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# Mapping the Research Productivity of Three Medical Sciences Journals Published in Saudi Arabia: A Comparative Bibliometric Study

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**Mapping the Research Productivity of Three Medical Sciences Journals Published  
in Saudi Arabia: A Comparative Bibliometric Study**

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### **Abstract**

**Introduction:** The purpose of this study was to compare the progress of research outcomes specifically of three old and new established Saudi medical research journals: Saudi Journal of Medicine and Medical Sciences (SJMMMS), Journal of Saudi Heart Association (JSHA), and Journal of Infection and Public Health (JIPH) for the period of 2013 to 2017.

**Materials and Methods:** Scientific papers under the titles of original and review articles, short communications, case and short reports were downloaded from the websites of these journals. The data was analyzed according to three parameters: the growth of publication, the types of publication, and the authorship pattern.

**Results:** The findings of the study revealed that 827 articles were contributed by 3808 authors with an average of 4.6 authors per article, and 12.9% articles were published in 64 issues of SJMMMS (n=600, 15.7%) , JSHA (n=951, 24.9%), and JIPH (n=2257, 59.2%) during 2013–2017. The majority of articles (n=746, 90.2%) included more than one author, leaving only 81 articles (9.7%) were prepared by single (or solo) authors. The authors have been collaborated with national and international authors for their scholarly work.

**Conclusions:** The comparison of bibliometric indicators of the three medical journals showed the rising tendency of research publications and the high rate of collaborative research output. These journals contributed a massive number of research papers during the period of five years. Collaboration among researchers facilitates sharing knowledge and techniques and brings a mixture of positive scientific thoughts. The unified bylaws for faculty in Saudi universities should give more weight to multi-authored papers.

**Keywords:** Bibliometric; Collaboration; Medical Sciences; Research Productivity; Saudi Arabia.

## 1. Introduction

Saudi Arabia (SA) has been playing a leading role in the development of scientific knowledge in the Arab world and progressing rapidly in field of scholarly communication. The Saudi government provides a huge support for improving education, research and innovations. Therefore, the number of degree awarding research institutions and scholarly journals has increased since 2000, accordingly the research activities particularly in health sciences have been growing (Al-Bishri, 2013; Latif, 2015; Meo, Hassan, & Usmani, 2013). Scientific productivity is usually considered fundamental to scientific career advancement. To examine and assess the scientific productivity of publications in any particular subject at any specific time, a bibliometric analysis is useful via the use of citation indicators. This type of statistical analysis was firstly described by Prichard (1969) as “*statistical bibliography*” and defined as “*the application of mathematics and statistical methods to books and other media of communication.*” (p. 348)

The bibliometric studies in health sciences have become popular because funding organizations, scientists and policy makers request frequent assessment of the research activities. The bibliometric studies assist in (a) classifying weak and strong areas of published research, (b) identifying productive researchers and institutions, and (c) recognizing collaborative patterns to conduct research. Scientific progress of any institution or specialty can be determined by the growth and the impact of the published research (Baladi & Umedani 2017; Ullah et al., 2016). Scholarly journals are the major channel for communication and disseminating research results to the scientific community around the world. These journals allow researchers with a platform to publish their research findings and provide up-to-date information in the research field of their interest (Mohan & Rajgoli 2017). The present study aimed to compare bibliometric indicators

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and ascertain the growth of research outcomes among Saudi medical research journals. To combine between old and new established journals with different scope and spectrum, three journals (a) Saudi Journal of Medicine and Medical Sciences (SJMMMS), (b) Journal of Saudi Heart Association (JSHA), (c) Journal of Infection and Public Health (JIPH) for the period of 2013 to 2017 were selected.

### **1.1 Saudi Journal of Medicine & Medical Sciences (SJMMMS)**

SJMMMS is a peer-reviewed journal published by Imam Abdulrahman Bin Faisal University. This journal publishes three issues in English per year, and its first issue was published in January 2013. The scope of SJMMMS covers the area of health specialties. SJMMMS is available in print and online (<http://www.sjmms.net/>).

### **1.2 Journal of the Saudi Heart Association (JSHA)**

JSHA is a peer-reviewed journal published by King Saud University in collaboration with Elsevier. JSHA is the official publication of the Saudi Heart Association. This journal publishes four issues in English per year, and its first issue was published in 1988. The scope of JSHA is cardiovascular diseases. JSHA is available in print and online (<http://www.journalofthesaudiheart.com/>).

### **1.3 Journal of Infection and Public Health (JIPH)**

JIPH is a peer-reviewed journal published by the Ministry of National Guard Health Affairs, King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), and the Saudi Association for Public Health in collaboration with Elsevier. JIPH published two issues in English per year in 2008, but JIPH has started publishing bi-monthly since 2011. The scope of

the journal covers the area of infection prevention and control, microbiology, infectious diseases, public health and the application of healthcare epidemiology. JIPH is available in print and online (<http://www.jiph.org/>).

## **2. Methods**

This is an introspective observational study carried out in the College of Applied Medical Sciences, KSAU-HS. The study data was taken from the websites of the targeted journals and mainly segregated based on three parameters: (a) the growth of publication, (b) types of publication, and (c) the authorship pattern. Excel spreadsheets were used for calculating and analyzing the data.

### **2.1 Objectives**

The specific objective of the current study addresses the following aspects:

1. The growth of publication that compares the year and issue distribution of publications.
2. The types of publication that include the assessment of original and review articles, short communications, and case and short reports.
3. The authorship pattern that identifies the authorship pattern and research collaboration.

### **2.2 Literature Review**

The review of relevant literature revealed some bibliometric studies that were conducted in SA. Alhaider, Ahmed, and Gupta (2015) analyzed 1386 pharmaceutical research produced in SA from 2001 to 2010. The study revealed that Saudi Pharmaceutical Journal was on the top list of 15 journals with 145 articles, King Saud University found to be most productive institution with 505 papers. Saquib et al. (2017) conducted a bibliometric assessment for 295 articles on

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cardiovascular diseases published during 1986 to 2015 in SA. The study focused on the type of cardiovascular diseases and research design and did not identify the journals' rank and origin.

Haq, Al Fouzan, and Baladi (2017) examined 45 research on oncology for the period of 2007–2015. The majority of the articles (n=33) were published in international journals, leaving only nine articles published in local journals. Shehatta and Mahmood (2016) inspected 88,506 research articles produced by Saudi researchers from 1980 to 2014. Of the total papers, 28% were about medical and health sciences. The majority of the articles were published in two Saudi journals indexed in the Web of Science: Saudi Medical Journal and Annals of Saudi Medicine. Latif (2015) reviewed 1562 research articles conducted by Saudi researchers for the period 2008–2012. The findings showed that 76% of the papers were original research articles and only one fourth of them were published in journals with high impact factor.

Al-Bishri (2013) evaluated 1905 articles published by Saudi authors in PubMed index journals between 2010 and 2011. The majority of the articles (n=216, 15.5%) focused on the community medicine with some published in high impact factor journals, such as New England Journal of Medicine and Lancet. The author concluded that SA was lagging behind in medical research and offered possible suggestions to increase the rate of research output in SA. The literature review showed several bibliometric assessment studies conducted in SA; however, to the best of our knowledge, the literature lacks a bibliometric study that compared between journals. The current study aims to fill this gap.

### 3. Results

#### 3.1 Growth of Publication

As indicated in Table 1 and Figure 1, 827 articles were published in 64 issues with an average of 12.92 articles per issue in the three journals. JIPH published 439 articles with an average of 14.6 articles per issue in 30 issues. SJMMS published 195 articles with an average of 13.9 articles per issue in 14 issues. JSHA published 193 articles with an average of 9.6 articles per issue in 20 issues. During the period between 2013 and 2017, the maximum of 43 articles and minimum of 8 articles were published in 30 issues of JIPH, the maximum of 20 and minimum of 10 articles were recorded in all 14 issues of SJMMS, and finally the maximum of 12 and minimum of 7 articles were published in 20 issues of JSHA.

Table 1: Year, Volume and Issue-Wise Distribution of Articles in JIPH, SJMMS, and JSHA.

No	Year, Journal & Volume	Issue I	Issue II	Issue III	Issue IV	Issue V	Issue VI	Total Article Published	%
1	2013 SJMMS V: 6	10	10					20	2.42%
2	2014 SJMMS V: 7	10	11	19				40	4.84%
3	2015 SJMMS V: 8	20	16	12				48	5.80%
4	2016 SJMMS V: 9	10	13	17				40	4.84%
5	2017 SJMMS V: 10	15	18	14				47	5.68%
6	2013 JSHA V:25	8	8	8	7			31	3.75%
7	2014 JSHA V:26	9	9	9	8			35	4.23%
8	2015 JSHA V:27	10	10	11	10			41	4.96%
9	2016 JSHA V:28	9	10	10	11			40	4.84%
10	2017 JSHA V:29	11	12	12	11			46	5.56%
11	2013 JIPH V: 1	8	11	13	10	11	12	65	7.86%
12	2014 JIPH V: 2	10	12	11	13	10	13	69	8.34%
13	2015 JIPH V: 3	11	12	13	10	14	16	76	9.19%
14	2016 JIPH V: 4	15	9	19	20	19	12	94	11.37%
15	2017 JIPH V: 5	17	16	15	14	30	43	135	16.32%
		173 (21%)	177 (21.4%)	183 (22.1%)	114 (13.7%)	84 (10.1%)	96 (11.6%)	827 (12.92 articles per issue)	



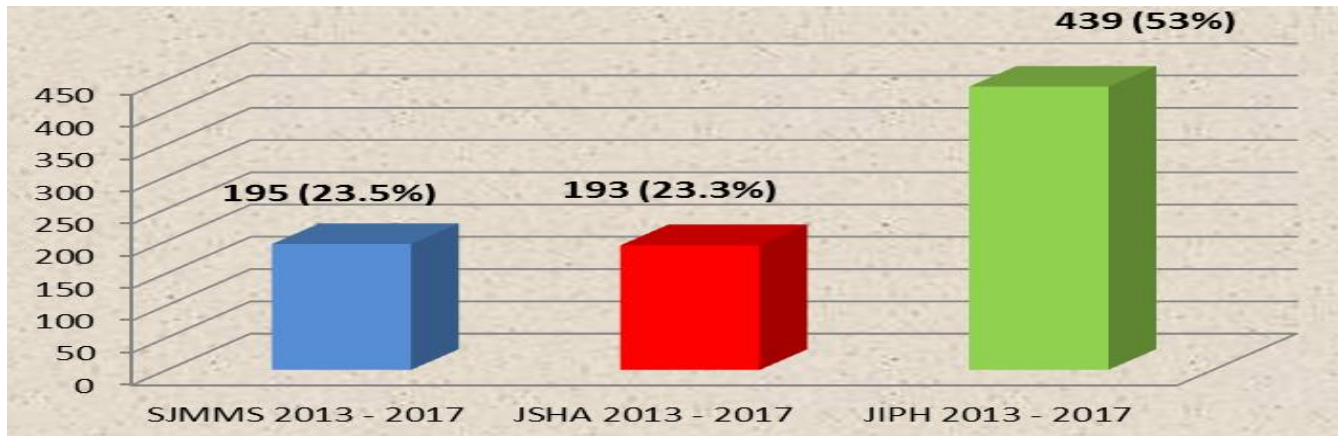


Figure 1. Published research items in JIPH, SJMMS, and JSHA.

### 3.2 Types of Publication

Figure 2 and Table 2 present the distribution of published research according to type. Out of the 827 published papers, 514 (62.15%) were original articles followed by 173 (20.92%) case reports, 82 (9.92%) review articles, and other publication types. Total of 5312 pages was written in the three journals in all types of publication during the targeted period with an average of 6.42 pages per articles. The ratio of the number of pages was higher in SJHA (6.44) than in JIPH (5.14) and SJMMS (4.91). The total of 20,777 references were used to write the 827 research papers with mean value of 25.12 reference per article. The reference fraction was higher in JIPH (26.89) compared to SJHA (23.67) and SJMMS (22.55).

Table 2. Types of publication and Numbers of Pages and References.

Publication Type	SJMMS 2013 – 2017 Total issues 14	JSHA 2013 – 2017 Total issues 20	JIPH 2013 – 2017 Total issues 30	Total	%
Original Articles	89	85	340	514	62.15%
Review Articles	23	23	36	82	9.92%
Short Communications	4	1	23	28	3.39%
Case Reports	79	84	10	173	20.92%
Short Reports	0	0	30	30	3.63%
Total Articles	195	193	439	<b>827</b>	
Pages	958	1244	3110	5312	6.4 pages use per article
Total References	4399	4569	11809	20777	25.1 references use per article

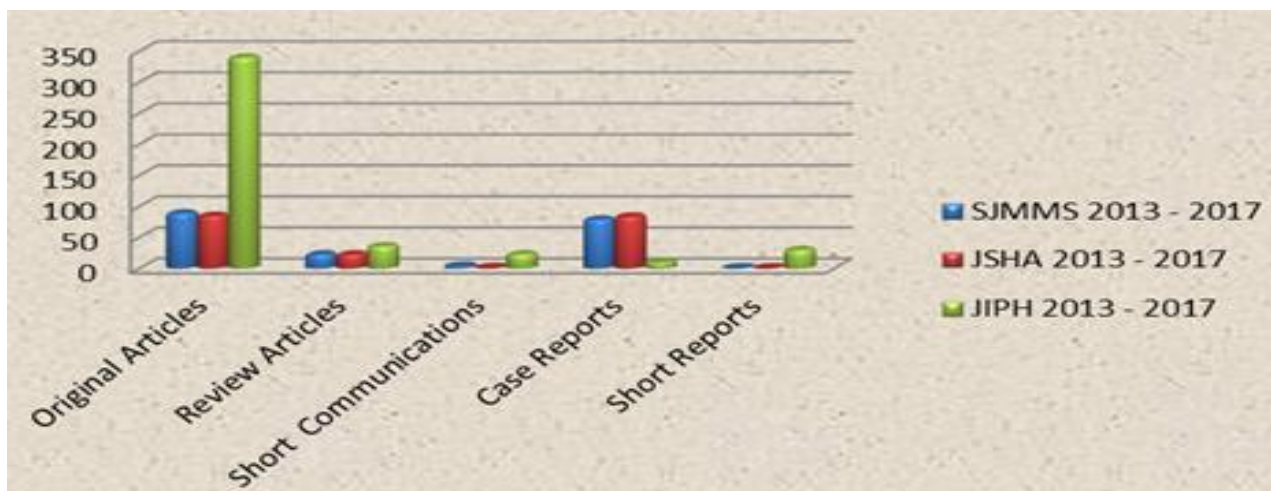


Figure 2. Types of Publication in JIPH, SJMMS, and JSHA.

### 3.3 Authorship Pattern

All the 827 research papers were written by 3808 authors with an average of 4.6 authors per article. The number of authors of 439 articles published in JIPH was 2257 authors with an average of 5.1 authors per article. The total of 951 authors with an average of 4.92 authors per article published 193 papers in JSHA. The 195 papers that were published in SJMMS were authored by 600 researchers with an average of 3.07 authors per article. Table 3 shows the total

number of authors per journal for the period of 2013–2017. Figure 3 depicts that the majority of research articles (n=746; 90.2%) were carried out by groups of researchers rather than by single authors. Only 81 (9.7%) papers were produced by single authors. Authorship pattern disclosed that four authored papers ranked first in order sharing (19.8%) of the total research output followed by three authored papers taking 16.9% of the total research contributions. Only 36 (4.3%) articles were conducted by  $\geq 10$  authors.

Table 3. Total Number of Authors in Published Papers in JIPH, SJMMS, and JSHA.

Number of Authors	SJMMS 2013 – 2017 Total issues 14	JSHA 2013 – 2017 Total issues 20	JIPH 2013 – 2017 Total issues 30	Total	%
Total Authors	600	951	2257	3808	4.6 authors per article

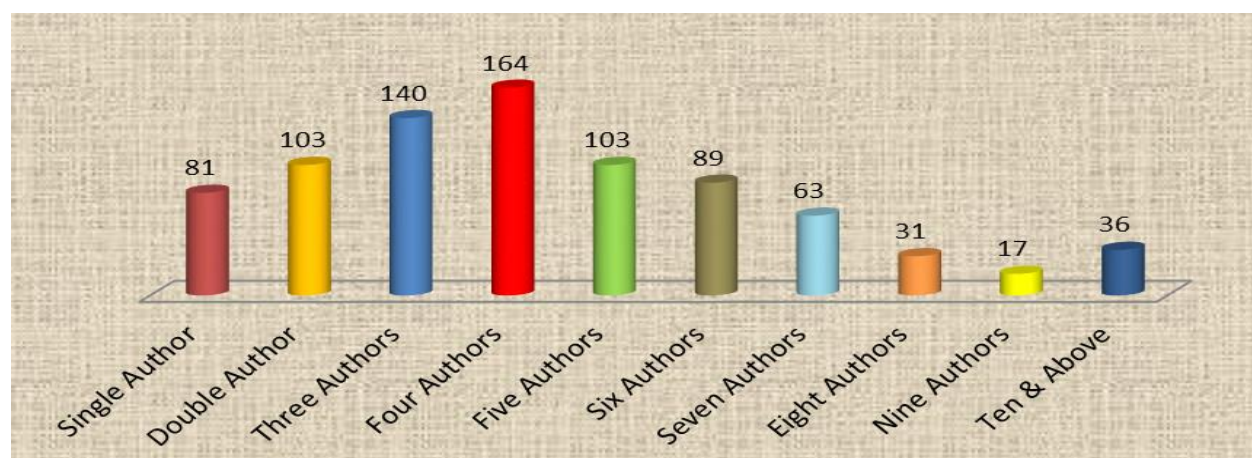


Figure 3. Authorship Pattern of JIPH, SJMMS, and JSHA.

#### 4. Discussion

Journals are tools that disseminate the scholarly communication among the scientific community around the globe. Bibliometric analyses of the journals’ literature provide valuable information in terms of the productivity of authors, type and quality of research, and development of the

journal in a specific field. SA was in the 50<sup>th</sup> position of scientific publication with 2402 papers according to SCImago Journal and Country Rank (SJR, 2018), which is a publically available portal that includes journal and country scientific indicators developed according to the Scopus database. However, the numbers of Saudi scholarly publication were rapidly accelerated in last decade and reached 32<sup>nd</sup> position in 2016 with 19918 papers. The current bibliometric analyzed the literature of three free to access Saudi journals specialized in medicine and medical sciences, public health, and cardiology. This analysis was based on the publications data consisting of 827 research papers published during 2013–2017. The rising tendency of scholarly communication was evident. The total of published research articles in all three journals was 116 in 2013 compared to 187 in 2017. This increase in publication was estimated at 61.20% with 6.77% annual growth rate.

The publication types brought out the fact that the original articles (62.15%) occupied the predominant place among the other types of publication. The authorship pattern of the journals research revealed that the majority of papers are multi-authored, which indicated the research output of the authors is mainly collaborative. Through collaboration, researchers share knowledge that bring in a mixture of positive scientific ideas. However, the unified bylaws for faculty in Saudi universities give more weight to single authored papers compared to multi-authored papers. For example, one of the requirements to be eligible for promotion from assistant professor to associate professor is four published and/or accepted for publication units. A scholarly work is to be counted as ‘one unit’ if it is single authored, and ‘half unit’ if it has two authors. If the research was conducted by more than two authors, it will be regarded as ‘half unit’ for the first author and ‘quarter unit’ for each of the others (KSAU-HS, 2018). The Ministry of

Education in SA is recommended to revise this particular bylaw to be in parallel with the trends towards collaborative research, which is gaining currency day-by-day.

## **5. Conclusions**

The research activities in SA is in a growing path. The comparison of bibliometric indicators of three Saudi medical journals revealed the rising tendency of research publications and the high rate of collaborative research. These journals contributed massive number of research papers (n=827) for the period of 2013–2017. Although not all the published articles in these three journals were carried out in SA, such contribution provides a glowing image about Saudi scientific activities in the global scenario. The unified bylaws for faculty in Saudi universities should give more weight to multi-authored papers.

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