

The Scientometrics Analysis of Physiotherapy Journal

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Abstract - This paper aims to know the impact of research developments in the Physiotherapy Journal for ten years from 2008 to 2017. This paper has analyzed various factors such as year-wise distribution of papers, institution and subject wise distribution, authorship pattern productivity and collaboration among multi-authors and many more features. The result shows that the highest number i.e. 403 (96.88%) articles are published by multi author whereas the rest of lowest number i.e. 13(3.13%) of papers were published by single authors. All the documents published are contributed by foreign authors. The maximum numbers of citations 1633 found in 2013 and the highest average citation per article was 40.22 in the year 2010. The least number of citations were 1075 in 2017 and the least average citation per article is 27.27 in the year 2014.

Keyword: Physiotherapy, Scientometrics, Authorship Pattern, Literature Growth.

1. Introduction:

The science of science with more stress on the quantitative aspects is used to communicate the process of science including socio-cultural aspects, which is known as Scientometrics. The term 'Scientometrics' refers to the study of science as an information process applying the quantitative methods. However, in the present information world journals are identified as the basic information source, through which the flow of new ideas, innovation and scholarly communication is possible among the scientists as well as for the research scholars. There are five prominent roles as identified by Schaffner (1994) that construct a collective knowledge base, disseminating information, authenticating the quality of research, giving out rewards and building scientific communities within scholarly communities by the journals. In this study the peer reviewed journal is being analyzed as it is the very important means which communicates the research finding among the present and anticipated scientific communities (Thyer, 2008). This study will be helpful for the physiotherapy institution libraries and librarians to plan a better collection development. And also it helps students of physiotherapy to find out the literature.

2. About the Journal:

Physiotherapy is a peer reviewed academic journal, bearing the ISS Number 0031-9406. It publishes scholarly articles in the Physiotherapy discipline. The journal is being

published since 1980 published by Elsevier publications . It is a quarterly Journal which publishes four issues in a year. According to the Journal Citation Report (2016), the Impact Factor (IF) of the journal is 3.010. The journal publishes the peer reviewed papers on the latest topics which are of current interest to the Physiotherapists. The output of the Physiotherapy journal during the period of ten years (2008-2017) is analyzed in the present study to identify the growth, volume and year wise distribution of the publications, contributions published, authorship pattern, geographical distribution of publications and length of the articles.

Source: <https://www.journals.elsevier.com/physiotherapy>

3. Objectives of the study:

1. To make an analysis of articles published in Physiotherapy Journal from 2008 to 2017;
2. To identify the number of contributions published during the period of study;
3. To study the authorship pattern;
4. To identify country wise distribution of articles; and
5. To study the length of articles.

4. Methods and materials:

The present study is emphasized on the research papers published in the Physiotherapy Journal during the year 2008 and 2017. Hence, the study covers the research papers published in the four volumes each with four issues. The study is on Scientometric analysis which is used to study in brief the Scientometric features of the articles published in Physiotherapy Journal from 2008 to 2017. There are **416** articles published on Physiotherapy journal from 2008 (vol. 94) to 2017 (vol. 103).

5. Analysis and interpretation:

Table - 1 Year Wise Distribution of Articles:

Year	No. of contributions	Percentage	Cumulative	Cumulative (%)
2008	40	9.62	40	9.62
2009	40	9.62	80	19.23
2010	50	12.02	130	31.25
2011	48	11.54	178	42.79
2012	53	12.74	231	55.53
2013	41	9.86	272	65.38
2014	36	8.65	308	74.04
2015	38	9.13	346	83.17
2016	40	9.62	386	92.79
2017	30	7.21	416	100.00
Total	416	100		

The table 1 shows the year-wise distribution of the output. The number of publications decreased from 40 in the year 2008 to 30 in the year 2017. The highest and lowest number of publications was contributed in the year 2013 and 2017 respectively.

Table - 2 Issue Wise Distribution of Articles:

Vol. No	March	June	September	December	Total
94	8	10	12	10	40
95	9	10	11	10	40
96	11	12	13	14	50
97	11	12	13	12	48
98	12	14	12	15	53
99	14	12	7	8	41
100	9	16	5	6	36
101	8	9	11	10	38
102	9	5	9	17	40
103	10	8	4	8	30
Total	101	108	97	110	416

Table 2 shows issue wise distribution of articles. Volume No. 99 shows the highest number of total articles. The second highest position is occupied by Volume No. 97. The lowest number of articles in volume 104, i.e. 30 articles. And in all ten volume, 24.28% of the articles are published in March issue, 25.96% in June issue, 23.32% in September and 26.44 of articles published in the month of December.

Table - 3: Institution Wise Contribution of Articles:

Name of the Institution	No. of Articles	Percentage
Universities	237	56.97
Colleges	77	18.51
Hospital	70	16.83
Research Institutions	32	7.69
Total	416	100

The table 3 shows the institution wise contributors of articles. The highest number of contributions were from Universities with 237 (56.97%), Colleges 77 (18.51%), Hospitals (16.83%) and 32 (7.69%) from Research Institutions.

Table - 4: Subject wise contribution of articles:

Subject	No. of Articles	Percentage
Orthopedic physical therapy	86	20.67
Neurologic physical therapy	54	12.98
Community and Rehabilitation	49	11.78
Orthopedic Manual Therapy.	45	10.82
Cardiovascular and pulmonary physical therapy	40	9.62
Sports physical therapy	33	7.93
Physiotherapy in Obstetrics and Gynecology	31	7.45
Pediatric physical therapy	20	4.81
Geriatric physical therapy	16	3.85
Oncology physiotherapy	9	2.16
Others	33	7.93
Total	416	100

The physiotherapy subject is a very vast subject which can be further divided into many major branches viz. Orthopedic physical therapy, Neurologic physical therapy, Community and Rehabilitation, Orthopedic Manual Therapy, Cardiovascular and pulmonary physical therapy, Sports physical therapy, Physiotherapy in Obstetrics and Gynecology, Pediatric physical therapy, Geriatric physical therapy, Oncology physiotherapy etc.

The subject experts among the physiotherapy discipline have contributed their research work to show the development of the physiotherapy among various branches. The table 4 shows that out of the various discipline the Orthopedic physical therapy papers stand out with maximum number of articles i.e. 86 (20.67%), followed by Neurologic physical therapy 54 (12.98%), Community and Rehabilitation 49 (11.78%). Further, very few articles from oncology physiotherapy i.e. 9 (2.16%) can be observed from the table.

Table - 5: Citation Wise Distribution of Articles:

Year	No of articles	No. of citations	Average no of citations per paper
2008	40	1327	33.18
2009	40	1609	40.22
2010	50	1583	31.66
2011	48	1604	33.42
2012	53	1633	30.81
2013	41	1118	27.27
2014	36	1110	30.83
2015	38	1278	33.63
2016	40	1429	35.73
2017	30	1075	35.83
Total	416	13766	33.09

Table 5 represents that the maximum numbers of citations i.e. 1633 is found in 2013, followed by 1609 citations in 2010, 1604 in the year 2012. Further, the highest average citations per article is 40.22 in the year 2010, followed by 35.83 in 2017. Although the number of article was least in the year 2017 i.e. 30 articles as compared from the above table, the citations for these articles was more for each article i.e. 35.83 which shows the quality of the papers has increased over the period of time.

Table - 6: Year Wise Authorship Pattern of Articles:

Year	Volume	Number of Authors						Total
		1	2	3	4	5	More than 5	
2008	94	3	12	9	9	6	1	40
2009	95	2	5	13	15	2	3	40
2010	96	2	7	11	11	7	12	50
2011	97	3	8	11	8	4	14	48
2012	98	3	11	13	10	7	9	53
2013	99	0	3	10	6	10	12	41
2014	100	0	1	11	8	5	11	36
2015	101	0	5	8	9	5	11	38
2016	102	0	1	6	7	11	15	40
2017	103	0	2	7	4	4	13	30
Total		13	55	99	87	61	101	416
Percentage		3.13	13.22	23.80	20.91	14.66	24.28	100

The table 6 exhibits the authorship pattern of the publications. Single author contributions were 13 in number, which formed 3.13% of the total output. Rest of the 403 publications was contributed by the co-authors, which is 96.88% of the total publications. Two authors contributed less number of publications (55). Whereas, more than five authors contributed highest number (101) of publications, which is 24.28%. It can be derived from the table that the multi-authorship publications dominate over the single authored publications.

The four authored papers were highest (14) in the year 2010 (i.e. 96 volume), five authored papers were highest in 2012 and 2017 with 14 (98 volume) and 15 (103 volume) respectively. The lowest was no single author articles were published during 2014 to 2017. This shows the single authors showed less interest in writing the research articles compared to multi author papers.

Table - 7: Authorship Pattern

Pattern	Total no. of Contributions	Cumulative Contributions	Percentage
Single Author	13	13	3.13
Double Author	55	68	13.22
Three Author	99	167	23.8
Four Author	87	254	20.91
Five Author	61	315	14.66
More Than Five Author	101	416	24.28
Total	416		100

There are six types of authorship pattern identified in the study such as single, double, three, four, five and more than five authors. As per the data from Table 7 depicts that the majority of 101 (24.28%) publications contributed by more than five authors followed by 99 (23.80%) articles contributed by three authors and the least number of papers i.e. 13 (3.13%) contributed single author. It was noticed by the researchers that most of the publications are contributed by multi authors who are interested and involved in research to contribute their publication.

Table - 8: Single Author vs. Multi-Authors:

Year	Authorship		Total
	Single	Multi- Author	
2008	3	37	40
2009	2	38	40
2010	2	48	50
2011	3	45	48
2012	3	50	53
2013	0	41	41
2014	0	36	36
2015	0	38	38
2016	0	40	40
2017	0	30	30
Total	13	403	416
Percentage	3.13	96.88	100

Multi authors are often used in scientometric studies to measure research collaboration in academic communities. Table 8 represents that the single as well as multi-authors pattern in Physiotherapy journal during the period of study. The study reveals that the highest number

i.e. 403 (96.88%) contributors were published by multi authors whereas the lowest number i.e. 13 (3.13%) papers were published by single author.

Table - 9: Degree of Collaboration (DC)

Year	Single Authored	Multi Authored	Total Output	Collaboration
2008	3	37	40	0.925
2009	2	38	40	0.950
2010	2	48	50	0.960
2011	3	45	48	0.938
2012	3	50	53	0.943
2013	0	41	41	1.000
2014	0	36	36	1.000
2015	0	38	38	1.000
2016	0	40	40	1.000
2017	0	30	30	1.000
Total	13	403	416	0.969*

The degree of collaboration in quantitative terms, the formula given by K. Subramanyam was used. To calculate Degree of Collaboration (DC)

where, **DC = Degree of Collaboration; Nm = Number of Multi Authored Contribution, Ns = Number of Single Authored Contribution.**

$$DC = \frac{Nm}{Nm + Ns}$$

Table 9 shows that the degree of collaboration (DC) on authorship in the Physiotherapy Journal during the period of study. The table shows the analysis that the multi authored articles are more than single authored papers. Hence, the value of DC* = 0.969, the average degree of collaboration in "Physiotherapy" is 0.969 which clearly represents that its dominance of multi authored contributions.

Table - 10: Country Wise Distribution of Articles:

Name of the Country	No. of Articles	Percentage
UK	184	44.23
Australia	63	15.14
Brazil	31	7.45
Ireland	18	4.33
USA	14	3.37
Canada	12	2.88
The Netherlands	12	2.88
Spain	10	2.40
Sweden	7	1.68
Norway	7	1.68
South Africa	6	1.44
Japan	5	1.20
New Zealand	5	1.20
Germany	4	0.96
Belgium	3	0.72
China	3	0.72
Singapore	2	0.48
Others	30	7.21
Total	416	100

The table 10 shows Country Wise Distribution of Articles. In the area of physiotherapy, United Kingdom, Australia, Brazil are the high contributors of articles with 184 (44.23%), 63 (15.14%), 31 (7.45%) respectively, followed by Ireland 18 (4.33%), USA 14 (3.37%), Canada and Netherlands with 12 (2.88%) articles each, Spain 10 (2.40%). The countries which contributed less than five articles are Germany 4 (0.96%), Belgium and China 3 (0.72%) articles each and Singapore 2 (0.448%).

Table - 11: Length of Articles:

Year	Total No. of Pages				Percentage
	1 to 5	6 to 10	11 & More	Total	
2008	4	32	4	40	9.62
2009	0	34	6	40	9.62
2010	12	32	6	50	12.02
2011	9	34	5	48	11.54
2012	7	45	1	53	12.74
2013	6	35	-	41	9.86
2014	17	18	1	36	8.65
2015	11	27	-	38	9.13
2016	9	31	-	40	9.62
2017	4	26	-	30	7.21
Total	79	314	23	416	100

Table 11 reveals that out of 416 articles, majority of the articles 314 (75.48%) have the length of 6-10 pages followed by 79 (18.99%) articles which contain the length of 1-5 pages, pages and very minimum length of article is 23 (5.53%) 11 and more page.

Findings and conclusion:

The present study has explored and shown the various factors such as year, subject, institution and country wise distribution of articles, authorship pattern, author productivity, collaboration between single and multi-authors. The major findings of the study are as follows.

- The highest number of contributions were from universities with 237 i.e. 56.97% and occupied first position and the lowest number i.e. 32 (7.69%) were from research institutions which has obtained fourth position.
- Out of 416 articles, the highest number i.e. 86 (20.67%) articles covers on Orthopedic physical therapy and the lowest number i.e. 02 (2.16%) papers focus on Oncology physiotherapy.
- The highest number of contributors i.e. 403 (96.88%) was published by multi author whereas the remaining 13 (3.13%) papers were published by single authors.
- The maximum number of citations i.e. 1633 found in 2013, but the highest average citation per article i.e. 40.22 found in the year 2010. The least number of citations were 1075 in 2017 and the least average citation per article is 27.27 in the year 2014.
- All the documents (100.00%) are published by foreign authors. The highest number i.e. 314 (75.48%) of articles has the length of 6-10 pages and the least number of 23 (5.53%) articles contain the length of 11 pages and above.
- The average degree of collaboration is 0.969 which clearly represents its dominance of multi authored contributions.

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