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GROWTH OF INDIAN HEALTH SCIENCE PUBLICATIONS : A BIBILOGRAPHIC ANALYSIS BASED ON SCOPUS DATABASE

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ABSTRACT

Health sciences, related to social aspect than pertaining to pure medical aspect, also termed as health care science. There exist deviation with medical research. Therefore an attempt has been made to find the growth of Indian literature in basic health sciences. For this purpose, medical online data base were not considered. Insteat Scopus database has been taken for the study. Under the search term "Health Science" and "India", irrespective of the field, the SCOPUS database provided more than 2234 records. These records were further analysed using Excel and SPSS software. This paper attempt to provide the growth of Indian literature in field of health sceinces over the period of 43 years ie. 1970-2012.

Key Words: SCOPUS, Health Science Publications, Bibliographic Analysis, Databases, Bibliometric study

INTRODUCTION

The growth and awareness in health science has been witnessed during the last two decades. Majority of the development on health science literature were covered in medical database. Casual analysis has been made in the scopus database to find out any Indian literature on health sciences. It is surprising to see there exist 2234 publications in the scopus database during the period of 1970 to 2012 (43 years). This paved way for the bibliometric study on health science and hence this paper. These articles are not covered in the medical database.

HEALTH SCIENCE

Healthcare science, also known as medical science, is a set of applied sciences applying portions of natural science or formal science, or both, to develop knowledge, interventions, or technology of use in healthcare or public health.[1] Such disciplines as medical microbiology, clinical virology, clinical epidemiology, genetic epidemiology, and biomedical engineering are medical sciences. Explaining physiological mechanisms operating in pathological processes,

however, pathophysiology can be regarded as basic science. It is not to be confused with Medical research. This indicates that health sciences are somewhat related to social aspect than pertaining to pure medical aspect. There are at least 45 different specialisms within healthcare science, which are traditionally grouped into three main divisions

- Specialisms involving life sciences
- Specialisms involving physiological science
- Specialisms involving medical physics or bioengineering

BIBLIOMETRIC STUDY

Bibliometric analysis is employed by researchers to study the growth of literature in given field. Pritchard (1969) defined the term Bibliometric as the application of statistical and mathematical methods to books and other communication. The bibliometrics has emerged as a thrust area of research, incorporating different branches of human knowledge. There are famous Laws of Bibliometric i.e. Lotka's law (1926) of scientific productivity, Bradford's law (1934) of scattering and Zips law (1949) on frequency of words. But the Bibliometric studies started in late sixties.

OBJECTIVES

Main objectives of the study are

1. To examine the worldwide research production in health sciences.
2. To study the year wise distribution of Indian contribution in health science literature.
3. To identify the document type of the publications in Indian health sciences literature.
4. To identify the Indian Institutions/organizations conducting the research in health sciences.
5. To identify the top 20 journals' publication on health sciences.
6. To compare and measure the growth rate of literature published from India.
7. To study the authorship pattern in health science literature
8. To identify the countries collaborated in producing health science literature.

COLLECTION OF DATA

For this study, the literature on health sciences data has been downloaded from 'Scopus', multidisciplinary online database, which is an international indexing and abstracting database, using the search term "Health Science". For this study, publications commencing from 1970-2012 (43 years) has been downloaded from the database. A total of 2,234 data has been identified.

The collected data has been classified by using Excel and the same was loaded in to SPSS (Statistical Package for Social Sciences) for the purpose of analysis. Statistical tools such as frequency distribution and percentage analysis and Scientometric techniques such as Authorship pattern, Relative Growth Rate (RGR), Doubling time (dt) etc has been used for the study.

DATA ANALYSIS

The global contribution of health science publications accounts to 1,13,794 and the country wise distribution is shown in Table 1

TABLE 1– COUNTRY WISE DISTRIBUTION

S.No	Countries	No of publications	%	Cumulative %
1	United States	43530	38.25	38.25
2	United Kingdom	10712	9.41	47.66
3	Canada	6730	5.91	53.57
4	Australia	4155	3.65	57.22
5	Germany	3643	3.2	60.42
6	Netherlands	2910	2.56	62.98
7	China	2730	2.4	65.38
8	Italy	2604	2.29	67.67
9	France	2532	2.23	69.9
10	India	2231	1.96	71.86
11	Sweden	2206	1.94	73.8
12	Spain	2154	1.89	75.69
13	Japan	1991	1.75	77.44
14	Brazil	1670	1.47	78.91
15	Switzerland	1573	1.38	80.29
16	South Korea	1272	1.12	81.41
17	Belgium	1182	1.04	82.45
18	Denmark	1101	0.97	83.42
19	Iran	1059	0.93	84.35
20	Norway	982	0.86	85.21
21	Finland	950	0.83	86.04
22	Taiwan	902	0.79	86.83
23	Turkey	867	0.77	87.60
24	South Africa	829	0.73	88.33
25	New Zealand	782	0.69	89.02
26	others	12497	10.98	100.00
	Total	113794	100	

Twenty five countries were producing 89% of the total publications of health science. India occupies tenth position with the contribution of 1.96. I.e. nearly 2% of the publications were from India. The Indian contribution has been analyzed in this paper. The year wise distribution of a total 2,234 records were shown in table 2

Table 2 Year wise distribution of Indian contribution on health science

YEAR	TP	%	CP	Cum %
1970	1	0.04	1	0.04
1971	1	0.04	2	0.09
1972	1	0.04	3	0.13
1973	1	0.04	4	0.18
1975	1	0.04	5	0.22
1978	3	0.13	8	0.36
1979	2	0.09	10	0.45
1980	1	0.04	11	0.49
1982	6	0.27	17	0.76
1984	1	0.04	18	0.81
1985	4	0.18	22	0.98
1988	4	0.18	26	1.16
1989	3	0.13	29	1.30
1990	4	0.18	33	1.48
1991	4	0.18	37	1.66
1992	3	0.13	40	1.79
1993	7	0.31	47	2.10
1995	5	0.22	52	2.33
1996	5	0.22	57	2.55
1997	11	0.49	68	3.04
1998	14	0.63	82	3.67
1999	17	0.76	99	4.43
2000	54	2.42	153	6.85
2001	60	2.69	213	9.53
2002	104	4.66	317	14.19
2003	99	4.43	416	18.62
2004	47	2.10	463	20.73
2005	74	3.31	537	24.04
2006	112	5.01	649	29.05
2007	164	7.34	813	36.39
2008	214	9.58	1027	45.97
2009	204	9.13	1231	55.10
2010	211	9.44	1442	64.55
2011	333	14.91	1775	79.45
2012	459	20.55	2234	100.00
	2234	100.00		

TP = Total Publications, CP = Cumulative Publications; cum % = Cumulative %

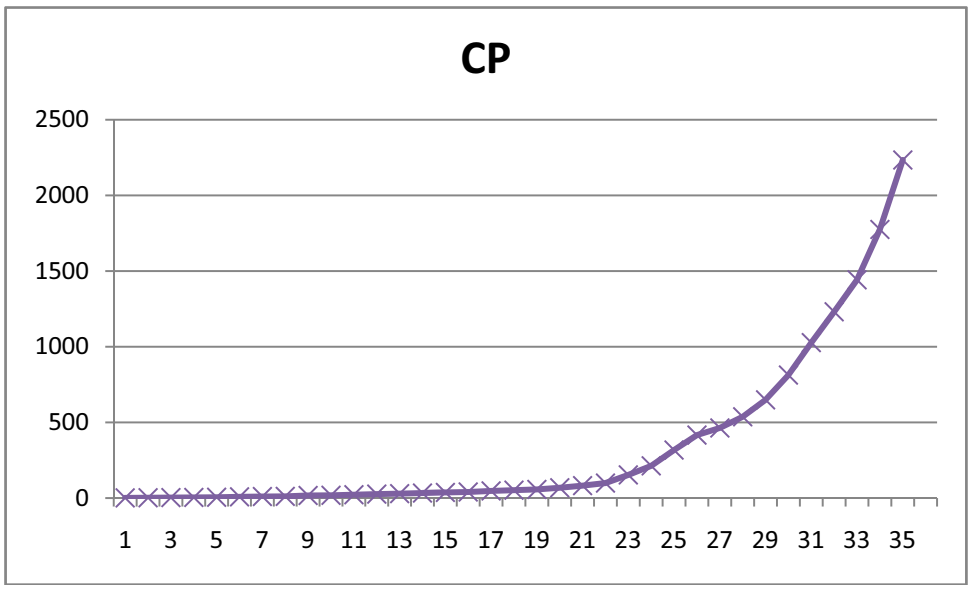

FIG. 1 Growth Indian literature on health science publications in 43 years

It can be seen from table 2 that the publication of health science research seems to be in parabolic nature. During the last six years there is a substantial increase in the publications. This indicates that the awareness and importance of health science has been in increasing trend.

The document wise distribution of health science records were shown in Table 3.

Table 3 Document type

S.No	Document type	TP	%
1	Article	1576	70.55
2	Review	350	15.67
3	Conference Paper	214	9.58
4	Editorial	19	0.85
5	Article in Press	19	0.85
6	Letter	18	0.81
7	Short Survey	14	0.63
8	Note	9	0.40
9	Book Chapter	5	0.22
10	Book	2	0.09
11	Erratum	1	0.04
12	Undefined	7	0.31
	Total	2234	100.00

It can be seen from table 3 that majority of the health science literature are published as journal article (70.55%). It is followed by review (15.672%), Conference Paper(9.58%) and editorial column (0.85%).

The top 25 institutions that contribute the health science literature has been identified and shown in table 4

TABLE - 4 TOP 25 AFFILIATED INSTITUTIONS'/ORGANIZATIONS' PUBLICATIONS

S.No	AFFILIATION	TP	%	CP
1	All India Institute of Medical Sciences	135	6.04	6.04
2	National Institute of Mental Health and Neuro Sciences	44	1.97	8.01
3	Jawaharlal Nehru University	34	1.52	9.53
4	Postgraduate Institute of Medical Education and Research	30	1.34	10.87
5	Indian Institute of Toxicology Research	27	1.21	12.08
6	Banaras Hindu University	26	1.16	13.25
7	National Environmental Engineering Research Institute India	26	1.16	14.41
8	Indian Institute of Technology, Delhi	26	1.16	15.57
9	Anna University	23	1.03	16.60
10	Sanjay Gandhi Postgraduate Institute of Medical Sciences Lucknow	23	1.03	17.63
11	Christian Medical College, Vellore	21	0.94	18.57
12	Kasturba Medical College, Manipal	21	0.94	19.51
13	Indian Council of Medical Research	20	0.90	20.41
14	Sher-I-Kashmir Institute of Medical Sciences	19	0.85	21.26
15	Chatrapati Shahuji Maharaj Medical University	19	0.85	22.11
16	Indian Institute of Technology, Kharagpur	18	0.81	22.92
17	Indian Veterinary Research Institute	18	0.81	23.72
18	Jadavpur University	18	0.81	24.53
19	Indian Institute of Science	17	0.76	25.29
20	Annamalai University	17	0.76	26.05
21	Indian Agricultural Research Institute	16	0.72	26.77
22	National Institute of Nutrition India	16	0.72	27.48
23	University of Calcutta	16	0.72	28.20
24	Central Food Technological Research Institute India	15	0.67	28.87
25	Aligarh Muslim University	15	0.67	29.54

It could be observed from Table 4 that the top 25 institutions contributions were only 29.54%. Among the 25 top institutions All India Institute of Medical Sciences, National Institute of Mental Health and Neuro Sciences and Jawaharlal Nehru University are in top three positions.

It seems majority of the articles in health science are appeared in the journals. There fore it is better to identify the top 20 journals in health science. The top 20 publications were identified and the same is shown in table 5. The table further shows the percentage of contribution on total number of records and the cumulative percentage.

TABLE 5 - TOP 20 JOURNALS PUBLICATIONS

S.No	Journal name	No. of publications	%	Cum %
1	Environmental Monitoring and Assessment	124	5.55	5.55
2	Asian Journal of Microbiology Biotechnology and Environmental Sciences	85	3.80	9.35
3	AIDS and Behavior	31	1.39	10.74
4	Indian Journal of Pediatrics	29	1.30	12.04
5	Bulletin of Environmental Contamination and Toxicology	22	0.98	13.03
6	Journal of Biosciences	21	0.94	13.97
7	Iranian Journal of Pharmaceutical Research	20	0.90	14.86
8	Indian Journal of Medical Research	20	0.90	15.76
9	World Journal of Microbiology and Biotechnology	20	0.90	16.65
10	Current Science	19	0.85	17.50
11	International Medical Journal	18	0.81	18.31
12	Journal of Infection and Public Health	16	0.72	19.02
13	Social Science and Medicine	16	0.72	19.74
14	Journal of Medical Systems	15	0.67	20.41
15	World Heart Journal	14	0.63	21.04
16	National Medical Journal of India	14	0.63	21.66
17	Nutrition Reviews	13	0.58	22.25
18	Molecular and Cellular Biochemistry	12	0.54	22.78
19	Annals of the New York Academy of Sciences	12	0.54	23.32
20	Applied Biochemistry and Biotechnology	11	0.49	23.81

It is observed from table 5 that the Environmental Monitoring and Assessment (124 articles), Asian Journal of Microbiology Biotechnology and Environmental Sciences (85) and AIDS and Behavior (31) journals are the major contributors in health sciences. Only 23.81% of the articles are appearing the top 20 journals. However 10% of the articles are appearing in top three journals.

The relative growth rate (RGR) and Doubling Time (Dt) has been calculated yearwise and the same is shown in Table 6 and Figure 2 and 3.

Table 6 : RGR and Doubling time

S.No.	YEAR	Cumulative publications	Cum %	w1	w2	RGR	Dt
1	1970	1	0.04		0.00	0.00	0.00
2	1971	2	0.09	0.00	0.69	0.69	1.00
3	1972	3	0.13	0.69	1.10	0.41	1.71
4	1973	4	0.18	1.10	1.39	0.29	2.41

5	1975	5	0.22	1.39	1.61	0.22	3.11
6	1978	8	0.36	1.61	2.08	0.47	1.47
7	1979	10	0.45	2.08	2.30	0.22	3.11
8	1980	11	0.49	2.30	2.40	0.10	7.27
9	1982	17	0.76	2.40	2.83	0.44	1.59
10	1984	18	0.81	2.83	2.89	0.06	12.12
11	1985	22	0.98	2.89	3.09	0.20	3.45
12	1988	26	1.16	3.09	3.26	0.17	4.15
13	1989	29	1.3	3.26	3.37	0.11	6.35
14	1990	33	1.48	3.37	3.50	0.13	5.36
15	1991	37	1.66	3.50	3.61	0.11	6.06
16	1992	40	1.79	3.61	3.69	0.08	8.89
17	1993	47	2.1	3.69	3.85	0.16	4.30
18	1995	52	2.33	3.85	3.95	0.10	6.85
19	1996	57	2.55	3.95	4.04	0.09	7.55
20	1997	68	3.04	4.04	4.22	0.18	3.93
21	1998	82	3.67	4.22	4.41	0.19	3.70
22	1999	99	4.43	4.41	4.60	0.19	3.68
23	2000	153	6.85	4.60	5.03	0.44	1.59
24	2001	213	9.53	5.03	5.36	0.33	2.09
25	2002	317	14.19	5.36	5.76	0.40	1.74
26	2003	416	18.62	5.76	6.03	0.27	2.55
27	2004	463	20.73	6.03	6.14	0.11	6.47
28	2005	537	24.04	6.14	6.29	0.15	4.67
29	2006	649	29.05	6.29	6.48	0.19	3.66
30	2007	813	36.39	6.48	6.70	0.23	3.08
31	2008	1027	45.97	6.70	6.93	0.23	2.97
32	2009	1231	55.1	6.93	7.12	0.18	3.82
33	2010	1442	64.55	7.12	7.27	0.16	4.38
34	2011	1775	79.45	7.27	7.48	0.21	3.34
35	2012	2234	100	7.48	7.71	0.23	3.01

Authorship Pattern

Authorship pattern of the publications were identified for the Indian publications and the same is shown in Table 7.

Table 7 No. of authors

S.No.	No. of authors	Publications	Percent
1	Single	286	12.8
2	Two	493	22.1
3	Three	459	20.5
4	>3	996	44.6
	Total	2234	100.0

Only 286 (12.8%) of publications are single author publications. 87.2% of publications are collaborative in nature. Nearly 44.6% of articles are published by more than three authors.
The top 25 countries that are collaborated were also identified and the same is shown in Table 8.

Table 8 Country collaborated

S.No.	Country collaborated	N o. of Publications	%
1	United States	224	10.03
2	United Kingdom	83	3.72
3	Canada	37	1.66
4	Australia	34	1.52
5	Japan	22	0.98
6	Germany	21	0.94
7	Switzerland	20	0.90
8	France	19	0.85
9	China	18	0.81
10	Nepal	17	0.76
11	South Korea	14	0.63
12	South Africa	14	0.63
13	Thailand	14	0.63
14	Italy	14	0.63
15	Malaysia	13	0.58
16	Saudi Arabia	13	0.58
17	Sweden	12	0.54
18	Belgium	11	0.49
19	Netherlands	11	0.49
20	Singapore	11	0.49
21	Poland	10	0.45
22	Mexico	10	0.45
23	Slovakia	8	0.36
24	Taiwan	8	0.36
25	Brazil	8	0.36
	Total	666	29.84

Nearly 29.84% of articles are collaborated by top 25 countries. Among the top 25 countries, USA has a collaboration up to 10.03% of articles. It is followed by UK (3.72%), Canada (1.66%) and Australia (1.52%).

FINDINGS

- It is observed that among Twenty five countries were producing 89% of the total publications of health science, out of which India occupies tenth position with the contribution of 1.96%.

- It is found that the publication of health science research seems to be in parabolic nature. During the last six years there is a substantial increase in the publications. This indicates that the awareness and importance of health science has been in increasing trend.
- It can be seen that the majority of the health science literature are published as journal article (70.55%). It is followed by review (15.672%), Conference Paper(9.58%) and editorial column (0.85%).
- It is found that the top 25 institutions contributions were only 29.54%. Among the 25 top institutions All India Institute of Medical Sciences, National Institute of Mental Health and Neuro Sciences and Jawaharlal Nehru University are in top three positions.
- It is found that only 23.81% of the articles are appearing the top 20 journals. .Environmental Monitoring and Assessment (124 articles), Asian Journal of Microbiology Biotechnology and Environmental Sciences (85) and AIDS and Behavior (31) journals are the major contributors in health sciences. However 10% of the articles are appearing in top three journals.
- It is observed that the relative growth rate is linear in nature.
- It could be observed that during the last few year it can be seen that the doubling time of articles takes place three to four years.
- It is observed that only 12.8% of publications are Single author publications. 78.2% of publications are collaborative in nature.
- It is assessed that nearly 44.6% of articles are published by more than three authors.
- It is obtained that nearly 29.84% of articles are collaborated by top 25 countries.
- Besides it is observed that among the top 25 countries, USA has a collaboration up to 10.03% of articles. It is followed by UK (3.72%), Canada (1.66%) and Australia (1.52%)

CONCLUSION

In this study a preliminary literature outcome on basic health sciences were provided. The recent rise of interest among the health science education community in individual faculty making subjective judgments about medical trainee performance appears to be directly related to the introduction of notions of integrated competency-based education and assessment for learning. Although it is known that assessor expertise plays an important role in performance assessment, the roles played by different factors remain to be unraveled. It is therefore essential fo conducted an exploratory study with the aim of building a preliminary model to gain a better understanding of expertise of health science literature.

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