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A Bibliometric Analysis of Hematological Research Productivity among Five Islamic Countries during 1996 to 2013 (a 17-years period)

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Abstract

Background: This study made an attempt to make the quantitative and qualitative evaluation of hematological research output in five Islamic countries; Iran, Turkey, Malaysia, Saudi Arabia and Egypt; which have the most scientific productions from 1996-2013.

Materials and Methods: The current study was carried out during the 1st to 31st of September, 2014 in Blood Transfusion Research Center, Shiraz, Iran. This bibliometric study evaluated quantities and qualities of publications on hematological researches based on SCImago Journal Ranking, for over 17 years (1996- 2013). Strategy of the research was based on the keyword "hematology ". Neither language nor document type restrictions were considered. Data were extracted, tabulated, and compared to identify the ranks as well as trends. The ranking and analyzing indicators included were: 'number of documents', 'citable documents', 'citation', 'self-citation', 'cites per documents', 'H-index', 'sited documents', and 'international collaboration' .

Results: The 5 Islamic countries published a total of 6914 documents in the field of hematology in this period. This number represents 0.248 % of the total documents produced globally in the field of hematology. Results revealed an increase in the number of publications and citable documents for these countries during 1996-2013. Comparison among these countries showed that Turkey, Iran, Egypt have the highest number of documents and citable documents, respectively. Furthermore Turkey and Iran led qualitative indicators like H-index and citation.

Conclusion: Despite considerable improvement in recent years these Islamic countries should further support their scientific institutes to increase the quantity and quality of hematology publications.

Keywords: Islamic countries, hematology, SCImago Journal Ranking, bibliometric study.

Introduction

Measurements of scientific publishing in the form of numerical data are called bibliometric indicators [1,2]. These indicators have become a standard tool of research management and scientific policy making during the last decade. Principally, universities and academic institutions increasingly rely on scientific analyses for making decisions about promotion, tenure, and funding [3,4]. These methods are primarily quantitative, but are also used to make pronouncements about qualitative features of scientific literature [5]. Comparisons of bibliometric characteristics between regions and countries can reveal differences in research orientations, capacities, and collaboration patterns [6].

The data used in this study were based on SCImago Journal Ranking (SJR), which is one of the most important available resources on the World Wide Web. SJR site is an open-access resource, which consists of many published journal titles in a wide variety of countries and languages. Initially, a research group from Spanish universities developed an indicator named SCImago Journal Ranking (SJR)

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for the assessment of the quality of scientific journals while applying page rank algorithm on the Scopus database [7].

Hematology is a branch of internal medicine concerning the study of blood, the blood-forming organs, and blood diseases. The medical aspect of hematology is concerned with the diagnosis, treatment and overall management of blood disorders and malignancies, including types of hemophilia, leukemia, lymphoma and sickle-cell anemia. Hematology also focuses on lymphatic organs and bone marrow and diagnosis of blood count irregularities or platelet irregularities [8]. The objective of the present study was to evaluate and summarize the research activity and scientific impact of Iran, Turkey, Malaysia, Saudi Arabia and Egypt in the field of hematology for an accurate identification of research ranking.

Materials and Methods

The SJR database, accessible free of charge, was selected as the most appropriate reference for ranking hematological publications of these countries. The subject-content analysis was conducted according to the five major Islamic countries. Data related to hematology research output for 17 years were obtained from SCImago journal ranking (SJR) during the 1st to 31st of September, 2014. Research strategy was based on the keyword "hematology". Reviews, journal articles, case reports, and similar types of documents were all included in the study and language restrictions was not considered. We chose the "Countries" icon for comparison and then in the "Select countries or regions to compare" tool bar, Iran, Turkey, Malaysia, Saudi Arabia and Egypt were selected. In the "Subject area" icon, "medicine" was selected and the comparison was limited to hematology. Finally, the bibliographic data were analyzed, then transferred to Microsoft Excel and graphs were designed.

The ranking and analyzing indicators were: number of documents, citable documents, citation, self-citation, cites per documents, H-index, sited documents, and patterns of international collaboration. The data obtained from figures and tables were streamlined in a similar format. The comparison of data was performed and the trends were descriptively provided for each item. The results approximately included all available comparison data of these countries. Obviously, these data were used to do retrospective comparisons. It should be mentioned that during this study, more emphasis were on the comparison of data between countries, which were obtained from the online source, SJR.

Results

Figures 1 and 2, show the distribution of published documents and citable documents for

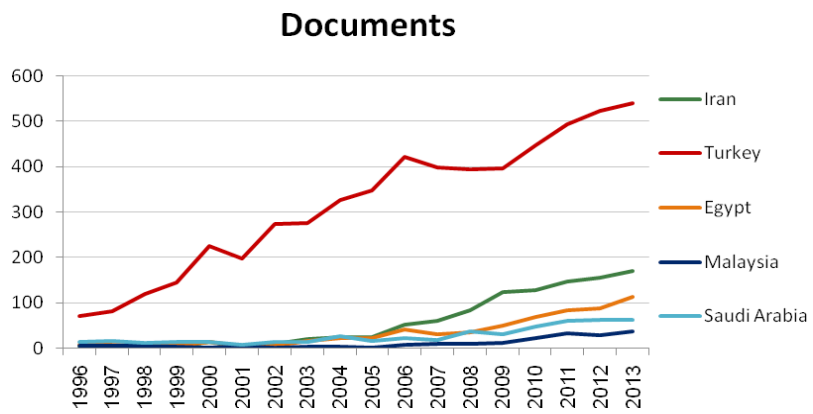

Figure 1: Hematology documents distribution during 1996-2013, based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia. A significant increase of documents published in Turkey from 1997 is observed, while Iran, Egypt and Saudi Arabia publications have increased significantly since 2005.

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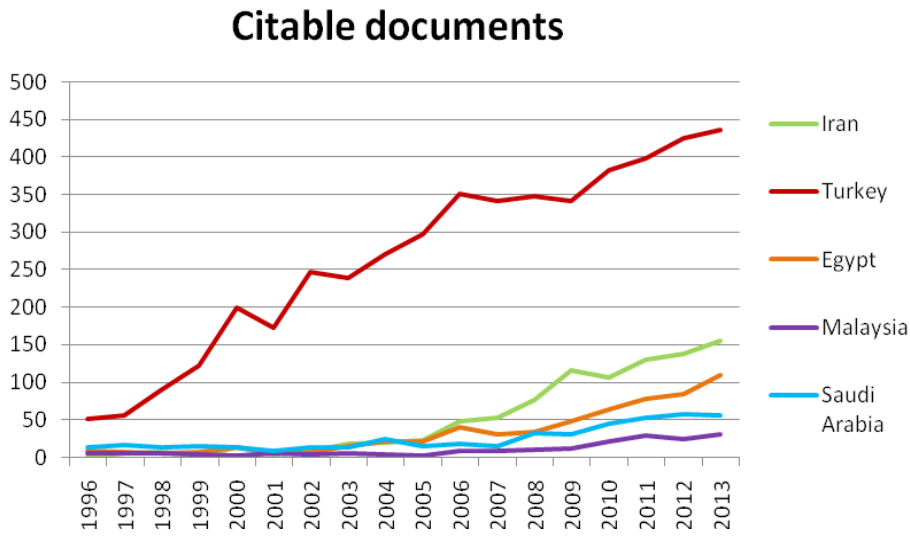

Figure2: Citable documents distribution during 1996-2013 based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia. A significant increase of citable documents published in Turkey from 1997 is observed, while citable documents from Iran, Egypt, Saudi Arabia and Malaysia have increased significantly since 2005.

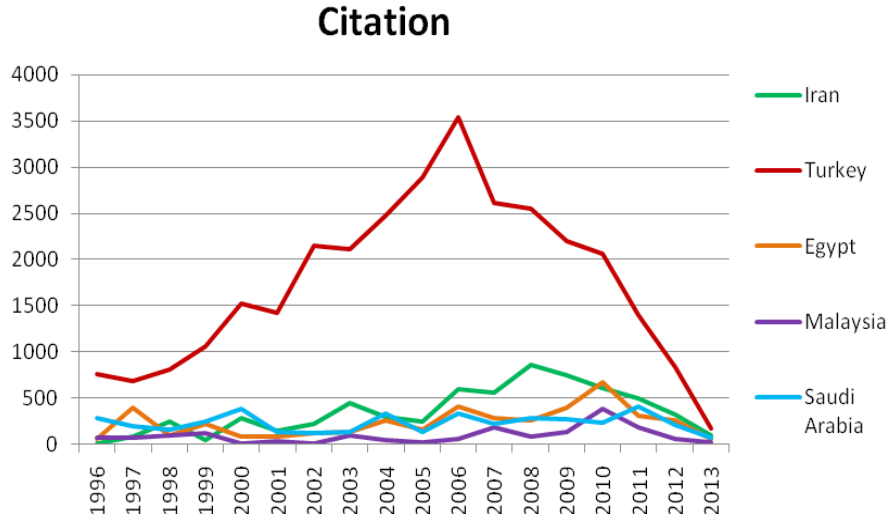

Figure 3: Citation distribution during 1996-2013 based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia.

Iran, Turkey, Malaysia, Saudi Arabia and Egypt from 1996 to 2013. Data revealed an increase in the published output of the hematological research and citable documents for the corresponding period. Although all these countries increased their production during this period Turkey had a faster growth followed by Iran and Egypt. Comparison of the total number of citable documents between these countries showed that Turkey with 4767 documents allocated most of the production and Iran with 928, Egypt with 591, Saudi Arabia with 443 and Malaysia with 185 documents were located after it. Considering the citation, documents from Turkey, Iran and Egypt had the highest citation, respectively. Figure 3 shows the distribution of citation impact of publications with regard to the subject area of hematology. For a better understanding of these results in figure 3 the focus should be on the trend. Iran had the highest citation in 2007, turkey in 2006 and after that the citation has decreased.

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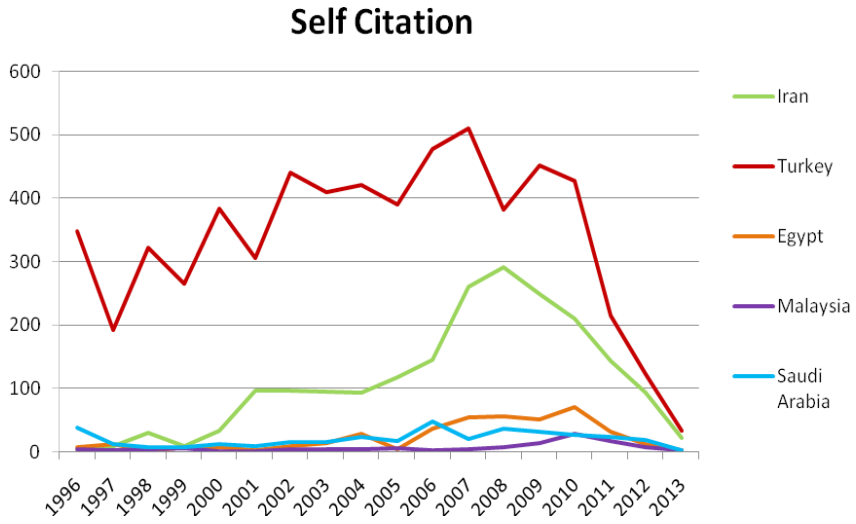

Figure 4: Distribution of self-citation during 1996-2013 based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia.

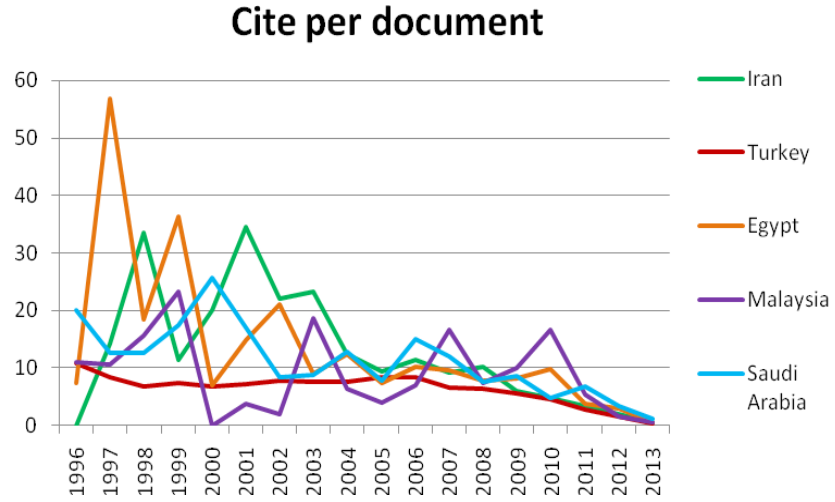

Figure 5: Cites per document distribution during 1996-2013 based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia. A balanced and steady state is represented for Turkey. The pattern of changes has fluctuations in other compared countries.

In comparison with other countries, Turkey and Iran had the highest self-citation. Turkey had the highest self-citation in 2002-2010 and Iran in 2007-2010, and the index declined for this area afterwards. Malaysia, Saudi Arabia and Egypt had low self-citation (Figure 4). The number of citations per documents for Iran and other countries is shown in figure 5. The highest number of citations per document in Iran was for year 2001 and this indicator has decreased afterward. Comparing the average number of citations per documents between these countries, we noticed Egypt had the highest citations per document (13.47cite per document) and Iran (12.68) lied in the 2th rank after Egypt. Saudi Arabia (11.28), Malaysia (8.93) and Turkey

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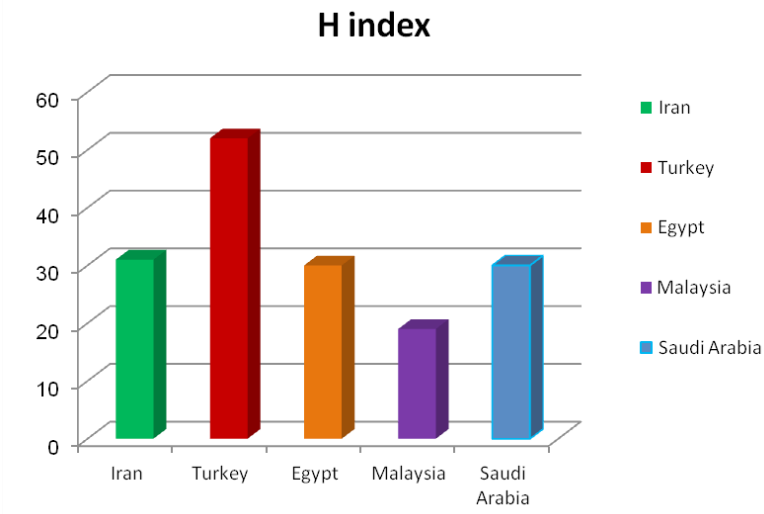

Figure 6: The comparison of Iran, Turkey, Egypt, Malaysia and Saudi Arabia, with respect to H-index during 1996-2013. Turkey has the highest H-index compared to other countries. The H-index of Iran is very close to both of Egypt and Saudi Arabia.

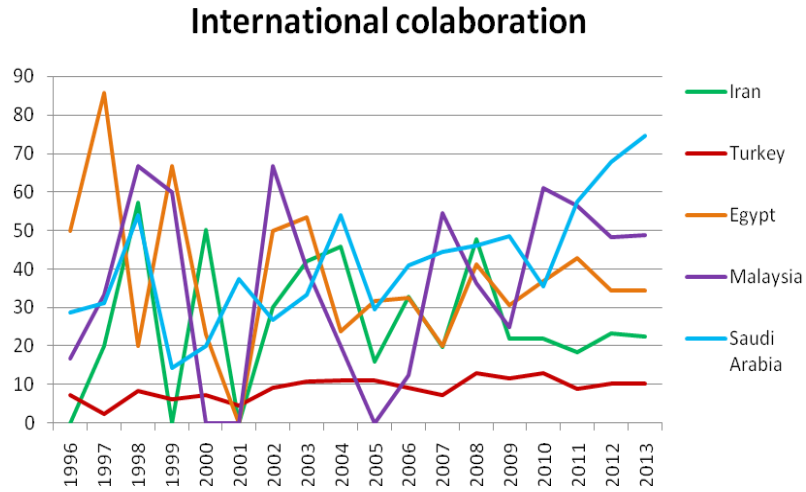

Figure 7: International collaborations distribution during 1996-2013 based on SJR records for Iran, Turkey, Egypt, Malaysia and Saudi Arabia. All countries showed significant fluctuations in scientific collaborations except Turkey.

(6.40) were located in next places, respectively. Figure 6 makes it possible to compare the ranking of these countries based on their H-index in hematology. In this regard, Iran rests on the second position after Turkey. Examining the pattern of international collaboration may also reveal some information regarding the intensity and breadth of collaborations between researchers in these countries and other institutions of the world. In terms of international collaboration in hematological research, apart from Turkey high fluctuations were seen in other countries (Figure 7). All indicators described are presented and summarized in Table 1. Furthermore, Table 1 illustrates the rankings of these countries considering "global ranking", "number of documents", "citable documents", "number of citations", and "number of self-citations" in addition to "citations per document" and "H-index".

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Table 1: Comparison of the number of documents, citable documents, citations, self-citations, H-index, citations per document and global ranking in hematology based on SJR data among Iran, Turkey, Egypt, Malaysia and Saudi Arabia during 1996-2013.

Country	Global Ranking	Documents	Citable documents	Citations	Self-Citations	Citations per Document	H index
Turkey	12	5660	4767	31196	6094	6.4	52
Iran	29	1031	928	6227	1983	12.69	31
Egypt	38	614	591	4259	410	13.47	30
Saudi Arabia	42	495	443	4160	366	11.28	30
Malaysia	49	210	185	1571	108	8.93	19

Discussion

Many methods have been suggested to evaluate the scientific productivity of countries, universities, research institutes, journals, research teams and research fields. Bibliometric studies in recent years have provided an accurate and objective method for this purpose [9]. The aim of the present study was to analyze the scientific productions of the Iran, Turkey, Malaysia, Saudi Arabia and Egypt in the field of hematology using the SCImago Journal Ranking (SJR) tool, which facilitates comparisons during long-term periods. SJR is a web-based research evaluation tool allowing the estimation of the publication outputs and citation rates of institutions and countries [5]. SCImago Journal Ranking (SJR) was found to be an appropriate database for searching and ranking bibliometric studies. It is an open-access and user-friendly database for comparing all the regions of the world. Although the present source may have several limitations, but we believe the results represent a useful tool for scientists and public health policy-makers to plan and organize researches on hematology in these countries. This study offers a comparison between five of the most productive Islamic countries in terms of their citation impacts and other indicators within a 17-year period (1996-2013). In recent years the number of scientific document in the field of hematology produced by researchers in these countries has been increasing; however this growth was greater in countries like Turkey and Iran. Furthermore, considering the number of documents Turkey and Iran, are ranked in the 12th and 29th position in the World, respectively. Various citations related indicators have been introduced and used for evaluating the research performance of scholars [10]. Citation counts provide researchers and administrators with a reliable and efficient indicator for assessing the research performance of authors, institutions, and countries with their relative impact and work quality [11,12]. The increase of the citation impact was mainly visible in Turkey. Although a similar trend can be seen for other countries, their growth had a lower slope. Malaysia had the lowest position in the citation ranking. This indicator should be improved by performing high-quality and outstanding researches among these countries. “Citations per document” is designed to measure the quality of document under the evaluation, and shows the average number of citations for each document [13]. According to this indicator, Egypt, Iran and Saudi Arabia lie in the first to third rank. H-index (Hirsch index) is another qualitative indicator widely used in bibliometric studies. H-index is a stable and consistent estimator of scientific achievements, which is used as a measure to quantify the scientific outputs of a single researcher, university research groups, and journal or any of (more extensive) publication sets [14]. In this regard, Turkey is ranked in the first position. We observed that Egypt and Saudi Arabia are similar in term of H index, and they are located slightly behind Iran.

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We used citation, cite per documents, self-citation and H-index for evaluating the qualities of documents. When the number of documents, citable documents, and the H-index were considered, Turkey rested in the first place. But in some indicators such as citations per document the ranking was changed. Other researchers around the world have studied the progress trend in hematology research, for example; in a similar work done in 2013, distribution and trends of hematology and oncology research in Latin America were analyzed for a 10-year period (2000–2010). The indicators which were used in this study included the number of citations of full-text articles, year of publication, and times to publication. This study indicated that Hematology and oncology research is increasing in Latin America and has a positive trend. Furthermore significant positive growth trends were observed for Brazil, Mexico, Peru, and Uruguay. Argentina and Uruguay were the most productive countries when considering the rate of abstract presentation per population [15]. In another study done in 2013, output of India in the anemia disease research was analyzed for a 21-year period (1993-2013). The study focused on the total number of publications, citations, authorship pattern, degree of collaboration, most productive authors, subject pattern, major collaborative partners in India, most productive journals, active institutions and highly cited papers. The study revealed that 5085 papers were published during the period under study. The highest number of papers (739) was published in the year 2013 with 178 citations. The minimum number of papers (47) was republished in the year of 1996, with 3245 citations. The study reveals that lowest number (0.56%) of citations was received in the year 2013 [16], which is consistent with the fact that it takes several years after publication for a scientific paper to reach its citation potential. Hematological researches in the Malaysia, Saudi Arabia and Egypt lag behind Turkey and Iran. It is correct to say that there is a simple reason for the lower quantity and quality of the publications from Malaysia in contrast to other countries like Turkey and Iran. It is likely that the level of acceptable research activities in these countries is limited to particular countries due to the presence of institutional accredited educational plans. Several studies have discussed the reasons leading to the scarcity of medical researchers in some Islamic countries [17-19]. Furthermore, in countries with more scientific output, basic and applied scientific studies such as hematologic research are taken into account equally as an essential investment in the long-term welfare [20]. This study showed that these countries still lack distinct and elaborate hematological programs at different educational levels [14,21-24]. Accordingly, it is likely that performing a series of targeted hematological studies to reach a preferable development is needed. As a final point, it must be noted that the outcomes of bibliometric analyses may be different depending on the selected database. Based on the authors' knowledge, the present study is the first comparative study that has compared the quantities and qualities of hematology-based research between these Islamic countries.

Conclusion

Despite considerable improvement in recent years these Islamic countries should further support their scientific institutes to increase the quantity and quality of hematology publications.

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