

# SCIENTOMETRIC ANALYSIS IN THE FIELD OF OCCUPATIONAL THERAPY: A GLOBAL LEVEL PERSPECTIVE

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## Abstract

This study presents the global level perspective of Occupational Therapy research output during the period of 1989 to 2015 and these analyses included year wise research growth, global publication share and patterns of research communication channels and the most productive journals. Data was extracted from the Web of Science citation database using the search string of "Occupational Therapy" during 1989 to 2015, a total of 8095 publications were retrieved. The highest number of records has found to be at 2013. The whole study period sample mean relative growth rate of 0.35. Thus this article can be concluded by collaborative author's productivity dominates compared to the single author's contribution. So there is a need of promoting single author productivity in the field of Occupational Therapy research in global level. In the country wise distribution of publications the United States of America stood in first rank position and India holds the 25<sup>th</sup> position in the global level; India has to improve in the field of Occupational Therapy in future.

**Keywords:** Scientometric, Occupational Therapy, Degree of Collaboration, Authorship pattern,

## Introduction

Scientometric is an important research tool for understanding the subjects which aims in measuring the utility of documents and relationships between documents and fields. This present study deals with the Scientometric Analysis in the field of Occupational therapy, the occupational therapy is a science degree-based, health and social care profession, regulated by the Health and Care Professions Council. Occupational therapy takes a whole-person approach both mental and physical health, enabling individuals to achieve their full potential. Occupational therapy provides practical support to enable people to facilitate recovery and overcome any barriers that prevent them from doing the activities (occupations). This helps to increase people's independence and satisfaction in all aspects of life. Occupational Therapy (OT) can be used to evaluate the living and work skills of the people and treatment given to them according to their stage or level. This therapy will develop, recover, or maintain the daily living and work skills of people with a physical, mental, or cognitive disorder. Adult rehabilitation, Pediatrics, Hand therapy, Ergonomics, Vision rehabilitation, Community consultation, Driver rehabilitation, and assisted living care also come under the Occupational Therapy. Occupational therapists play an important role in the evaluation and management of patients.

## Objective of the Study

- To measure the year wise distribution of publication and growth rate of literature
- To identify the authorship pattern and degree of collaboration
- To examine the country wise distribution of publications
- To identify the Institution wise distribution of publications
- To identify the Journal wise distribution of publications

## Data Extraction and Methodology

A sample of 8095 records during 1989 to 2015 published retrieved from web of science database and indexed is used for the study. In order to perform a quantitative analysis, this study considered published articles in Web of Science database. The Web of Science is the search platform provided by Thomson Reuters (the former Thomson Scientific emerged from the institute for Scientific Information (ISI) in Philadelphia). The study period 1989 to 2015 is selected as the database is available. A total of 8095 records were downloaded and analyzed using the Hiscite software application and tabulated for making observations as per the objectives of the study and VOS Viewer software is used for visualization of bibliometric networks.

## Data Analysis & Interpretation

### Year wise distribution of Publications

To analyze the year wise publication of research on Occupational Therapy, the data has been presented in table-1. The table depicts clearly during the period 1989 - 2015 a total of 8095 publications were published. In the present study the research output on Occupational Therapy publication is taken as a tool to evaluate the performance at various levels.

**Table 1: Year wise distribution of occupational therapy research output and Relative Growth Rate and doubling time**

Year	Records	Cum.No.of Records	Log <sub>e</sub> <sup>1</sup>	Log <sub>e</sub> <sup>2</sup>	[R(P)]	Mean [R(P)]	[Dt(P)]	Mean [Dt(P)]
1989	43	43		3.76	3.76	0.42	0.18	7.66
1990	61	104	3.76	4.11	0.35		1.98	
1991	166	270	4.11	5.11	1		0.69	
1992	171	441	5.11	5.14	0.03		23.10	
1993	152	593	5.14	5.02	-0.12		5.77	
1994	166	759	5.02	5.11	0.09		7.70	
1995	191	950	5.11	5.25	0.14		4.95	
1996	150	1100	5.25	5.01	-0.24		2.89	
1998	9	1109	5.01	2.20	-2.81		0.25	
1999	204	1313	2.20	5.32	3.12		0.22	
2000	211	1524	5.32	5.35	0.03		23.10	
2001	241	1765	5.35	5.48	0.13		5.33	
2002	232	1997	5.48	5.45	-0.03		23.10	
2003	242	2239	5.45	5.49	0.04		17.33	
2004	269	2508	5.49	5.59	0.1	6.93	6.01	
2005	232	2740	5.59	5.45	-0.14	4.95		
2006	267	3007	5.45	5.59	0.14	4.95		
2007	386	3393	5.59	5.96	0.37	1.87		
2008	453	3846	5.96	6.12	0.16	4.33		
2009	561	4407	6.12	6.33	0.21	3.30		
2010	611	5018	6.33	6.42	0.09	7.70		
2011	682	5700	6.42	6.53	0.11	6.30		
2012	735	6435	6.53	6.60	0.07	9.90		
2013	835	7270	6.60	6.73	0.13	5.33		
2014	729	7999	6.73	6.59	-0.14	4.95		
2015	96	8095	6.59	4.56	-2.03	0.34		
<b>Total</b>	<b>8095</b>					<b>0.35</b>		<b>13.67</b>

## Degree of Collaboration

Various methods have been the degree methods proposed to calculate the degree of research collaboration. Here in this study the formula proposed by Subramanyam (1983) has been used.

$$DC = N_m / (N_m + N_s)$$

Where, DC = Degree of Collaboration;  $N_m$  = Number of Multiple Authored Papers;  $N_s$  = Number of Single Authored Papers; Therefore,  $DC = C = 6496/8095 = 0.80$ .

**Table 2: Shows the Authorship Pattern Degree of Collaboration**

Year	Single	Multi	Total	DC
1989	31 (1.94)	12 (0.18)	43 (0.53)	0.28
1990	43 (2.69)	18 (0.28)	61 (0.75)	0.30
1991	70 (4.38)	96 (1.48)	166 (2.05)	0.58
1992	87 (5.44)	84 (1.29)	171 (2.11)	0.49
1993	57 (3.56)	95 (1.46)	152 (1.88)	0.63
1994	72 (4.50)	94 (1.45)	166 (2.05)	0.57
1995	67(4.19)	124 (1.91)	191 (2.36)	0.65
1996	51 (3.19)	99 (1.52)	150 (1.85)	0.66
1998	2(0.13)	7 (0.11)	9 (0.11)	0.78
1999	60 (3.75)	144 (2.22)	204 (2.52)	0.71
2000	46 (2.88)	165 (2.54)	211 (2.61)	0.78
2001	58(3.63)	183 (2.82)	241 (2.98)	0.76
2002	49 3.06)	183 (2.82)	232 (2.87)	0.79
2003	48 (3.00)	194 (2.99)	242 (2.99)	0.80
2004	50 (3.13)	219 (3.37)	269 (3.32)	0.81
2005	45(2.81)	187 (2.88)	232 (2.87)	0.81
2006	43(2.69)	224 (3.45)	267 (3.30)	0.84
2007	42(2.63)	344 (5.30)	386 (4.77)	0.89
2008	71 (4.44)	382 (5.88)	453 (5.60)	0.84
2009	89 (5.57)	472 (7.27)	561 (6.93)	0.84
2010	89(5.57)	522(8.04)	611 (7.55)	0.85
2011	105 (6.57)	577 (8.88)	682 (8.42)	0.85
2012	99 (6.19)	636 (9.79)	735 (9.08)	0.87
2013	132 (8.26)	703 (10.82)	835 (10.32)	0.84
2014	83 (5.19)	646 (9.94)	729 (9.01)	0.89
2015	10 (0.63)	86(1.32)	96 (1.19)	0.90
<b>Total</b>	<b>1599 (19.75)</b>	<b>6496 (80.25)</b>	<b>8095</b>	<b>0.80</b>

## Institution wise distribution of Publications

The below table analysis indicates Institution-wise research productivity. It is noted that 5987 institutions were contributed 8095 of the total research productivity. It is noted that University of Queensland contributed the highest number of research publications 190 at the same time it ranks Global Citation Score 1143. University of Toronto contributed 159 research publication at the same time it ranks first in terms of Global Citation Score 2120. Next to that University of Sydney contributed 123 Research Publication having Global Citation Score 1369.

**Table 3 shows the Institution wise distribution of publications**

Sl.No	Institution	Records	%	TLCS	TGCS
1	University of Queensland	190	2.3	303	1143
2	University of Toronto	159	2.0	243	2120
3	University of Sydney	123	1.5	254	1369
4	Karolinska Institute	111	1.4	265	1616
5	La Trobe University	111	1.4	223	1055
6	McMaster University	105	1.3	263	1057
7	University of Southern California	105	1.3	427	1292
8	University British Columbia	93	1.1	232	1282
9	Boston University	89	1.1	357	1627
10	Lund University	87	1.1	173	811

### Country wise distribution of Publications

The below table indicates that among the country wise distribution of Occupational Therapy covered by the study tops United States of America with 2559 (31.6%) publications followed by Unknown with 1066 (13.2%), United Kingdom with 942 (11.6%), and Australia with 763 (9.4%) research publications respectively. First place goes to United States of America having total Global Citation Score of 37015 with 2559 publications. India ranks 25<sup>th</sup> place with 52 (0.6%) with 582 Global Citation Score.

**Table 4 shows the Country wise distribution of publications**

Sl.No	Country	Records	%	TLCS	TGCS
1	USA	2559	31.6	4631	37015
2	UK	942	11.6	1282	11936
3	Australia	763	9.4	1296	6546
4	Canada	706	8.7	1274	8198
5	Germany	410	5.1	141	2896
6	Sweden	368	4.5	629	3790
7	Netherlands	299	3.7	791	5697
8	Italy	167	2.1	78	2508
9	France	139	1.7	77	2005
10	Japan	120	1.5	97	708

### Journal wise distribution of Publications

The study found that the total research output of the Occupational Therapy for the study period (1989 – 2015) published in 1629 journals. The journal “American Journal of Occupational Therapy” topped with 1331 publications with the Global Citation Score of 9937; next “British Journal of Occupational Therapy” with 461 publications with Global Citation Score 709 & Australian Occupational Therapy Journal with 282 publications having the Global Citation Score 846 followed by other journals.

**Table 4 shows the Journal wise distribution of publications**

Journal	Recs.	%	TLCS	TGCS
American Journal of Occupational Therapy	1331	16.4	4485	9937
British Journal of Occupational Therapy	461	5.7	343	709
Australian Occupational Therapy Journal	282	3.5	438	846
Scandinavian Journal of Occupational Therapy	201	2.5	234	458
Archives of Physical Medicine and Rehabilitation	166	2.1	459	3783
Canadian Jrl. of Occupational Therapy-Revue Canadienne D Ergotherapie	156	1.9	223	389

Disability and Rehabilitation	142	1.8	207	996
Otjr-Occupation Participation And Health	141	1.7	180	525
Occupational Therapy International	93	1.1	51	187
Work-A Journal Of Prevention Assessment & Rehabilitation	88	1.1	44	147

Figure 1: Most productive journals

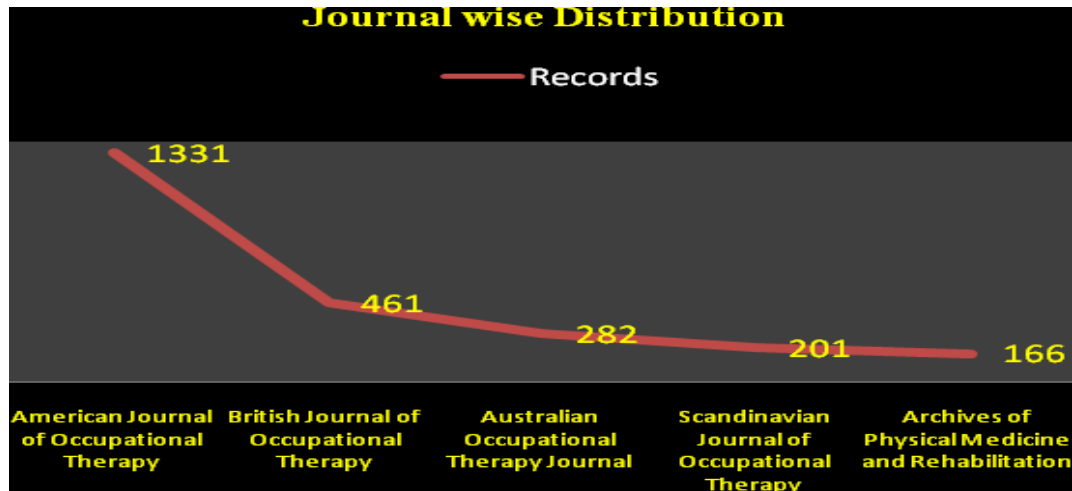


Table 5: Time Series analysis of single author in Occupational Therapy Research output

Year	Single	%	X	X <sup>2</sup>	XY	Year	Single	%	X	X <sup>2</sup>	XY	
1989	31	1.94	-13	169	403	2003	48	3	1	1	48	
1990	43	2.69	-12	144	516	2004	50	3.13	2	4	100	
1991	70	4.38	-11	121	770	2005	45	2.81	3	9	135	
1992	87	5.44	-10	100	870	2006	43	2.69	4	16	172	
1993	57	3.56	-9	81	513	2007	42	2.63	5	25	210	
1994	72	4.5	-8	64	576	2008	71	4.44	6	36	426	
1995	67	4.19	-7	49	469	2009	89	5.57	7	49	623	
1996	51	3.19	-6	36	306	2010	89	5.57	8	64	712	
1997	-	-	-5	-	-	2011	105	6.57	9	81	945	
1998	2	0.13	-4	16	8	2012	99	6.19	10	100	990	
1999	60	3.75	-3	9	180	2013	132	8.26	11	121	1452	
2000	46	2.88	-2	4	92	2014	83	5.19	12	144	996	
2001	58	3.63	-1	1	58	2015	10	0.63	13	169	130	
2002	49	3.06	0	0	0	<b>Total</b>	<b>1599</b>				1613	11700

Straight line equation is applied to arrive at estimates for future growth under the Time Series analysis. Straight Line Equation,  $Y_c = a + bX$ ; Since  $\sum X = 0$ ,

$$a = \frac{\sum Y}{N} = \frac{1599}{27} = 59.22; b = \frac{\sum XY}{\sum X^2} = \frac{11700}{1613} = 7.25$$

Estimated literature in 2020 is when  $X = 2020 - 1993 = 27$

$$= 59.22 + 7.25 * 27 = 1794.69$$

On the application of the formula of time series analysis and subsequently, from the result obtained separately for the year 2020, it is found that the future trend of growth in research literature output may take an increasing trend during the years to come. The inference is that there is a positive growth level in research literature output in Occupational Therapy research literatures.

**Table 6: Time Series analysis of multi-authors in Occupational Therapy Research output**

Year	Multi	%	X	X <sup>2</sup>	XY	Year	Multi	%	X	X <sup>2</sup>	XY
1989	12	0.18	-13	169	156	2003	194	2.99	1	1	194
1990	18	0.28	-12	144	216	2004	219	3.37	2	4	438
1991	96	1.48	-11	121	1056	2005	187	2.88	3	9	561
1992	84	1.29	-10	100	840	2006	224	3.45	4	16	896
1993	95	1.46	-9	81	855	2007	344	5.3	5	-	1720
1994	94	1.45	-8	64	752	2008	382	5.88	6	36	2292
1995	124	1.91	-7	49	868	2009	472	7.27	7	49	3304
1996	99	1.52	-6	36	594	2010	522	8.04	8	64	4176
1997	-	-	-5	-	-	2011	577	8.88	9	81	5193
1998	7	0.11	-4	16	28	2012	636	9.79	10	100	6360
1999	144	2.22	-3	9	432	2013	703	10.82	11	121	7733
2000	165	2.54	-2	4	330	2014	646	9.94	12	144	7752
2001	183	2.82	-1	1	183	2015	86	1.32	13	169	1118
2002	183	2.82	0	0	0	<b>Total</b>	<b>6496</b>			<b>1588</b>	<b>48047</b>

Straight Line Equation is applied to arrive at estimates for future growth under the Times Series analysis. Straight Line Equation  $Y_c = a + bX$ ; Since  $\Sigma x = 0$ ,

$$a = \Sigma Y/N = 6496/27=240.59; b = \Sigma XY/\Sigma x^2=48047/1588=30.26$$

$$\begin{aligned} \text{Estimated literature in 2020 is when } X &= 2020 - 1993 = 27 \\ &= 240.59 + 30.26 * 27 = 7312.95 \end{aligned}$$

On the application of the formula of time series analysis and subsequently, from the results obtained separately for the year 2020, it is found that the future trend of growth in research literature output may take an increasing trend during the years to come. The inference is that there is a positive growth level in research literature output in the field of Occupational Therapy research literatures.

### Findings and Conclusion

During the Twenty Seven years time span Global Contribution in terms of publication is significantly increased and time series analysis shows that the positive growth trend in future. As compared to global contribution, Indian contributions still need to improve the research performance in this field.

Based on the analysis undertaken the present study, the following findings are drawn.

- ✓ The findings of Research Productivity in Occupational Therapy has the highest publication as 835 in the year 2013 with 1235 Global Citation Scores followed by 735 papers in 2012 with 2838 Global Citation Score. It is found that in the year 2007,386 records have published with highest Global Citation Score of 6525
- ✓ The authorship pattern of research productivity on Occupational Therapy has identified that majority of papers are multi-authored. It is found from the analysis that Lotka's law may not be applicable with regard to author productivity.
- ✓ This study reveals that the United States of America tops the first place followed by United Kingdom, Australia so on.
- ✓ This study found that the total research output of the Occupational Therapy for the study period (1989 – 2015) published in 1629 journals. As the major portion of the research productivity covered by American Journal of Occupational Therapy, British Journal Occupational Therapy with more Global Citation Scores.
- ✓ Totally 5987 institutions were contributed articles to the total research productivity. University of Queensland tops first in the ranking followed by University of Toronto with high Global Citation Scores.

The trend towards collaborative research is gaining day-by-day. Every work of researchers depends purely on the library because it contains more springs forth information.

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