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ANALYSIS OF RESEARCH OUTPUT ON HOCKEY AT GLOBAL LEVEL: A SCIENTOMETRIC STUDY

THARMAR K
Bharathidasan University, tharmasurya87@gmail.com

KALIDASAN R
Bharathidasan University, kalidasanbdu@gmail.com

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K.Tharmar* and R.Kalidasan**

*Research Scholar, Dept. of Physical Education, Bharathidasan University, Tiruchirappalli
**Associate Professor, Dept. of Physical Education, Bharathidasan University, Tiruchirappalli

Abstract

This paper examines the publication of the game of Hockey at global level indexed in web of science. The relevant data for the study have been extracted from the web of science database. The search term "Hockey" has been used as keyword. A total of 3849 unique records over the year 1989 – 2016 have been downloaded and analyzed under various categories, out of 3849 records, only top 10 records alone have been considered for this study. More number of articles was published in the year 2016. The authorship trend shows that, out of total 3849 published publication, It is also investigated that "British Journal of Sports Medicine" has more number of published, 126 (3.3). Furthermore, this study also identified that document wise distribution, word frequency, institution wise, institution with subdivision wise, and geographical distribution of the literature and citation analysis is also distinguished.

Keywords: Scientometric, Hockey**,** Web of science,

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1. INTRODUCTION

1.1 Sceintometric

Scientometric is a age of research and expedition in every field of knowledge. The consequent increase in the production of information is best reflected in the literature of every discipline. **Scientometrics** is the study of measuring and analysing science, technology and innovation. Major research issues include the measurement of impact, reference sets of articles to investigate the impact of journals and institutes, understanding of scientific citations, mapping scientific fields and the production of indicators for use in policy and management contexts. According to Nalimov V.V, & Mulchenko Z.M. (1969) "The application of those quantitative methods which are dealing with the analysis of science viewed as an Information process".

1.2 Hockey

Hockey is a leading sport in the world. In this game played with curved sticks and ball. Hockey is a team sport in which two teams play against each other by trying to maneuver a ball into the opponent's goal using a hockey stick. There are many types of hockey such as field hockey, bandy and ice hockey. According to Wein., (1981) "Hockey is a dynamic game played by both sexes requiring a high level of skills, excellent conditioning, and well-coordinated team effort".

The Indian men's hockey one of the greatest records in sports between 1928 and 1964, the team lost only one match at Olympic games, winning eight gold medals and one silver. India had an unbeaten sequence of Olympic men's hockey gold medals from 1928 to 1956 and returned with gold medals in 1964 and 1980.

Without a doubt, it was a great disappointment after India had been disqualified for the Olympics in the year 2008. The question that continues to haunt a hundred crores of people in the subcontinent is that whether it is possible for us to attain the past glory. The crisis management in the wake of frequent losses in Olympics and other International Hockey

Tournaments after 1980 is understandable. As a result, the administration, coaches, scientists, and other observers have studied a lot through analysis. However, depth analysis is required for determining the real cause of defeat in international competitions. This study attempts to analyze the research output of Hockey at the global level, which is available in the electronic form.

2. Objective of the study

The following are the major objectives of this study

- To identify and analyze the rate of growth of research productivity in the game of hockey at global level;
- To examine the Year wise distribution of publications;
- To analyze the author wise distribution of publications;
- To identify journal wise distribution of publications the game of hockey research output;
- To note down the Document wise distribution of publications;
- To identify the word wise distribution of publications
- To assess the Institution wise research concentration on hockey research output;
- To identify the Country – wise distributions

3. Methodology

The author affiliation is the basic unit of investigation of the study. The Scientometric analysis was used in this study to investigate publications related to "Hockey" that have been indexed by Web of Science. Web of Science provides researchers, administrators, academics and students with quick, powerful access to the world's leading citation database. In order to satisfy the objectives, the data were collected from the Web of Science database on November-2017. "Hockey" is the search terms were used to retrieve the data from Web of Science database. A total 3849 unique records over the year 1989-2016 have been downloaded and analyzed under various categories. The study has considered only the top 10 publications/ results from each category and analyzed based on total number of records published by research scholar, coaches, faculties, staff members and others of various countries in the global level and the same indexed in the Web of Science database. HistCite software has been used to extract the data from the database.

4. ANALYSIS AND INTERPRETATIONS

4.1 YEAR WISE DISTRIBUTION OF RECORDS

The main objective of the chronological study was to find out current information marked by Web of Science in the field of "Hockey". Through this study will be able to know the number of articles published on the game of hockey during the year 1989-2016 has been analyzed and shown in Table I.

Table No -I
Year wise contributions

S. No	Year of Publication	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	1989	19	0.5	74	161	28
2	1990	20	0.5	97	146	27
3	1991	25	0.6	112	561	26
4	1992	43	1.1	207	836	23
5	1993	35	0.9	132	752	25
6	1994	40	1.0	123	738	24
7	1995	48	1.2	395	1424	22
8	1996	53	1.4	229	845	21
9	1997	71	1.8	246	940	18
10	1998	62	1.6	264	1617	20
11	1999	66	1.7	418	1954	19
12	2000	72	1.9	307	1876	17
13	2001	91	2.4	584	2780	15
14	2002	90	2.3	392	2034	16
15	2003	106	2.8	587	2724	14
16	2004	124	3.2	466	3158	13
17	2005	130	3.4	565	3886	12
18	2006	147	3.8	738	3774	10
19	2007	142	3.7	684	3486	11
20	2008	150	3.9	514	3646	9
21	2009	163	4.2	625	3651	8
22	2010	196	5.1	737	3644	6
23	2011	180	4.7	597	3753	7
24	2012	247	6.4	578	3161	5
25	2013	249	6.5	578	3004	4

26	2014	272	7.1	521	2157	3
27	2015	306	8.0	347	1438	2
28	2016	380	9.9	139	694	1
	Total	**3849**	**100**			

The above table-I expects that the year wise distribution of records in the game of Hockey at Global level for the study period 1989 to 2016 (Twenty Eight Years). In the year 1989 has only 19 (0.5%) records with 74 TLCS and 161 TGCS. Further, it is followed by year 1990 has 20 records with 97 Total local Citation Scores and 146 records are Total Global Citations score. The highest publication in the year 2016 with 380 records and placed in first rank respectively.

4.2 AUTHOR WISE DISTRIBUTION OF THE PUBLICATIONS

The characteristics of any subject literature include not only the basic publishing patterns but also the contribution by the authors. There are certain authors in every subject who account for several papers in their field. However, some of them are well known in a given field. It is therefore important to know the eminent authors in the field of Hockey. This information is useful equally for the librarian as well as the researcher. The prime objective of the study is to find out the authors whose contribution is significant in the field of Hockey. For this purpose, a ranking list of top 10 productive authors has been prepared and presented in the table II in order of decreasing number of papers published in the selected field of hockey.

Table No-II

Author wise distributions

S. No.	Name of the Author	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	Baker J	43	1.1	407	1117	1
2	Emery CA	41	1.1	415	946	2
3	Meeuwisse WH	33	0.9	588	1234	3
4	Stuart MJ	29	0.8	257	512	4
5	Elferink-Gemser MT	27	0.7	27	496	5

6	Mihalik JP	27	0.7	228	469	6
7	Greenwald RM	25	0.6	291	615	7
8	Smith AM	25	0.6	179	386	8
9	Guskiewicz KM	24	0.6	252	894	9
10	Visscher C	23	0.6	31	491	10
	Total	**3849**	**100**			

Table -II Shows that the Top 10 author wise distributions of publications during the study period 1989-2016 in the field of Hockey game at Global level. The Total number of author publication in these records with 9558. The highest Productivity of publications goes to Baker J with 43 records and followed by the Emery CA with 41records, Meeuwisse WH 33 records and Stuart with 29 records, Elferink-Gemser MT and Mihalik JP with 27 records. It is found that the Visscher C has contributed less number of 23 records and placed in tenth respectively.

4.3 JOURNAL WISE DISTRIBUTIONS OF THE PUBLICATIONS

In the present era, journals play an important role in scientific communication of current information. The study has further ascertained the number of records published in the various journals and the results are shown in Table III.

Table No -III

Journal wise distributions

S. No	Name of the Journal	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	British Journal of Sports Medicine	126	3.3	847	3743	1
2	Medicine And Science In Sports And Exercise	125	3.2	467	1689	2
3	American Journal of Sports Medicine	117	3.0	1328	4235	3
4	Journal of Strength And Conditioning Research	115	3.0	517	2087	4
5	Journal of Sports Sciences	106	2.8	442	2817	5
6	Clinical Journal of Sport Medicine	104	2.7	714	2045	6
7	Sports Medicine	69	1.8	468	3644	7
8	Journal of Sport & Exercise	56	1.5	131	1012	8

	Psychology					
9	Journal of Athletic Training	52	1.4	290	984	9
10	Physician And Sports Medicine	42	1.1	56	209	10
	Total	**3849**	**100**			

The above table -III shows that the Journal wise Distribution of the publications. The total number of Journals is 1152, among this Journal "BRITISH JOURNAL OF SPORTS MEDICINE" with 126 records with first rank of the scattering and 3743 TGCS. The next Journal follows as "MEDICINE AND SCIENCE IN SPORTS AND EXERCISE" with 125 records with second rank of the scattering and 1689 TGCS as well as follows the publications.

4.4 WORDS WISE DISTRIBUTIONS OF THE PUBLICATIONS

The high-frequency keywords will be able to understand the various aspects of searching in the game of hockey research output. Table IV shows the high frequency of keywords as follows.

Table No -IV
Words wise distributions of the publications

S. No	Description	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	HOCKEY	1666	43.3	7014	16034	1
2	ICE	732	19.0	4224	8414	2
3	PLAYERS	607	15.8	2861	8212	3
4	SPORTS	338	8.8	905	8476	4
5	SPORT	308	8.0	1082	7256	5
6	ATHLETES	301	7.8	839	7476	6
7	INJURIES	287	7.5	2007	5936	7
8	PERFORMANCE	255	6.6	597	4151	8
9	INJURY	236	6.1	1408	6016	9
10	ELITE	235	6.1	932	4295	10
	Total	**3849**	**100**			

The above the table IV shows that Ranking of word wise Distribution. The total word of the publication is 6391 records. Among this word "Hockey" has 1666 highest records with first

rank of the frequency and TGCS with 16034 records. The next word follows as “ICE” with 732 records with second rank of the frequency and TGCS 8414 records as well as following the publications.

4.5 DOCUMENT WISE DISTRIBUTION OF PUBLICATIONS

The literature on the topic “Hockey” has been published in different forms such as articles, conference proceedings, letters, meeting abstracts, etc. The main objective of this analysis is to know the forms in which the literature is being published. The study helps the information scientists or librarians in knowing the most productive form of literature on the topic “Hockey”.

Table No -V
Document wise distribution

S. No	Document Type	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	Article	2903	75.4	9300	46847	1
2	Review	275	7.1	1106	7947	2
3	Meeting Abstract	203	5.3	16	37	3
4	Editorial Material	121	3.1	151	447	4
5	Article; Proceedings Paper	109	2.8	593	3013	5
6	Book Review	102	2.7	0	24	6
7	Letter	60	1.6	28	82	7
8	Note	16	0.4	72	441	8
9	News Item	14	0.4	1	12	9
10	Reprint	10	0.3	4	91	10
	Total	**3849**	**100**			

Table-V shows the study reveals that the Document wise distributions of publications covered by Web of science on the game of Hockey in Journal articles has 2903 highest records with first rank, it is followed by review has 275 records and occupied second rank. It is found that Review; Book Chapter has less number of only one record in the web of science.

4.6 INSTITUION WISE DISTRIBUTION OF THE PUBLICATIONS

The table -VI analysis indicates Institution-wise distribution in the game of hockey at global level research productivity from the web of science database.

Table No -VI
Institution wise distribution

S. No	Institution	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	Unknown	186	4.8	69	324	1
2	University of Calgary	127	3.3	889	2780	2
3	University of Alberta	115	3.0	385	1950	3
4	University Toronto	114	3.0	534	1643	4
5	University of British Columbia	77	2.0	250	2012	5
6	University of Ottawa	77	2.0	135	540	6
7	McGill University	75	1.9	514	1647	7
8	York University	75	1.9	515	1220	8
9	University of N Carolina	59	1.5	554	1877	9
10	Harvard University	57	1.5	247	781	10
	Total	**3849**	**100**			

The above the table -VI shows that the Institution-wise research productivity. It is noted that out of the 3849 records of the publications, Unknown the highest number of research publications 186 records and University of Calgary has second highest number of research publications 127 records and University of Alberta has third highest number of research publications with 115 records stands third and others.

4.7 LANGUAGE WISE DISTRIBUTION OF PUBLICATIONS

Literature on a particular subject may be published in different languages. For researcher and the information scientist, it is always important to know the language(s) in which the material of their area or specialization is published. The study provides information about the most dominant language(s) in which the literature on the subject "Hockey" is being produced.

Table No -VII

Language wise distribution of publication

S. No	Name of the Language	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	English	3770	97.9	11253	58770	1
2	German	31	0.8	12	94	2
3	French	20	0.5	8	54	3
4	Spanish	8	0.2	0	29	4
5	Italian	7	0.2	0	4	5
6	Russian	4	0.1	0	0	6
7	Portuguese	3	0.1	0	2	7
8	Czech	2	0.1	1	5	8
9	Dutch	2	0.1	0	0	9
10	Swedish	1	0.0	0	0	10
11	Turkish	1	0.0	0	0	11
	Total	**3849**	**100**			

It is observed from Table -VII that English is the highly used language to publish the documents. It is studied almost 3770 (97.9 %) of documents have been published in English language and the same have indexed in Web of Science.

4.8 COUNTRY WISE DISTRIBUTION OF THE PUBLICATIONS

Certain countries give more research in particular game than others. This is very much useful not only for the information manager in finalizing the subscription list of periodicals but also for the research scholars as they tend to know the countries that are leaders in their respective field of research. Table VIII shows the list of top 10 Countries which are involved in producing the research material in the game of hockey during 1989-2016.

Table No -VIII

Country – wise collaborative distribution of publications

S. No	Country	Total Number of Records	Percentage (%)	TLCS	TGCS	Rank
1	USA	1287	33.4	4246	22456	1
2	Canada	1024	26.6	4176	15075	2
3	UK	366	9.5	882	5897	3
4	Unknown	326	8.5	518	2644	4
5	Australia	259	6.7	1053	7607	5
6	Germany	168	4.4	314	2670	6
7	Sweden	111	2.9	339	2838	7
8	Switzerland	98	2.5	404	2652	8
9	Finland	96	2.5	404	2244	9
10	Netherlands	95	2.5	97	1251	10
	Total	**3849**	**100**			

The above table -VIII shows that Country wise research productivity. It is noted that out of the 3849 records of the publication. It clearly explains that the USA has contributed 1287 highest records and placed in first rank among other top counties. It is followed by Canada has 1024 records and occupied second rank. Further, it is found that Netherlands has contributed less number of 95 records and placed in tenth rank respectively. The result of the study clearly indicates that other countries should also be encouraged and concentrate the game of hockey at global level.

5. CONCLUSION

The research articles published in peer-reviewed journals will create a global impact on the institutions and authors. These contributions will help the research community to get required information for the research. Perhaps, the institutions as well as authors will get an opportunity to collaborate with national and international research institutions. Web of Science is one of most important research tools for collecting information for the research in all the domains. It provides the required information in various forms like articles, research reports, conference papers, bibliographic information etc.

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