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Santha Subbulaxmi S  
santhamd3@gmail.com

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# A SCIENTOMETRIC ANALYSIS OF LITERATURE OUTPUT IN THE JOURNAL SURVEY OF OPHTHALMOLOGY

**Mrs. S. Santha Subbulaxmi**

Manager – Web Applications

Aravind Eye Hospital & Postgraduate Institute of Ophthalmology,  
Madurai – 625 020, Tamil Nadu.

[santhamd3@gmail.com](mailto:santhamd3@gmail.com)

## Abstract

*Survey of Ophthalmology is an international peer reviewed journal which publishes clinically oriented surveys in the field of ophthalmology. This study is an attempt to investigate and analyse the literature corpus published in the journal during the period 2014-2018. The data was obtained from PubMed. It was found that a total of 377 literatures were published during the period 2014-2018 by 1,520 authors. Two authorship pattern was the popular authorship pattern and degree of collaboration was 0.93. Majority of the first authors were from USA. The first authors from India had contributed 3.4% in the literature corpus. Most of the first authors from India were from LV Prasad Eye Institute and Dr. Rajendra Prasad Centre for Ophthalmic Sciences. Majority of the first authors from other countries were working in Massachusetts Eye and Ear Infirmary. The literature corpus was cited by 5,028 literatures. "Humans" was the most popular MeSH/keyword.*

**Keywords:** Survey of ophthalmology, Bibliometric, Scientometric; Literature growth; Authorship Pattern; Citation Pattern;

## 1. INTRODUCTION:

Survey of Ophthalmology is an international peer reviewed journal from the reputed publisher ELSEVIER. It publishes clinically oriented articles in the field of ophthalmology. The articles are of survey type which includes feature articles, section reviews, book reviews and abstracts. The full text articles are available from 1975 to till date. Access to full text is limited to the personal subscribers and accesses to abstracts are complimentary. The 2018 impact factor of the journal was 3.959.

The ophthalmic literature published in the journal is notable in the ophthalmology field. This study intends to investigate the ophthalmic literature output published in the journal and the impact created by those literatures. To do this, the present study uses the Scientometric analysis techniques to investigate the literature published in the journal during the period 2014 - 2018. The study results will be helpful to the journal, libraries and the ophthalmic community.

## 2. REVIEW OF LITERATURE:

The studies which analyses the literature output of a single journal, used to explore the growth pattern, subject wise distribution, authorship pattern, collaboration pattern, reference distribution and citation distribution with the help of Scientometric techniques. The

Scientometric and bibliometric studies published after the period 2013 (recent 5 years) were reviewed for conducting this study. Few of those studies and their results were as follows:

Paul, G., (2014) studied the literature published in Indian Journal of Physics during the period 2004 and 2013. The citation information is collected from Web of Science and Scopus database. In this study, the author found that almost all physics journals cite articles published in IJP. The Journals published from India cite the literature published in IJP more than the journals published from abroad during.

Rao, K. N., (2014) conducted a bibliometric Analysis of the literature published in Journal of Propulsion and Power during the period 1985 and 2013. It was found that out of total 4047 articles, 1330 were produced by two authors and 1098 by three authors. Country-wise collaborative research productivity of articles reveals that maximum number of articles were produced by one country. From top 27 ranked list of authors who have contributed alone or co-authored along with other authors, it is found that Fleeter, S. from Purdue University, USA has authored and co-authored highest number of 54 articles.

Singh, J. K. (2014), analyzed the literature published in the journal Indian Journal of Pure and Applied Physics during the period 2006 and 2010 by using Scientometric techniques. The study results revealed that most the papers published in the journal were contributed jointly and overall average citation per paper was 1.87. The study also revealed that the foreign contribution in Indian journal is significantly less.

Singh, K., (2017) explored the literature published in International Journal of Library and Information Studies during the period 2012 and 2016. After analyzing bibliographic forms 3685 references were found in the 283 articles. Only 4 different countries across the world have contributed research articles to this journal during the period of study.

Lamani, M. B., (2017) examined the literature output of New England Journal of Medicine published in the period 1989 and 2014. The literature corpus contains 43,694 publications with 3,26,2469 citations with 74.67 average citations per paper. Out of the total publications, around 55.57% publications published in the form of letter.

### **3. OBJECTIVES:**

- To investigate year wise literature growth
- To find out the page length of the literature published in the journal
- To identify the authorship pattern
- To find out the degree of collaboration
- To find out the top 10 countries published in the journal and their literature contribution
- To ascertain the Institutions of first authors from India who published in the journal

- To identify the top 12 institutions of the first authors from other countries who published in the journal
- To identify about the citation pattern of the literature published in the journal
- To investigate the citations of the literature published in the journal
- To identify the popular Mesh/keyword used to index the literature

#### 4. MATERIALS AND METHODS:

The data was obtained from PubMed using the advanced search builder in its homepage. In the builder, the field “Journal” is selected and "Survey of Ophthalmology” was chosen to retrieve the results. The scientific literature published in print during the period 2014 - 2018 was considered for the study. A total of 377 records were downloaded in XML format from PubMed and converted in to excel using the tool PubMed2Xls. The citation data is obtained from Google scholar during the period 21-23 July 2019. Further data cleaning and analysis was done by using MS-Access and MS-Excel.

#### 5. RESULTS:

A total of 377 literatures were published in the journal, survey of ophthalmology during the period 2014-2018. A total of 1,520 authors produced the literature corpus and the corpus is cited by 5,028 literatures.

**Table 1: Year wise Literature Growth**

S.No.	Year	No. of Literature	Percentage	Growth Rate
1	2014	69	18.3%	
2	2015	56	14.9%	-18.8%
3	2016	63	16.7%	12.5%
4	2017	83	22.0%	31.7%
5	2018	106	28.1%	27.7%
	<b>Total</b>	<b>377</b>		

**Table 1** shows up the year wise literature growth over the period 2014 – 2018. Percentage is calculated for each year based on the formula  $\text{Percentage} = \frac{\text{No. of literature produced in the year}}{\text{total no. of literature}}$ . Growth rate is calculated for each year based on the formula  $\text{Growth Rate} = \frac{\text{Present data} - \text{Past data}}{\text{Past data}}$ . Total published literatures in 2014 are 69. In 2015, the total published literatures are 56 which show up a significant decay of 18.8% while comparing to 2014. In 2016, total published literatures are 63 which show up a growth of 12.5% while comparing to 2015. In 2017, the total published literatures are 83 which show up a growth of 31.7% while comparing to 2016. In 2018, the total published literatures are 106 which shows up a growth of 27.7% while comparing to 2017.

**Table 2: Page length of Literature and Mean Page Length:**

S.No.	Year	Page 1 to 10	Page 11 to 20	Page 21 and	Total	Total	Mean
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						above		Literature (L)	pages of Literature (N)	Page length of Literature (N/L)
		No. Literature (C1)	(C1/L) %	No. Literature (C1)	(C1/L) %	No. Literature (C1)	(C1/L) %			
1	2014	45	65.2%	20	29.0%	4	0.6%	69	667	9.7
2	2015	30	53.6%	22	39.3%	4	0.7%	56	608	10.9
3	2016	30	47.6%	24	38.1%	9	1.1%	63	800	12.7
4	2017	47	56.6%	27	32.5%	9	1.0%	83	921	11.1
5	2018	55	51.9%	37	34.9%	14	1.1%	106	1219	11.5
	<b>Total</b>	<b>207</b>	<b>54.9%</b>	<b>130</b>	<b>34.5%</b>	<b>40</b>	<b>0.9%</b>	<b>377</b>	<b>4215</b>	<b>11.2</b>

The page length of the literature is grouped in to three ranges, 1 to 10, 11 to 20 and 21 and above. **Table 2** shows up the no. of literature in each group and mean page length. Out of the 377 published literature, 207 (54.9%) were between 1 to 10 pages, 130 (34.5%) were between 11 to 20 pages, 40 (0.9%) were 21 and above pages. The mean page length was highest (12.7) in the year 2016 and lowest (9.7) in the year 2014. Overall, the mean page length of all the papers published during the period 2014 and 2018 is 11.2.

**Table 3: Authorship pattern:**

S.No.	Authorship	2014	2015	2016	2017	2018	Total	Percentage	Rank
1	Single Author	11	3	2	6	5	27	7.2%	6
2	Two Authors	16	10	10	15	21	72	19.1%	2
3	Three Authors	14	10	14	16	19	73	19.4%	1
4	Four Authors	12	11	12	18	17	70	18.6%	3
5	Five Authors	7	13	8	13	18	59	15.6%	4
6	Six Authors	2	5	7	4	12	30	8.0%	5
7	Seven Authors	4		6	8	8	26	6.9%	7
8	Eight Authors	3	2	2	1	3	11	2.9%	8
9	Nine Authors				1	1	2	0.5%	10
10	Ten and above authors		2	2	1	2	7	1.9%	9
	<b>Total</b>	<b>69</b>	<b>56</b>	<b>63</b>	<b>83</b>	<b>106</b>	<b>377</b>		

A Total of 1,520 authors produced the literature corpus. **Table 3** shows up the authorship patterns. Three authors produced around 19.4% of the literature and this pattern is in the first rank. Two authors produced around 19.1% of the literature and this pattern is in the second rank. Four authors produced around 18.6% of the literature and this pattern is in the third rank.

**Table 4: Degree of Collaboration:**

S.No.	Year	Single Author (Ns)	Multiple Authors (Nm)	Degree of Collaboration $C = Nm / (Nm + Ns)$
1	2014	11	58	0.84
2	2015	3	53	0.95
3	2016	2	61	0.97
4	2017	6	77	0.93

5	2018	5	101	0.95
	<b>Total</b>	27	350	0.93

**Table 4** shows up the degree of collaboration. It was clear from the above analysis that single-authored papers were less than that of multi-authored papers. To determine the extent of collaboration in quantitative terms, the formula given by K.Subramanyam is used.

The formula is:  $C = \frac{Nm}{(Nm+Ns)}$ . The total degree of collaboration is 0.93

**Table 5: Top 10 Countries of First authors:**

S.No.	Country	No. of Literature	Percentage
1	USA	195	51.7%
2	UK	31	8.2%
3	Australia	25	6.6%
4	India	13	3.4%
5	Italy	13	3.4%
6	Singapore	10	2.7%
7	Spain	10	2.7%
8	Canada	10	2.7%
9	China	8	2.1%
10	Turkey	7	1.9%
	<b>Total</b>	<b>322</b>	<b>85.4%</b>

The first author details of the published literature are mined further. The first authors are from 38 different countries. **Table 5** shows up the top 10 countries of the first authors. Majority of the first authors are from USA and it is of 51.7%. The top 10 countries as shown in the table shares 85.4% of the literature published in Survey of Ophthalmology during the period 2014-2018.

**Table 6: The Eight Institutions of Indian First authors:**

S.No.	Country	No. of Literature	Percentage
1	LV Prasad Eye Institute	3	0.8%
2	Dr. Rajendra Prasad Centre for Ophthalmic Sciences	3	0.8%
3	Drishti CONE Eye Care	2	0.5%
4	L V Prasad Eye Institute	1	0.3%
5	Guru Nanak Eye Centre	1	0.3%
6	The Roskamp Institute	1	0.3%
7	Vallabhbai Patel Chest Institute	1	0.3%
8	Vasan Eye Care	1	0.3%
	<b>Total</b>	<b>13</b>	<b>3.4%</b>

A total of thirteen Indian authors are published in Survey of Ophthalmology as first author. Their literature contribution is 13 which is of 3.4%. The Indian first authors are working in eight

different institutions. Table 6 shows up the eight institutions of the Indian first authors. A total of three authors are from the Institutions, LV Prasad Eye Institute and Dr. Rajendra Prasad Centre for Ophthalmic Sciences who have published three papers in Survey of Ophthalmology and this made the institutions top in the ranking list.

**Table 7: Top 12 Institutions of First authors from other countries:**

S.No.	No. of Literature	Percentage	Percentage
1	Massachusetts Eye and Ear Infirmary	19	5.0%
2	Wills Eye Hospital	10	2.7%
3	Bascom Palmer Eye Institute	7	1.9%
4	Baylor College of Medicine	6	1.6%
5	Conegliano Hospita	5	1.3%
6	Cole Eye Institute	4	1.1%
7	Duke University Medical Center	4	1.1%
8	Emory University School of Medicine	4	1.1%
9	Illinois Eye and Ear Infirmary	4	1.1%
10	Shiley Eye Institute	4	1.1%
11	Wills Eye Institute	4	1.1%
12	University of Copenhagen	4	1.1%
	<b>Total</b>	<b>75</b>	<b>19.9%</b>

Around 364 first authors are from other countries. They are working in 251 different institutions. **Table 7** shows up the top 12 institutions of the first authors from other countries. A total of 19 authors from Massachusetts Eye and Ear Infirmary have published 19 literatures in survey of ophthalmology and made the institutions top in the top 12 ranking list.

**Table 8: Citation wise Distribution of the Literatures during the period 2014-2018:**

S.No.	Citation Range	2014	2015	2016	2017	2018	Total	Percentage	Rank
1	1 to 10	36	23	25	59	91	234	62.1%	1
2	11 to 20	7	14	15	15	11	62	16.4%	2
3	21 to 30	9	6	10	6	4	35	9.3%	3
4	31 to 40	6	5	6	3		20	5.3%	4
5	41 to 50	1	1	2			4	1.1%	7
6	51 to 60	1	4	2			7	1.9%	5
7	61 to 70	2		1			3	0.8%	9
8	71 to 80	2	1	2			5	1.3%	6
9	81 to 90	2	1				3	0.8%	9
10	91 and above	3	1				4	1.1%	7
	<b>Total</b>	<b>69</b>	<b>56</b>	<b>63</b>	<b>83</b>	<b>106</b>	<b>377</b>		

Among the total published literature corpus, cited literature is 316 (83.8%) and literature without citation is 61 (16.2%). Those 316 literatures published in Survey of Ophthalmology during the period 2014-2018 was cited by 5,028 literatures. **Table 8** shows up the ten citation

ranges, year wise distribution of cited literature counts, percentage and rank. Majority of the literature has citations in the range of 1-10 and those no. of literatures are 234 (62.1%).

**Table 9: Citations of literatures published in the period 2014-2018:**

S.No.	Year	No. of Literature	Citations (C)	Average No. of citations per literature (C/N)	Rank	Overall Cumulative	
						Citations	%
1	2014	69	1,533	22.2	1	1,533	30.5%
2	2015	56	1,129	20.2	2	2,662	52.9%
3	2016	63	1,212	19.2	3	3,874	77.0%
4	2017	83	657	7.9	4	4,531	90.1%
5	2018	106	497	4.7	5	5,028	100.0%
	<b>Total</b>	<b>377</b>	<b>5028</b>	<b>13.3</b>			

**Table 9** shows up the citations of the literatures published during the period 2014-2018. The average no. of citation per literature was highest in the year 2014 and it holds the first place. The literature published in the year 2014 has 30.5% of citations in the total citations for the five years. The cumulative citation percentages show up that the literature published in 2014 and 2015 has more than half of citations (52.9%) in the total citations for the five years.

**Table 10: Top 10 Popular MeSHterms/Keywords Ranking List:**

Rank	2014	2015	2016	2017	2018	All 5 years
1	Humans (67)	Humans (56)	Humans (62)	Humans (78)	Humans (92)	Humans (355)
2	Female (17)	Female (11)	Male (11)	Diagnosis, Differential (16)	Female (12)	Female (61)
3	Male (12)	Male (9)	Female (11)	Male (11)	Risk Factors (10)	Male (50)
4	Magnetic Resonance Imaging (8)	Risk Factors (7)	Diagnosis, Differential (10)	Female (10)	Diagnosis, Differential (9)	Diagnosis, Differential (45)
5	Diagnosis, Differential (8)	Magnetic Resonance Imaging (6)	Middle Aged (9)	Global Health (8)	Diagnostic Techniques, Ophthalmological (9)	Middle Aged (31)
6	Adult (8)	Middle Aged (5)	Disease Management (7)	Visual Acuity (8)	Visual Acuity (8)	Risk Factors (29)
7	Middle Aged (7)	Adult (5)	Visual Acuity (7)	Tomography, Optical	Tomography, Optical	Magnetic Resonance



				Coherence/methods (7)	Coherence (7)	ce Imaging (27)
8	Tomography, X-Ray Computed (6)	Aged (5)	Animals (6)	Magnetic Resonance Imaging (7)	Male (7)	Adult (27)
9	United States (5)	Animals (5)	Glucocorticoids/therapeutic use (5)	Disease Management (7)	Intraocular Pressure/physiology (6)	Visual Acuity (26)
10	History, 20th Century (5)	Angiogenesis Inhibitors/therapeutic use (4)	Fluorescein Angiography (5)	Diagnostic Techniques, Ophthalmological (6)	Tomography, Optical Coherence/methods (6)	Tomography, Optical Coherence (24)

Total distinct MeSH/Keywords, found in the literature were 1,541 and they all appeared 3,048 times in the total literature. All the MeSH/keywords were ranked by calculating the total occurrences of those words in the literature for each year and for five years. The top 10 popular words were listed as in the **Table 10**. These 10 keywords are occurred around 22.1% in the total literature. The most popular keyword is Humans.

## 6. LIMITATIONS OF THE STUDY:

The data available as in PubMed is considered for the study. The actual data in the journal which is not indexed in PubMed is not used for the analysis.

## 7. CONCLUSION:

The results of the study revealed that a total of 377 literatures were published in the published in the journal “Survey of Ophthalmology” during the period 2014-2018. A total of 1,520 authors were produced the literature corpus. The mean page length of the paper was 11.2. Three authors authorship pattern had contributed a higher percentage in constructing the literature corpus while comparing with other authorship patterns and the total degree of collaboration was 0.93. Majority of the first authors were from USA. The first author from India had contributed 3.4% in the literature corpus. Majority of the Indian first authors are from the institutions, LV Prasad Eye Institute and Dr. Rajendra Prasad Centre for Ophthalmic Sciences. Majority of the first authors from other countries are working in Massachusetts Eye and Ear Infirmary. The literature corpus was cited by 5,028 literatures. “Humans” was the most popular MeSH/keyword.

In Conclusion, these results can give an idea about the literature corpus of the journal which is published during the period 2014-2018 to Ophthalmologists, Researchers, Librarians and Information service providers.

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