of quality and efficiency that contain planning, conducting, and different aspect of application of researches.^[3,4] Designing and implementation of these preventive or controlling programs require to accurate information and scientific evidence provided through related papers and reports.^[1,4-6]

With aim to monitoring and assessment of scientific trends, regardless of some limitations, scientometrics approaches provide reliable practical methods that measure, evaluate, and analyze scientific products of specific fields or units.^[2,7,8] In this regard, using qualitative/quantitative and computational approaches, different

indicators are increasingly employed to show the pattern of research outputs by researchers, universities, institutes, and countries.^[8,9]

One of its main indices is the number of published articles or science production in specific domains of sciences.^[4,10,11] The number of published articles is a frequently used scientometric indicator of the scientific situation of those domains or units.^[12] Citations of papers is another index that mostly uses as a proxy of quality and application of papers.^[7,10] The collaboration in research conducted and papers publication is considered as another citation indexes.^[10,11,13]

Considering the above, the aim of this study is scientometrics analysis of 15-year health researchers' productions and its contribution in total research production of Iran. In these analyses, the contribution of

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health researchers in trends of published papers, citations, and collaborative researches during the past 15-year period is presented by more details.

Methods

The present study is a scientometrics analysis of more than one-decade contribution of health scientific papers in Iranian scientific productions (2000–2014). Reviewing the publication number, publication trends, citations, and collaborative institutions has been compared with total scientific productions of country.

As it was the only source for multidisciplinary citation reports and regarding its most coverage in health and biomedicine disciplines, we systematically searched Scopus database as the valid source of citation reports of knowledge products.^[11,14]

We focus on papers as the main index of scientific products.^[9,14] The compassion of citation trends used as the proxy of papers' application.^[7,9,12] In addition, all of the collaborative papers extracted and analyzed separately.^[13] We also introduce top institutions, journals, and collaborative research centers in the field of health sciences.

Using methods of reviews and considering Emtree, based on defined aim of the study, for 15 years period of 2000–2014, Iran* has been searched in affiliation country of scientific productions. Refining of all fields' results is followed through limitation of source types to journals and subject areas to medicine, biochemistry, genetics and molecular biology, dentistry, health professions, and nursing as the main related fields that cover health research.

Search strategy has designed by research group and validated by external scientific group. The period of the study was limited to 2000–2014, and there was no limitation for language [Table 1]. Using Pearson's Chi-square, P-trends were estimated by Stata version 11 (StataCorp, College Station, TX, USA).

Results

Trends of publications and citations

Given data, during 2000–2014, 237,056 scientific papers have been published in all fields of publication sciences. From them, 81,867 (34.53%) were assigned to health fields including medicine, biochemistry, genetics and molecular biology, dentistry, health professions, and nursing. Pearson Chi-square test confirmed significant time trends of published papers ($P = 0.000$). The time trends of papers and their citations are shown in Figure 1.

Collaborative papers

In total fields, Iran had the most collaborative papers with the USA (9883, 4.17%), the UK (5719, 2.41%), and Canada (5553, 2.34%). International contributions of in

Table 1: Search strategy

All fields

AFFILCOUNTRY (iran*) AND PUBYEAR > 1998 AND PUBYEAR < 2016 AND (LIMIT-TO (SRCTYPE, "j"))

Medical fields

AFFILCOUNTRY (iran*) AND PUBYEAR > 1999 AND PUBYEAR < 2016 AND (LIMIT-TO (SRCTYPE, "j")) AND (LIMIT-TO (SUBJAREA, "MEDI") OR LIMIT-TO (SUBJAREA, "BIOC") OR LIMIT-TO (SUBJAREA, "DENT") OR LIMIT-TO (SUBJAREA, "NURS") OR LIMIT-TO (SUBJAREA, "HEAL"))

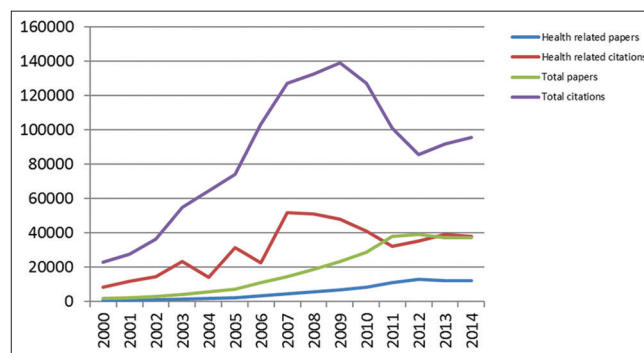


Figure 1: Time trends of articles and their citations

health papers had similar patterns. In this view, the first collaborative country in papers was the USA (3885, 4.75%). After that, the UK and Canada with 2268 (2.77%) and 1580 (1.93%) papers, had second and third ranks, respectively.

Subject area

In overall, at national level, most of the papers were published in fields of medicine (24.17%), engineering (19.09%), and chemistry (16.79%). In health domains, most of the papers were published in the field of medicine (59.40%). After that, the highest proportion of publications belonged to biochemistry, genetics and molecular biology (14.54%), and pharmacology, toxicology, and pharmaceuticals sciences (8.51%). Figure 2 compares the distribution of subject area of health domains and total fields' publications.

Institutions/journals

Considering the role of research centers, universities, or other scientific institutes in the publication of papers, Azad University, Tehran University of Medical Sciences, and University of Tehran with 32,579 (13.74%), 22,357 (9.43%), and 21,792 (9.19%) papers had the most contribution in national scientific papers, respectively.

In medical and health-related fields, Tehran University of Medical Sciences was responsible for 21.87% of knowledge productions. After that, Azad University participates in 11.15% of knowledge productions. The third rank belonged to Shahid Beheshti University of Medical Sciences, with 7.28% counterpart [Figure 3].

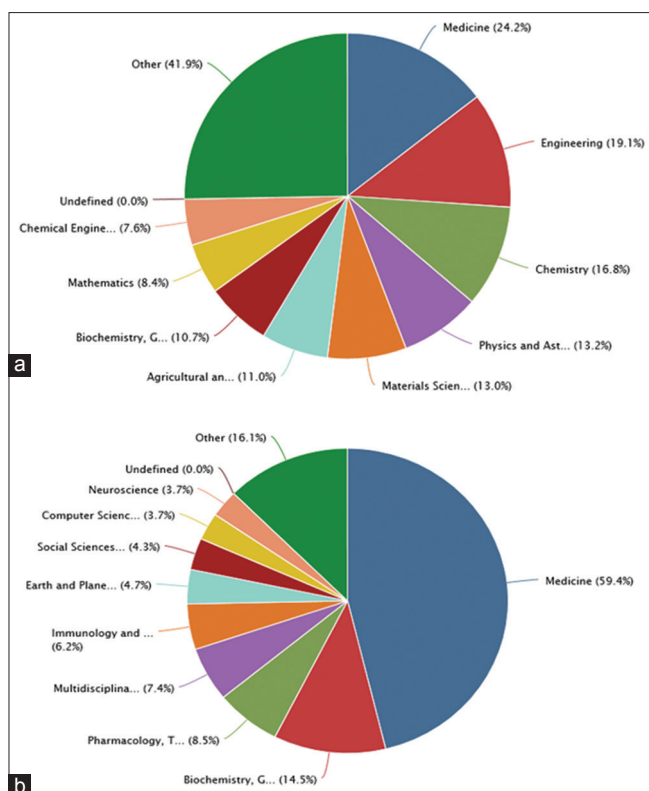


Figure 2: Distribution of subject area of (a) total fields and (b) health domains publications

Regarding the sources of publication, Life Science Journal, Advances in Environmental Biology, and Australian Journal of Basic and Applied Sciences with 0.85%, 0.82%, and 0.70% of national publication contribution were the top three sources of Iranian publication, respectively. For health domains publications, Life Science Journal (2.1%), Australian Journal of Basic and Applied Sciences (1.85%), and World Applied Sciences Journal (3.6%) had first three ranks.

From Iranian journal, Archives of Iranian Medicine (0.57%), Scientia Iranica (0.53%), and Journal of Research in Medical Sciences (0.52%) had the most contribution in total publication.

Archives of Iranian Medicine, Journal of Research in Medical Sciences, and Acta Medica Iranica with 1.54%, 1.38%, and 1.32% of national publication contribution were the top three sources of health-related publication, respectively.

Articles type

During this period, the most prevalent type of total publication was original articles which consist of 93.1% of all knowledge products. After that, review articles (2.2%) and letters (1.4%) set on next levels. These distributions with similar pattern follow in health domains, respectively, with 89.3%, 4%, and 3.6%. Figure 4 shows the distribution of article type.



Figure 3: Contribution of national universities/scientific institutes in publication of (a) total and (b) health related papers, 2000–2014

Discussion

The results of the present study verify the position of Iran's health researches between total scientific productions. This is vital for countries to assess and monitor the trends and possible challenges of research productions based on their research visions.^[2,15,16]

In Iran, at least one-third share of science products assign to health domains and there is a significant correlation between publication and their citations. In this regard, Tehran University of Medical Sciences has the most important contribution.

The trends and variations of science and technology publications mostly supervised through scientometrics indicators provide the best practical evidence.^[6,17,18] Such estimations, through detailed analyses of situations and possible scenarios, provide the possibility of the evidence-based management of knowledge production at levels of research units or even in specific domains of science.^[17,19,20]

In Iran, goals of health researchers are followed exactly based on national convention policies.^[15,21,22] Such approaches could appraise the performance and improvement of national science and technology.^[7]

Aim to that, the Comprehensive Scientific Map of Iran overwhelms the goals, policies, strategies, and requisites.^[15,16,21] This document emphasized on health research as one of the core components of health society and improvement of quality of life, and Iran is pictured as the highest developed country in science/technology by 2025.^[21,22]

In line with the present results, other evidence reveal that, during the recent years, the number of published articles

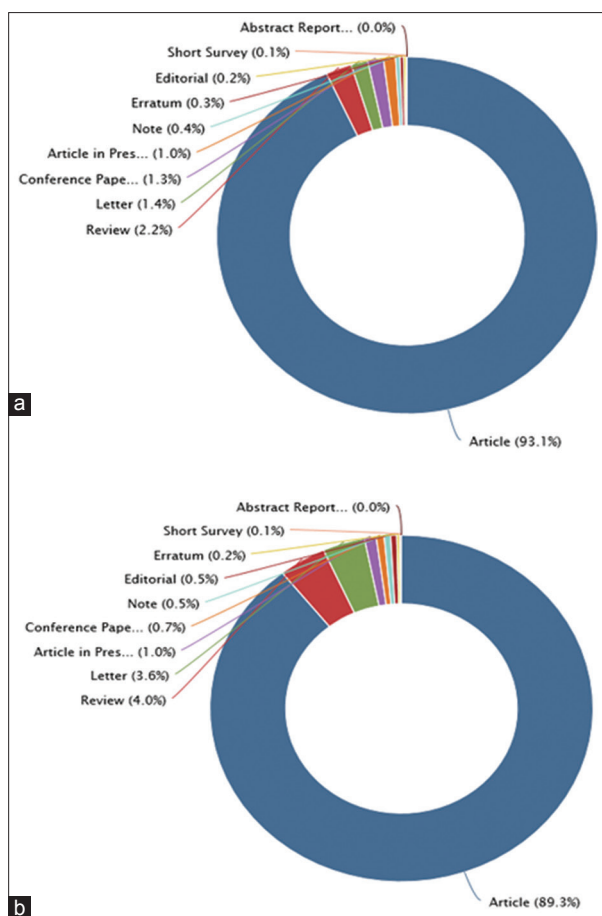


Figure 4: The national distribution of (a) total and (b) health-related article type

has significantly increased in the fields of basic and applied sciences.^[19,23,24] Iran has one of the fastest growth rates in scientific productions in the world, with a considerable growth in health publications.^[25]

These observed rapid increasing trends in research outputs can be attributed to the national commitment and attention of policy-makers, in highest level of leadership that has caused a strong support in equipment of facilities and resources.^[18,24]

Moreover, the recent improvement of the subject of science editing, mostly managed by expert editors, should be considered as one of the most facilitators of the progressive quality of publications such as indexing, online management of journals, and other related processes.^[26]

Health research essentially involves different wide multidisciplinary collaborations and sometimes across multiple organizations potentially, provide more facilities for increasing the citations and applications of papers.^[27-29]

Our analyses revealed that citation as one of the representative indexes for paper's application and quality, regardless present planned ascending pattern, in adjusted forms of parametric indexes such as "citation per paper," needs to be more attention.

Leading organization with higher rate of collaborative papers, resource allocation, and high-cited productions should be recognized as rich capital of sharing experiences.^[15] It is important policy consideration that the increasing trends of related multidisciplinary research centers as well as faculties and consequently the increase of health research specialists, students, projects, and dissertations are positive potential factors which influence the rise in the number and citations of papers in these fields.^[5,18,23]

Considering the design and conduction approaches, the present study benefited from many strength points. First, to clarify the exact pattern of knowledge production in health researches, we focused on specific domain. Second, during a systematic search of data, we benefited from the most comprehensive co-national international database with the most coverage. Third, we assessed collaboration between health researches in related research fields. Fourth, we explain the situation of health researches as one of the most effective knowledge productive countries in total contribution in details. We also faced with some limitations in multidisciplinary subject categories. Moreover, a large amount of data, especially in evaluation of citation trends, led to some time-consuming processes.

Conclusions

To the best of our knowledge, this is the first scientometrics analysis 15 years of contribution of health knowledge productions in total scientific product of country that provide practical information for better research planning in related multidisciplinary fields. Despite the ascending trends in health research outputs, more efforts required for the promotion of quality and better application of them. These analyses also could be useful for better planning and management of planning and conducting studies in these fields.

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Conflicts of interest

There are no conflicts of interest.

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