

# Bibliometric research productivity analysis: A case study of Shifa Tameer-e-Millat University

Amir Latif<sup>1</sup>, Ikram Ul Haq<sup>2</sup>

<sup>1</sup> Librarian, Shifa College of Pharmaceutical Sciences, Shifa Tameer-e-Millat University, Islamabad, Pakistan

<sup>2</sup> Librarian, College of Dentistry, King Saud bin Abdulaziz University for Health Sciences, Riyadh, Kingdom of Saudi Arabia

## Author's Contribution

<sup>1</sup> Manuscript writing, data collection

<sup>2</sup> Data investigation, review of manuscript

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## Correspondence

Amir Latif

[librarian.scps@stmu.edu.pk](mailto:librarian.scps@stmu.edu.pk)

## A B S T R A C T

**Objectives:** This study is aimed to conduct a bibliometric analysis of research productivity of Shifa Tameer-e-Millat University (STMU).

**Methodology:** Data was collected from online resources from 2012 to 2018. The outcome parameters were the number of publications in each year, document type, scrutiny of the subject area, authorship pattern, research collaboration, frequently used journal and the range of references.

**Results:** STMU produced 231 documents with frequent references between of 20 to 29. Two-thirds of total publications consisted of original articles and Pharmacology was found to be the preferred area of research.

**Conclusion:** Research publication is the key element to measure academic performance. There has been a growing tendency in publications over the past three years.

**Keywords:** Bibliometric, scientific productivity, research, publications.

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## Introduction

The advancement of knowledge depends on continuing research and enhancing scientific and scholarly communication. Conducting systemic research is an innovative activity to enhance the existing theories and provide a suitable solution to the problems.<sup>1,2</sup> Medical research has been carried out to discover new treatment of diseases in order to improve the prognosis and quality of life.<sup>3</sup> Higher education institutions and universities are known to be the knowledge hub and center of research.<sup>4</sup> The estimation of research publication output is one of the imperative gauges to assess the quality of education and prestige of the specific institution.<sup>5</sup> The research publications have been increased manifold during the last decade due to the accessibility of digital resources and the allocation of sufficient finance for higher education.<sup>6</sup> So, the studies on bibliometric evaluation of literature have also been amplified,<sup>7,8</sup> Alan Prichard originated the term bibliometric in 1969, which is a combination of mathematics and statistics on books and other published materials.<sup>9</sup> Bibliometric studies help to find out the least

and most preferred areas of research as well as other attributes of publication output.<sup>5</sup> These studies are used for the decision-making process and allocation of funds.<sup>10</sup>

The research output of the university scientists in the form of research papers in peer-reviewed scholarly journals is being considered as one of the main criteria for assessing the performance of the university scientists and faculty.<sup>5</sup> Shifa Tameer-e-Millat University (STMU) is a recognized institution for providing education and training to health care professionals and students, located in Islamabad, the capital of Pakistan. It was established in 2012 sponsored by Shifa International Hospital. STMU is paying special attention to hi-tech health care research and is striving hard to increase the quantity and quality of publications. Due to the sincere efforts of the management, it has been seen that scholarly publications have been increasing lately.<sup>11</sup>

A 2012 study evaluated the publication output in the field of medical sciences by the universities of Pakistan from 2007 to 2010. Twenty-four medical universities

produced 5,889 publications with an average of 1472.25 documents per year and an average of 245.35 documents per university. Karachi University was found to be most productive followed by Aga Khan University and the University of Punjab.<sup>12</sup> Another study indicated that Pakistan produced 38,274 documents from 1996 to 2020 and the share of Pakistan's research output was only 0.32% from the global perspective.<sup>13</sup> A recent study analyzed the scientometric examination of 4,876 documents created by the researchers of the National University of Sciences and Technology, Islamabad from 2004 to 2018.<sup>14</sup> Iqbal et al. analyzed the research growth of Pakistan from 1981 to 2015. The study revealed that Karachi University emerged as the most productive university and King Saud University of Saudi Arabia was found to be the top priority in international research collaboration.<sup>6</sup>

Sab C. et al. conducted a scientometric analysis of medical research in India from 2009 to 2018 as reflected in Web of Science. A total of 29,153 documents published by Indian medical researchers were reviewed. All India Institute of Medical Sciences arose as the most prolific organization with 2,209 documents and Indian Journal of Medical Research stood at top in journals' rank with 2,158 documents. The study also exposed that United States was on the top with 471,342 publications on medical science during the same period followed by China with 134,685 documents.<sup>15</sup> A 2010 report examined the medical research output by Iranian researchers from 1978 to 2007. A total of 15,487 documents were published by Iran over 30 years with an average of 516.23 documents per year and Pharmacology was found to be a preferred area of research with 2,222 (12.35%) documents.<sup>16</sup> Haq and Alfouzan carried out the bibliometric analysis of 775 publications produced by King Saud bin Abdulaziz University for Health Sciences from 2005 to 2015. Medicine (n=119; 15.35%) was the most opted for area of research and United States was found to be on top priority in international research collaboration.<sup>5</sup>

The quality of research publications reflects the excellence of the institution and the standards of teaching. The current bibliometric study involves the requirement of evaluation of scholarly publications produced by the researchers of STMU and its findings available for the authorities in strategic decision-making

for enhancement of academic and research quality. The aim of the study is to present the bibliometric profile of research publications produced by the faculty of STMU during the targeted period set in the methodology.

## Objectives

Following were the objective of the study:

1. To investigate the growth of the research output by the authors of STMU,
2. To distribute the documents by types and by subjects,
3. To assess the pattern of authorship, national and international collaboration, frequently used journals, distribution of journal by country and range of references.

## Research Methods

The data was collected using four online data bases including Google Scholar, Medline/PubMed, Scopus, and Web of Science from January 2012 to December 2018. It comprised records of publications of authors affiliated with STMU and its constituent institutions. The study organized the bibliographic information of all the retrieved documents and moved them to Microsoft Excel Sheet for investigation. The bibliometric parameters including number of publications in each year, document type, scrutiny of a subject area, authorship pattern, and research collaboration, frequently used journal along with publications country and number of publications as well as the range of references have been presented in a tabulated form. Following formula<sup>17</sup> has been used to get the annual average growth rate.

$$\text{Annual growth rate} = 100 \frac{(\text{most recent value} - \text{past value})}{\text{past value}}$$

### Inclusion Criteria:

All kinds of documents with authorship affiliated with STMU and its constituent institutions published till December 31<sup>st</sup>, 2018 have been included in the analysis of this paper.

### Exclusion Criteria:

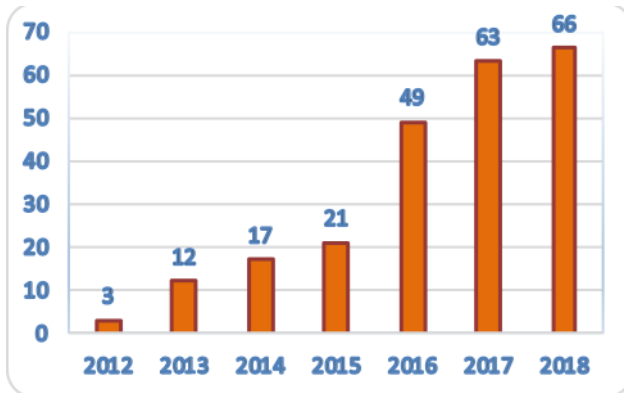
The documents which are publishing since January 1<sup>st</sup>, 2019 and the publications that didn't mention STMU and its constituent institutions as affiliated address have been excluded.

## Results

The researchers of STMU and its constituent institutions produced 231 documents during the period of seven years from 2012 to 2018 with an average of 28.87 documents per year as shown in Table 1 and Figure 1. The rising tendency of publications was found with an average annual growth rate of 88.64%. There were only 3 publications produced in the year 2012 and a maximum of 66 documents were found in the year 2018. Furthermore, more than fifty percent of the publications have been published in the last two years.

**Table 1: Year-Wise growth of Publications (n=231)**

Year	Number of documents	Percentage	Annual growth rate
2012	3	1.29%	--
2013	12	5.19%	300.00%
2014	17	7.35%	41.66%
2015	21	9.09%	23.52%
2016	49	21.21%	133.33%
2017	63	27.27%	28.57%
2018	66	28.57%	4.76%
<b>Average Annual growth rate</b>			<b>88.64%</b>



**Figure 1: Year-Wise growth of Publications (n=231)**

The analysis of document types shows that majority of publications written in the shape of original research articles (n=154; 66.66%), followed by case report/study (n=23; 9.95%), letter to editors (n=18; 7.79%) and book chapters (n=9; 3.89%). The details of other types are given in Table 2.

**Table 2: Distribution of Document type (n=231)**

Document type	Number of documents	Percentage
Article	154	66.66%
Case Report / Study	23	9.95%
Letters to Editors	18	7.79%
Book Chapter	9	3.89%
Editorial	6	2.59%
Review Article	6	2.59%
Abstract	3	1.29%
Short communication / Report	3	1.29%
Conference Paper	2	0.86%
Erratum	2	0.86%
Survey	2	0.86%
Brief Communication	1	0.43%
Doctoral Thesis	1	0.43%
Paper Poster	1	0.43%

The authors affiliated with STMU carried out research projects on a variety of themes. The subject-wise segregation of documents reveals that majority of research was conducted on pharmacology (n=31; 13.41%), medical education (n=30; 12.98%) and medicine (n=23; 9.95%). Most and least preferred areas of research are listed in Table 3.

**Table 3: Subject-wise distribution of documents (n=231)**

Subject	Number of documents	Percentage
Pharmacology	31	13.41%
Medical Education	30	12.98%
Medicine	23	9.95%
Community Medicine	20	8.65%
Cardiology	16	6.92%
Neurology	15	6.49%
Physical Therapy	15	6.49%
Genetics	10	4.32%
Ophthalmology	9	3.89%
Physiology	9	3.89%
Surgery	8	3.46%
Nursing	6	2.59%
Pathology	6	2.59%
Oncology	4	1.73%
Orthopedics	4	1.73%
Urology	4	1.73%
Rheumatology	3	1.29%
Biochemistry	2	0.86%
Gastroenterology	2	0.86%
Library Science	2	0.86%
Management Sciences	2	0.86%
Microbiology	2	0.86%

Anthropology	1	0.43%
Dentistry	1	0.43%
Dermatology	1	0.43%
Engineering	1	0.43%
ENT	1	0.43%
Immunology	1	0.43%
Gynecology	1	0.43%
Pediatrics	1	0.43%

A total of 1202 authors, including multiple counts, contributed in writing 231 documents, out of these authors, 554 (46.08%) authors are affiliated with STMU and its constituent institutions. In 128 (55.41%) documents, the principal investigators belonged to the STMU community. Table 4 describes the various authorship patterns being used to compose 231 documents, the authorship pattern of 4 authors was found to be most common followed by 3 authors and 5 authors pattern. Only 16 (6.92%) documents were written by solo authors. Vast majority of publications (n=215; 93.07%) were found to be the result of collaboration among researchers.

**Table 4: Authorship Pattern**

Rank	Pattern	Number of documents	Percentage
1	4 authors	46	19.91%
2	3 authors	27	11.68%
2	5 authors	27	11.68%
3	2 authors	26	11.25%
4	6 authors	25	10.82%
5	7 authors	24	10.38%
6	Single author	16	6.92%
7	8 authors	15	6.49%
8	9 authors	9	3.89%
10	10 authors	5	2.16%
11	> 10 authors	11	4.76%

Table 5 states the organizational affiliation inside the STMU. A bulk of documents are produced by the researchers affiliated with Shifa College of Medicine (n=131; 56.70%), followed by Shifa College of Pharmaceutical Sciences (n=39; 16.88%), and Department of Physical Therapy (n=17; 7.35%). There is a need to increase the research activities in Shifa College of Nursing, Department of Management Sciences, and Shifa College of Medical Technology.

**Table 5: Internal organizational affiliation**

Internal organizational	Number of documents	Percentage
Shifa College of Medicine	131	56.70%
Shifa College of Pharmaceutical Sciences	39	16.88%
Department of Physical Therapy	17	7.35%
Shifa International Hospitals	15	6.49%
Shifa College of Nursing	14	6.06%
Shifa Tameer e Millat University	10	4.32%
Department of Management Sciences	2	0.86%
Shifa College of Medical Technology	2	0.86%
Allied Health Sciences	1	0.43%

Table 6 depicts the analysis of international research collaboration, STMU authors collaborated with the researchers of 19 countries in 49 documents. The highest research collaboration (n=20; 8.65%) was found with the authors of United States, followed by UK (n=11; 4.76%) and Saudi Arabia (n=7; 3.03%) respectively. Only one paper was found to be in collaboration with authors of 11 countries each.

**Table 6: International Research Collaboration (n=49)**

Country	Number of documents	Percentage
USA	20	8.65%
UK	11	4.76%
Saudi Arabia	7	3.03%
Germany	6	2.59%
Canada	3	1.29%
Netherlands	3	1.29%
Malaysia	2	0.86%
Romania	1	0.43%
Spain	1	0.43%
Columbia	1	0.43%
Austria	1	0.43%
Israel	1	0.43%
France	1	0.43%
Belgium	1	0.43%
Norway	1	0.43%
Sweden	1	0.43%
Switzerland	1	0.43%
China	1	0.43%
UAE	1	0.43%

Out of 231 documents, 12 documents are non-journals material consisting of book chapters and a thesis, the remaining 219 documents have been published in 110 journals. There are 84 journals with a single publication each and 11 journals with 02 publications each and 03 journals with 03 publications each. Table 07 describes the list of top ten frequently used journals by the researchers of STMU. Out of these top ten favorite journals, eight are published from Pakistan. The journal entitled "Cureus", published from the United States was found on the top with 31 publications followed by Rawal Medical Journal (n=15) and Journal of the Pakistan Medical Association (n=13) respectively.

**Table 7: Frequently used journals**

Sr	Name of Journal	Documents	Publishing country
1	Cureus	31	USA
2	Rawal Medical Journal	15	Pakistan
3	Journal of the Pakistan Medical Association	13	Pakistan
4	Journal of the College of Physicians and Surgeons Pakistan	9	Pakistan
5	Journal of Shifa Tameer e Millat University	8	Pakistan
6	International Journal of Rehabilitation Sciences	5	Pakistan
7	Pakistan Journal of Neurological Sciences	5	Pakistan
8	The Professional Medical Journal	5	Pakistan
9	Journal of the Neurological Sciences	4	Netherlands
10	Journal of Ayub Medical College Abbottabad	4	Pakistan

The documents produced by STMU researchers were published in 110 journals published from 20 countries of the world including Pakistan. Almost forty percent (n=91; 39.39%) of the documents were published in 26 journals published from Pakistan. Thirty-one documents (13.41%) published in 16 journals published from United States

while 18 (7.79%) documents published in 18 journals of United Kingdom. Thirteen Indian journals with 16 (6.92%) documents stand on 4th rank.

**Table 8: Distribution of journals by country (n=20)**

Rank	Journal's geographical address	No. of Journals	No. of Publications	%age
1	Pakistan	26	91	39.39%
2	United States of America	16	31	13.41%
3	United Kingdom	18	18	7.79%
4	India	13	16	6.92%
5	Netherlands	8	11	4.76%
6	Poland	3	5	2.16%
6	Bangladesh	3	5	2.16%
7	China	3	4	1.73%
8	Germany	3	3	1.29%
8	Iran	3	3	1.29%
9	Brazil	2	2	0.86%
9	Malaysia	2	2	0.86%
9	Turkey	2	2	0.86%
9	UAE	2	2	0.86%
10	Nigeria	1	2	0.86%
11	Chile	1	1	0.43%
11	Egypt	1	1	0.43%
11	Saudi Arabia	1	1	0.43%
11	Romania	1	1	0.43%
11	France	1	1	0.43%

The estimation of references used by researchers in all documents counted 5,929 with an average of 26.53 references per documents. There are 11 book chapters and one online published thesis quoted the 959 references with an average of 79.91 references per documents. Almost one-third (n=75; 32.46%) of the total documents have used the reference range between of 20 to 29, followed by 62 (26.83%) documents using 10-19 reference range. More than half (n=137; 59.30%) documents have been following the range of references from 10 to 29. Only two documents used more than 100 references and there were 29 documents with less than 10 references.

**Table 9: Range of references in documents (n=231)**

Range of References	Number of documents	Percentage
Between 100-200	2	0.86%
Between 50-99	6	2.59%
Between 40-49	12	5.19%
Between 30-39	27	11.68%
Between 20-29	75	32.46%
Between 10-19	62	26.83%
Less than 10	29	12.55%

## Discussion

STMU is a newly established general category University, located in the capital of Pakistan, Islamabad. Though the university is relatively new, it has come a long way as far as its publications are concerned. STMU produced only 3 papers in the year 2012 but the document numbers reached 66 in 2018 with an average annual growth rate (AAGR) of 88.64. King Saud bin Abdulaziz University for Health Sciences produced 775 documents in 11 years with an AAGR of 31.66.5 The AAGR of STMU is promising and its researchers used all formats of publications for their research; the majority of documents consisted of original research articles (n=154; 66.66%) and only six review papers were found. A report on Indian medical research productivity for 2009 to 2018 revealed that out of 29,153 documents, 18,477 (63.37%) consisted of original research articles. STMU results have almost resembled in terms of percentage with Indian medical research.<sup>16</sup> The data of the World Fact book revealed that the health expenditure of Iran and Saudi Arabia have 8.1% and 5.7% of their GDP respectively, while Pakistan has allotted only 2.8% of its GDP on health expenditure. It is evident that the sufficient funding on health expenditure helps boost health sciences research in the country.<sup>18</sup>

All the documents of STMU have been categorized into various disciplines to view the strong areas of research. Pharmacology, medical education, medicine, community medicine and cardiology were found to be the top five areas of research. The publication growth of any area of research depends on dedicated research team and the supportive administrative environment. The research activities can be enhanced by providing research grant and lucrative incentives to the researchers. An analysis of Iranian medical research output of thirty

years also showed that Pharmacology has been the desired area of medical research in Iran. Authorship pattern of STMU showed that only 16 (6.92%) documents were written by a single author while the majority of documents (n=215; 93.08%) were the result of research collaboration. Four-author collaboration pattern was ranked on the top with 46 (19.91%) documents. Only 16 documents were found with 10 or more than 10 authors. A 5 years' bibliometric study on documents published in Journal of College of Physicians and Surgeons Pakistan (JCPSP) rendered that out of a total of 721 articles published from 2010 to 2014, 128 (26.06%) articles were written in four-author pattern. More than half of the articles cited the references between of 21-30. Medicine, Pathology and Surgery were found to be the top areas of research.<sup>19</sup>

There are nine different institutions of STMU that contributed their research in the targeted period, SCM (n=131; 56.70%) exceeded over other departments in the research outcome. STMU has been actively involved with international researchers in creating quality publications, out of all 231 documents, more than one-fifth of the documents (n=49; 21.21%) were the result of international collaboration with 19 countries with United States being on the top with 20 documents, followed by United Kingdom and Saudi Arabia respectively. STMU authors succeeded in publishing their research in 110 journals published from 20 countries of the world. United States' journal 'Cureus' has been on the top with 31 publications followed by Rawal Medical Journal and Journal of Pakistan Medical Association with 15 and 13 publications respectively. Forty percent of research was published in locally published sources while 60% appeared in overseas sources. STMU researchers cited 5,929 references in 231 documents with an average of 26.53 references per document. Almost one-third of the documents (n=75; 32.46%) followed the reference range between of 20-30.

The present study has some limitations which can be addressed in the future. STMU documents can be analyzed on the qualitative aspects e.g. citation impact of publications, most productive author, highly cited paper and impact factor of journals. Further, the research methodologies and role of STMU's authors in research can be assessed.

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## Conclusion

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Medical science is a noble profession and it is the responsibility of all the practitioners to disseminate their scholarly, professional knowledge and findings of experiments for the benefits of the whole humanity through scientific writing. The research publication is the key element to measure the performance of an academic institution. The authors of STMU are producing noteworthy publications with national and international research collaboration. However, there is a need to write more papers on the least preferred areas of research, e.g., dentistry, dermatology, gynecology, psychology, and pediatrics. There is also a need to develop and periodically review research policy to enhance research collaboration both nationally and internationally. Although the growing trend with a rapid steady surge was observed during the last three years still STMU needs to keep this momentum with a dedicated team of researchers.

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## References

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1. El Rassi R, Meho LI, Nahlawi A, Salameh JS, Bazarbachi A, Akl EA. Medical research productivity in the Arab countries: 2007-2016 bibliometric analysis. *J Glob Health*. 2018 ;8(2). DOI: <https://doi.org/10.7189/jogh.08.020411>
2. Haq IU, Elahi G, Dana I. Research Publications on Medical Microbiology in Pakistan during the period 2013-2017. *Lib Philos Pract*. 2019; 2253.
3. Ahmed I. Medical Research in Pakistan. *Isra Med J*. 2018; 10(6): 325-6.
4. Rezaeian M. Muslim world's universities: Past, present and future. *Middle East J Family Med*. 2016; 14(7):39-41. DOI: <https://doi.org/10.5742/MEWFM.2016.92859>
5. Haq IU, Alfouzan K. Research Productivity at King Saud bin Abdul Aziz University for Health Sciences, Kingdom of Saudi Arabia: A Bibliometric Appraisal. *J Rawalpindi Med Coll*. 2017; 21(2):182-6.
6. Iqbal HM, Mahmood K, Iqbal SA. Factors Contributing Towards Research Productivity and Visibility: A Case Study of Pakistan. *Libri*. 2018; 68(2):85-98. DOI: <https://doi.org/10.1515/libri-2017-0105>
7. Zaher WA, Meo SA, Almadi MA, Neel KF. Research Productivity of Health-care Institutions of Saudi Government: Ten-year Based Bibliometric Analysis. *J Nat Sci Med*. 2018; 1(1):13-6. DOI: [https://doi.org/10.4103/JNSM.JNSM\\_16\\_18](https://doi.org/10.4103/JNSM.JNSM_16_18)
8. Alfouzan S, Haq IU, Alfouzan S. Al-Imam Mohammad ibn Saud Islamic University: A Bibliometric Research Profile. *Lib Philo Pract* 2019; 2768.
9. Prichard A. Statistical Bibliography or Bibliometrics. *J Documentation* 1969; 25(4):348-9.
10. Meo SA, Hassan A, Usmani AM. Research progress and prospects of Saudi Arabia in global medical sciences. *Eur Rev Med Pharmacol Sci*. 2013; 17(24):3265-71.
11. Shifa Tameer-e-Millat University, Islamabad, Pakistan accessed from <https://stmu.edu.pk/about/mission-and-vision/>
12. Mushtaq A, Abid M, Qureshi MA. Assessment of research output at higher level of education in Pakistan. *J Pak Med Assoc*. 2012; 62(6):628-32.
13. Bashir, M. Bibliometric Studies of Pakistan's Research Output and Comparison with Other Selected Countries of the World. *Asian J Sci Tech*, 2013;4(2):1-7.
14. Riaz W, Naveed MA. A Scientometric Analysis of Research Output of National University of Science and Technology, Islamabad. Paper presented in International Conference on Emerging Issues of Information Landscape held on February 28 - March 01, 2019 at University of Sargodha, Pakistan.
15. Sab C, Kumar D, B Biradar. Medical Research in India: A Scientometric Assessment of Publications during 2009-2018. *Lib Philos Pract*. 2018; 2186
16. Mohammadhassanzadeh H, Samadikuchaksaraei A, Shokraneh F, Valinejad A, Abolghasem-Gorji H, Yue C. A bibliometric overview of 30 years of medical sciences productivity in Iran. *Arch Iran Med*. 2010; 13(4):313-7.
17. Prats MI, Bahner DP, Panchal AR, King AM, Way DP, Lin S, et al. Documenting the growth of ultrasound research in emergency medicine through a bibliometric analysis of accepted academic conference abstracts. *J Ultrasound Med*. 2018; 37(12):2777-84. DOI: <https://doi.org/10.1002/jum.14634>
18. The World Factbook - Central Intelligence Agency. (Internet) Cia.gov. 2020. (cited 2020 Feb 18). Available from: URL: <https://www.cia.gov/library/publications/the-world-factbook/>
19. Ullah S, Jan SU, Jan T, Ahmad HN, Jan MY, Rauf MA. Journal of the College of Physicians and Surgeons of Pakistan: Five Years Bibliometric Analysis. *J Coll Physicians Surg Pak*. 2016; 26(11):920-3.