

## Bibliometric analysis of the Journal of Pakistan Medical Association form 2009 to 2013

Muhammad Ibrahim,<sup>1</sup> Saeed Ullah Jan<sup>2</sup>

### Abstract

**Objective:** To conduct a bibliometric analysis of the Original articles published in the Journal of Pakistan Medical Association.

**Methods:** The study was conducted in Peshawar and comprised all Original articles published in the Journal of Pakistan Medical Association between 2009 and 2013. The articles were downloaded from the Journal website and bibliometric parameters were analysed.

**Results:** A total number of 913 Original articles were found in regular issues of the Journal, while leaving out six special supplements that were published during the period under study. The number of Original articles increased steadily from 148(16.2%) in 2009 to 214(23.4%) in 2013, In yearly terms, Original articles published each year ranged between 148 and 214; 510(55.9%) had 21-30 citations; 3-author contributions ranked the highest with 206(22.6%); 481(52.7%) authors were geographically affiliated to Sindh, Pakistan; Community Medicine was the most popular medical specialty with was 140(15.3%) articles; 17340(90.5%) citations were from journals; and the most productive institution was Aga Khan University, Karachi.

**Conclusion:** The number of papers published in Journal of Pakistan Medical Association per issue increased from 2009 to 2013 and the main region in terms of contribution was Sindh.

**Keywords:** Bibliometrics, Journal of Pakistan Medical Association, Distribution of articles, Citation, Author pattern, statistical bibliography-JPMA, bibliometrics- medical journal. (JPMA 65: 978; 2015)

### Introduction

The term 'bibliometrics' was first introduced in 1969 and at the same time the term 'scientometrics' was introduced. Bibliometrics was defined as "the application of mathematical and statistical methods on books and other media of communication". Scientometrics was defined as "the application of those quantitative methods which deals with the analysis of science viewed as an information process". However, today these terms are almost used as synonyms.<sup>1</sup>

Many scientists used the term under different names, but the concepts were more or less supplementary and complementary to each other with some broader and narrower extension of human ideas. One name that was used quite early but very scarcely was statistical analysis of the literature.<sup>2</sup>

Bibliometric study is being consistently adopted by the Library Information Science researchers to appraise and evaluate the scientific output of the published literature on any specific subject domain for a definite period through the application of bibliometric and citation

indicators. Moreover, bibliometric studies have been immensely useful for librarians in selection and weeding policies. It serves as a useful tool to the academic community in identifying most popular authors and potential publications. Furthermore, it helps in determining the highly cited journals, ranking of prolific authors, authors' productive pattern, the journal impact factor, and other significant details of any specific literature under study.<sup>3</sup>

Journal of Pakistan Medical Association (JPMA) is an international biomedical journal from Pakistan. The JPMA International Standard Serial Number (ISSN) 0030-9982 (J. Pak. Med. Assoc.) is a monthly peer-reviewed medical journal published by the Pakistan Medical Association since 1953 to date.

The JPMA is recognised by Pakistan Medical and Dental Council (PMDC), abstracted by MEDLINE/PubMed and indexed in the Index Medicus (1975)/EMBASE/BIOSIS Previews/EMBASE/Excerpta Medica, and the Science Citation Index Expanded. JPMA is the member of Committee on Publication Ethics, United Kingdom (COPE-UK (2010) and member of International Committee of Medical Journal Editors(ICMJE) (2009). The highest h-index among Pakistani science journals which are Thomson Reuters, Institute of Scientific Information (ISI) indexed is 23 of the JPMA. According to the Journal

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<sup>1</sup>Peshawar Medical College, <sup>2</sup>Sarhad University of Science and Information Technology, Peshawar.

**Correspondence:** Muhammad Ibrahim. Email: pmclibrary@hotmail.com

Citation Reports, the journal had impact factor of 0.409 in 2013.<sup>4</sup>

The current study was planned to investigate the different aspects of Original articles published in JPMA.

To examine the number and percentage of articles published by year

To find out the authorship pattern

To know the contribution of authors gender wise, geographical affiliation

To measure articles lengthwise

To study the pattern of citation

To classify articles by medical specialties

## Material and Methods

The bibliometric study was conducted in Peshawar and comprised Original articles published in JPMA to frame the portrait of the research publication. The Original articles included relate to the period between 2009 and 2013 which were downloaded from the JPMA website for analysis as the full text of articles are available in Hyper Text Markup Language (HTML) and Portable Document Format (PDF) versions for free. Parameters analysed were the number and percentage of articles published by year; authorship pattern; contribution of authors gender wise, and geographical affiliation; article length; pattern of citation; and articles by medical specialties.

All Original articles in the regular issues of the Journal were analysed while leaving out six special supplements, Review articles, Short Communication, Case Reports, Student's Corner and Letter to the Editor. For each Original article, the authorship pattern, gender of the authors, number of references, geographical affiliation of authors, contribution from multiple countries, medical specialty of the article and pattern of citations were noted. For the purpose of the study, Pakistan was divided into seven regions: Punjab, Sindh, Khyber Pakhtunkhwa, Baluchistan, Gilgit-Baltistan, Islamabad, and Azad Jammu and Kashmir (AJK), but the other countries were not subdivided.

## Results

There were a total of 913 Original articles and 19153 citations. The highest number of articles were 214(23.4%) were published in 2013 and the lowest were 148(16.2%) in 2009 (Table-1).

There were 206(22.6%) three-author contributions, followed by four-author 203(22.2%). However, contribution of five-author articles was 140(15.3%), six-author 125(13.7%), two-author 126(13.8%) and single-author 27(3.0%). For gender assessment, all the first authors were taken for analysis. There were 563(61.7%) male authors compared to 350(38.3%) female authors (Table-2).

Regarding geographical affiliation of first authors, two categories namely national and international zones were made. Contributions from Pakistan were 658(72%) in which major contribution was of Sindh 481(52.7%) followed by

**Table-1:** Year wise distribution of articles.

Year	Month												Total	Percent
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.		
2009	9	11	12	13	12	13	14	15	14	13	10	12	148	16.2%
2010	13	11	16	13	13	15	15	16	16	17	15	16	176	19.3%
2011	17	15	15	16	16	18	16	17	15	14	15	12	186	20.4%
2012	13	12	14	15	14	15	17	18	18	19	19	15	189	20.7%
2013	19	20	18	17	16	20	17	18	19	16	18	16	214	23.4%
Total	71	69	75	74	71	81	79	84	82	79	77	71	913	100%

**Table-2:** Contribution of authors by gender.

Year	Male	Percent	Female	Percent	Total	Percent
2009	95	64.2 %	53	35.8 %	148	16.2 %
2010	106	60.6 %	69	39.4 %	175	19.2 %
2011	116	63.7 %	66	36.3 %	182	19.9 %
2012	120	63.5 %	69	36.5 %	189	20.7 %
2013	126	57.5 %	93	42.5 %	219	24.0 %
Total	563	61.7 %	350	38.3 %	913	100 %

**Table-3:** Geographical Affiliation of Authors.

S.No	Zones/Countries	2009	2010	2011	2012	2013	Total	Percent
1	Azad Kashmir	0	0	0	1	1	2	0.2
2	Baluchistan	1	1	0	0	1	3	0.3
3	GilgitBaltistan	0	0	0	0	1	1	0.1
4	Islamabad	6	9	10	10	20	55	6.0
5	Khyber Pakhtunkhwa	1	3	2	6	6	18	2.0
6	Punjab	27	12	20	17	22	98	10.7
7	Sindh	90	120	92	92	87	481	52.7
8	Australia	0	0	4	0	0	4	0.4
9	Bangladesh	0	2	0	1	0	3	0.3
10	China	0	0	1	0	0	1	0.1
11	Egypt	0	0	1	1	0	2	0.2
12	Switzerland	0	0	3	0	1	4	0.4
13	India	0	2	1	1	2	6	0.7
14	Iran	8	9	20	28	36	101	11.1
15	Iraq	0	2	1	0	1	4	0.4
16	Ireland	0	1	0	0	0	1	0.1
17	Japan	1	0	0	0	0	1	0.1
18	Jordan	0	1	3	0	2	6	0.7
19	Liberia	0	0	5	0	0	5	0.5
20	Libya	0	1	0	0	0	1	0.1
21	Malaysia	0	0	0	2	0	2	0.2
22	Morocco	0	0	0	1	0	1	0.1
23	Nigeria	1	1	0	2	1	5	0.5
24	Oman	0	0	0	0	1	1	0.1
25	Qatar	0	0	1	0	1	2	0.2
26	Saudi Arabia	6	5	3	3	4	21	2.3
27	Scotland	1	0	0	0	0	1	0.1
28	Sri Lanka	0	0	0	0	1	1	0.1
29	Sudan	0	0	0	1	0	1	0.1
30	Thailand	0	0	0	0	1	1	0.1
31	Turkey	2	2	11	18	28	61	6.7
32	United Arab Emirates	3	1	1	1	1	7	0.8
33	United Kingdom	0	1	2	3	1	7	0.8
34	United States of America	0	2	1	1	0	4	0.4
35	Yemen	1	0	0	0	0	1	0.1
Total	35	148 (16.21%)	175 (19.17%)	182 (19.93%)	189 (20.70%)	219 (23.99%)	913	100%

**Table-4:** Type of Cited References.

Years	Journal	Book	Report/Proceed.	URL	News Paper	Dissert.	Other	Total
2009	2679	89	73	78	2	3	1	2925
2010	3357	130	102	118	5	6	6	3724
2011	3562	147	114	100	3	6	0	3932
2012	3570	126	171	131	1	6	3	4008
2013	4172	129	125	125	0	11	2	4564
Total	17340 (90.5%)	621 (3.2%)	585 (3.1%)	552 (2.9%)	11 (0.1%)	32 (0.2%)	12 (0.1%)	19153 (100%)

Punjab 98(10.7%) (Table-3). Contributions from other countries were 255(28%) among which Iran was the highest with 101(11.1%) authors followed by Turkey 61(6.7%). Also on the list were Saudi Arabia 21(2.3%), United Kingdom 7(0.8%) and United States of America

4(0.4%). Authors from 28 countries featured in JPMA.

Further, 63(7%) articles had been contributed by authors from multiple countries. The prominent year was 2012 with 21(33.3%) such articles followed by 2011 with

**Table-5:** Classification by Medical Specialties.

S.No.	Specialties	2009	2010	2011	2012	2013	Total	Percent
1	Anatomy		2	1	3		6	0.7%
2	Aneasthesia	4			4	2	10	1.1%
3	Bibliometrics Study		1			1	2	0.2%
4	Biochemistry	2	3			3	8	0.9%
5	Cardic Surgery	3					3	0.3%
6	Cardiology	3	11	13	9	13	49	5.4%
7	Cardiothorasic Surgery					1	1	0.1%
8	Cardiovascular Disease		2				2	0.2%
9	Communicable Disease		1		1		2	0.2%
10	Community Dentistry				1		1	0.1%
11	Community Medicine	23	30	25	26	36	140	15.3%
12	Plastic Surgery		1		1		2	0.2%
13	Dentistry	1		3	4	3	11	1.2%
14	Dermatology	1	1		2		4	0.4%
16	Diagnostic Cardiology		2		1		3	0.3%
17	Diagnostic Medicine		4		3		7	0.8%
18	Ear, Nose, Throat (E.N.T)	2	4	8	8	2	24	2.6%
19	Endocrinology	1	1	9		4	15	1.6%
20	Forensic Medicine		3	1	1	2	7	0.8%
21	Gastroenterology			5		1	6	0.7%
22	Genetics			1			1	0.1%
23	Gynaecology	6	3	12	6	17	44	4.8%
24	Histopathology			2		1	3	0.3%
25	Medical Education			3	7	8	18	2.0%
26	Medical Research	4		2			6	0.6%
27	Medicine	19	31	26	27	31	134	14.7%
28	Medicine-Cardiology	2					2	0.2%
29	Microbiology		1	3	2		6	0.7%
30	Neonatology	1	2		2		5	0.5%
31	Nephrology	2	2	1	2		7	0.8%
32	Neurology		2			2	4	0.4%
33	Nursing				1		1	0.1%
34	Obstetrics	5	13		8	2	28	3.1%
35	Occupational Medicine				1		1	0.1%
36	Oncology	4	2	8	2	7	23	2.5%
37	Ophthalmology	3	5	5	6	7	26	2.8%
38	Ophthalmology			1	1		2	0.2%
39	Oral Pathology					3	3	0.3%
40	Orthopaedics	1		6	1		8	0.9%
41	Paediatrics	5	14	9	9	5	42	4.6%
42	Parasitology		1				1	0.1%
43	Pathology	26	7	4	3	6	46	5.0%
44	Pharmacology	7	2	13	10	9	41	4.5%
45	Physiology	5	2	1	2	6	16	1.8%
46	Psychiatry	2	1	4	3	5	15	1.6%
47	Pulmonology		2				2	0.2%
48	Radiology	6	1	7	5	7	26	2.8%
49	Sexually Transmitted Diseases		1		1		2	0.2%
50	Sports Medicine			1			1	0.1%
51	Surgery	9	14	7	18	24	72	7.9%
52	Toxicology				3	3	6	0.7%
53	Urology	1	4	5	5	3	18	2.0%
Total	53	148	176	186	189	214	913	100%

14(22.2%) articles, while 2013, 2009 and 2010 had 11(17.4%), 9(14.2%) and 8(12.6%) articles. A total of 3736 authors contributed during the study period among whom 913(24.4%) were first authors and 2823(75.5%) co-authors.

In terms of length, 389(42.6%) articles were 4 pages in length followed by 282(30.9%) of 5 pages and 116(12.7%) of 3 pages. Articles of 6 pages were 98(10.7%) and more than 6 pages 25(2.7%).

Authors who preferred journals for citation were numbered 17340(90.5%) followed by those who cited books 621(3.2%) and report/proceedings 585(3.1%) (Table-4). Among the other sources of information cited, like newspapers, thesis/dissertation etc., the Internet was on top with 552(2.9%) citations.

Articles with 21-30 references were 510(55.9%), 11-20 references 355(38.9%) and 5-10 reference 29(3.2%). Articles containing 31-40 references were 16(1.7%) and over 40 references 03(0.3%).

A total of 53 specialties of Basic and Clinical Medical Sciences were covered by JPMA. Maximum articles related to Clinical Sciences, but in single specialty Community Medicine (Basic Sciences) was on top with 140(15.3%) articles followed by Medicine (Clinical Sciences) 134(14.7%) and Surgery (Clinical Sciences) 72(7.9%).

## Discussion

Bibliometric studies provide in depth analysis of scientific productivity, thus ensuring and verifying the validity and output of research publications. Various bibliometric studies have been conducted globally in order to identify significance of research work in the field of Medical Sciences. Literature review is an important and indispensable element in any research study. It facilitates understanding of previous research interests, research models and the size of research. A recent study evaluated International Journal of Medical and Health sciences (IJMHS) and revealed that the journal intends to build upon the observed momentum by strengthening international relationships, supporting new research collaborations.<sup>5</sup> Similarly, research publications have been analysed on Positron Emission Tomography (PET) from 2002 to 2012 with the result that a yearly considerable increase was noticed from 547 (2002) to 986 (2007), and 1838 (2012).<sup>6</sup> A study on toxicology research productivity in Middle Eastern Arab countries during a 10-year period (2003-2012) explored present data, showing a promising rise and a good start for toxicology research activity in toxicology journals from the Arab world.<sup>7</sup> Besides, there have been noted bibliometric studies conducted in the

field of Medical Sciences.<sup>8-11</sup>

With special reference to Pakistan, only a few bibliometric studies have been conducted so far to explore the significance of medical journals. One of the noted studies evaluated the Journal of Ayub Medical College from 1997 to 2006, concluding that the volume and number of articles in the JAMC had increased. Original articles are the main type of papers for this journal, and papers by authors from Pakistan make up the largest proportion.<sup>12</sup> Another study was conducted to rate Pakistani medical journals using the principles of citation analysis. It revealed that the JPMA remained on the top in all three rankings, while the Journal of College of Physicians and Surgeons-Pakistan attained second position in the ranking based on the total number of citations.<sup>13</sup> One study evaluated the significance of Rawal Medical Journal and revealed that there were 437 citations in 32 research articles in the two issues of Volume 31 from January to December 2006. Majority of contributions were by Pakistani authors; author and journal self-citations were low indicating a high Impact factor. More research activities and better literature search are required to improve journal quality.<sup>14</sup>

Besides the subject of Medical Science, various bibliometric studies have also been conducted in other subjects on different national and international journals. The findings of each study reveal interesting facts on authorship pattern, number of citations per article, increase in the output of each journal. For example, one revealed that most of the papers were single-author contribution and, being a Pakistani-origin journal, majority of the authors belonged to Pakistan. Authors from 12 foreign countries also contributed in this journal as found in the study of 11 volumes.<sup>15-18</sup>

A citation evaluation of the Journal of American Society for Information Science and Technology (JASIST) revealed that the publication rate of its literature doubled and the average number of references per paper increased 2 to 3 times in the period of 25 years from 1985 to 2004.<sup>19</sup> Similarly, a study analysed Ghana Library Journal published between 2000 and 2006, showing that the majority of items cited were articles 45% followed by books 32.5%.<sup>20</sup> A study on Malaysian Journal of Library and Information Science, covering period from 2001 to 2006, showed that the number of publications increased; statistically significant changes occurred in types of articles; and number of references per article along with length of the articles also increased. Two-author articles were greater in number and the major contribution was from Malaysian authors.<sup>21</sup> Literature published from 1999

to 2005 in the Annals of Library and Information Studies showed that maximum numbers of articles (17.56%) were published in the year 2005. Single-author contribution was the highest with a ratio of 35.88%. Majority of the contributors were Indian academics. Most of the publications (51.15%) had length of 6-10 pages.<sup>22</sup>

The current study showed that 214(23.4%) articles were published in 2013; three-author articles were 206(22.6%); male authors 563(61.7%) were prominent; authors from 28 countries contributed; majority citations were from journals 17340(90.5 %) followed by books 621(3.2%); and medical specialties covered during the selected period were 53.

### Conclusion

The JPMA has successfully completed 60 years of publication. It has got worldwide recognition and is increasingly growing to be a promising journal in the area of biomedical sciences by attracting scholarly articles from around the world. The frequency of publication is monthly and number of articles in the JPMA has increased gradually from 2009 to 2013. It is also concluded that the publication is open to all realms of Medical Sciences. Bibliometric studies of this nature can help to identify citation behaviour trends, author productivity, and can help to identify possible problems, such as the need to encourage authors to cite their own local literature alongside international literature, which helps to increase the authority of national medical journals. Results confirm that this journal can surely increase its impact factor and influence the research circle in the future.

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