Comprehensive Bibliometric Overview of Research Trends of Indian Journal of Pharmaceutical Education and Research

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ABSTRACT

In this study, we have examined the research trends of the Indian Journal of Pharmaceutical Education and Research for the year 2008-2020. We have used bibliometric indicators in two ways on the 1261 documents published in the journal. First, we have presented the performance analysis of the journal, like year-wise distribution of documents, authorship pattern, prolific authors, institutions, and countries. Secondly, the science mapping like keyword analysis, country collaboration, etc., was done using R and Vosviewer. The bibliographic and citation data of 1261 documents were extracted from the Scopus database.

Keywords: Bibliometric, Journal Analysis, Science Mapping, Performance Analysis.

INTRODUCTION

Indian Journal of Pharmaceutical Education and Research (hereafter IJPER) is a leading open-access journal in pharmacy and pharmaceutical education. It is the official journal of the Association of Pharmaceutical Teachers of India. The first issue of the journal was published in 1967, and since then, it has been quarterly publishing quality research. The journal's popularity can be seen by the fact that it is referred to by more than 6000 teachers, 40,000 students, and 1000 working professionals in the domain of pharmaceutical organizations. The journal is indexed in popular databases like Web of Science, Scopus, Science Central, Ulrichsweb, etc. The impact factor for the year 2019 as per clarivate analytics, 2020 is 0.501.[1]

This paper presents the comprehensive bibliometric overview of IJPER between 2008 and 2020. Bibliometric is a popular technique for quantifying prominence and identifying trends based on retrospective evaluation of the published articles.[2] We have used different bibliometric indicators like the evolution of publications, influential authors, citation structure, prolific countries and institutions, and keywords analysis.

OBJECTIVES

1. To study the year-wise distribution, length of publications of IJPER
2. To study the citation structure of IJPER
3. To study the authorship pattern of IJPER
4. To study the H classics publications of IJPER
5. To study the most prolific authors, institutions, countries of IJPER
6. To study the main topics of IJPER
7. To study the structural network of keywords, the country collaboration of IJPER.

LITERATURE REVIEW

Many studies have used bibliometric indicators on research output to measure the impact and evaluation of journal, author, subject domain, and institutions

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easily found in the scientific literature. In this review, we have presented some of the related studies. Bibliometric studies of the institutions include CNIO,[3] IIT,[4] IISER,[5] CSIR;[6] subject domain include COVID-19,[7-9] Coronavirus,[10] Vaccine Hesitancy,[11] Yoga,[12] Aloe Vera,[13] Pharmacology,[14] Clinical Pharmacology,[15] Pharmacy Practice Research,[16] Pharmaceutical Research in India[17] and Kingdom of Saudi Arabia,[18] Bipolar Disorder,[19] Digoxin Toxicity,[20] Antibiotics in Sediments,[21] and Journal includes Asian Pacific Journal of Tropical Medicine,[22] Allergy Journals,[23] Journal of Ultrasound in Medicine,[24] Korean Journal of Anesthesiology,[25] Journal of Oral Pathology and Medicine,[26] Journal of Mathematical Chemistry,[27] Current Science,[28] Journal of Orthopaedic Research,[29] Indian Journal of Pharmaceutical Education and Research.[30]

METHODS

The two popular databases for bibliometric analysis are the web of science by Clarivate Analytics and Scopus, a product of one of the publication giants, i.e., Elsevier. The study found that Scopus is a suitable database for pharmacy and pharmacology journals.[31] Therefore, the present study extracted bibliographic data from Scopus and performed bibliometric analysis. The Scopus was searched with SRCTITLE ("Indian Journal of Pharmaceutical Education and Research"). This query retrieved 1327 results, out of which 66 results of the year 2021 were excluded. A total of 1261 results from 2008 to 2020 were exported in the CSV file. The data includes citation information, bibliographic information, and Abstract and Keywords.

The bibliometric analysis can be divided into two-way analysis, i.e., performance analysis and science mapping analysis.[32] To present a comprehensive overview of research trends of IJPER, we have used the two-way bibliometric analysis. The bibliometric indicators like year-wise document published, number of citations, authorship pattern, etc., were used in the performance analysis. This analysis is carried out through open-source environment R. In the second analysis, science mapping analysis, the co-occurrence of keywords, collaboration network analysis was partly done by vosviewer software[33] and partly by bibliometrix[34] package of R. This study is the extension of previous research conducted on IJPER with more detailed analysis.

RESULTS

In this section, a bibliometric analysis of publications of IJPER from 2008 to 2020 is presented. As mentioned above, the results are divided into two sub-sections, i.e.,

Performance Analysis and Science Mapping Analysis. The performance analysis consists of Table 1 to table 9 and Figure 1 to 2, whereas science mapping analysis consists of Figures 3 to 6.

Year-wise Distribution of IJPER Publications

The table presents the 1261 documents published in 13 volumes (42 to 54) and 52 issues in the journal IJPER with an average of 97 publications per year. It was observed that 71 documents (5.63%) were published in the year 2008, after which a steep was observed in 2009 with 56 documents (4.44%). From 2010 to 2015, gradual fluctuations were observed, with the lowest number of publications in 2015 with 43 documents (3.41%). After 2015, there was a 300% growth in the number of publications, and the first time the number of documents crossed the three-digit mark in the year 2016 with 121 documents (9.60%). Figure 1 presents the visualization of the growth of publications in IJPER. The first peak was observed in the year 2017 with 196 documents (15.54%). The most number of documents in an issue was published in the July-September issue of 2017 (95, 7.53%). 2020 represents the second and highest number of documents published in IJPER with 209 documents. (184 articles, 24 reviews, 01 Editorial). The cumulative publications are also shown in Table 1.

Document Type

Table 2 shows the type of documents published in IJPER for the period under study. The results show that majority of documents are article (1174, 93.10%), followed by review (73, 5.79%). The proportion of other document type are very less, editorial (9, 0.71%), letter(2, 0.16%), short survey(1, 0.08%), note(1,0.08%) and erratum(1,0.08%).

Length of Publication

Table 3 shows the length of the publication of IJPER in the number of pages. The detailed results show that most of the documents have a length of six to ten pages (829, 65.74%), followed by documents of the length
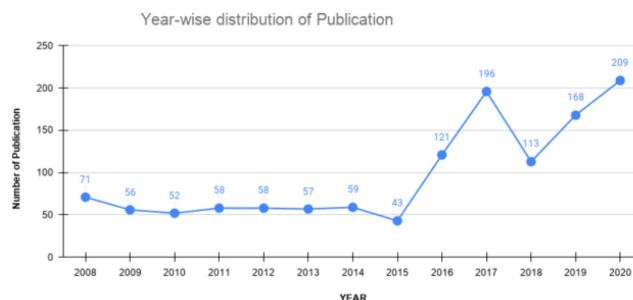

Figure 1: Number of IJPER publications by year.

Year	Volume	Issue				Total Paper	Cumulative	Percentage
		Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec			
2008	42	16	17	16	22	71	71	5.63
2009	43	16	14	14	12	56	127	4.44
2010	44	14	12	13	13	52	179	4.12
2011	45	15	14	11	18	58	237	4.60
2012	46	14	15	16	13	58	295	4.60
2013	47	16	18	12	11	57	352	4.52
2014	48	11	12	11	25	59	411	4.68
2015	49	11	13	9	10	43	454	3.41
2016	50	26	34	38	23	121	575	9.60
2017	51	21	39	95	41	196	771	15.54
2018	52	19	19	25	50	113	884	8.96
2019	53	23	44	50	51	168	1052	13.32
2020	54	25	71	72	41	209	1261	16.57
Total		227	322	382	330	1261		

Table 1: Annual Distribution of IJPER Publications.

Table 2: Type of Document published in IJPER.

Document Type	Publications	Percentage
article	1174	93.10
editorial	9	0.71
erratum	1	0.08
letter	2	0.16
note	1	0.08
review	73	5.79
short survey	1	0.08
Total	1261	100

Table 3: Length of the publications of IJPER.

Year	Page Count				Total Publication	Total Pages
	Pages (1-5)	Pages (6-10)	Pages (11-15)	>=16 Pages		
2008	33	35	3	0	71	415
2009	18	33	5	0	56	397
2010	10	37	5	0	52	391
2011	12	40	6	0	58	413
2012	16	41	1	0	58	382
2013	12	43	2	0	57	392
2014	15	34	8	2	59	489
2015	5	35	3	0	43	329
2016	9	91	19	2	121	1030
2017	73	108	14	1	196	1331
2018	19	72	20	2	113	909
2019	16	112	36	4	168	1448
2020	14	148	46	1	209	1862
Total	252	829	168	12	1261	9788
%	19.98	65.74	13.32	0.95		

of one to five pages (252, 19.98%) and documents of length eleven to fifteen pages (168,13.32%). A very few documents have a length of sixteen or more than 16 pages (12, 0.95%).

The mostlengthy paper of the journal entitled "*Multi-method active learning approach: Improving the educational experience in pharmaceutical drug development,*" has 37 pages, was published in the July-September issue of Volume 48 in 2014. The year 2020 was the mostlengthy volume of all times of IJPER with 1862 pages.

Citation Structure

Table 4 shows the number of citations IJPER has received from 2008 to 2020. The 1261 publications have been cited by 3608 times. The year 2011 is the most important year for the IJPER due to several reasons. First, the publications of the year 2011 have received the highest number of citations (713), accounting for 19.76% of the total citations. Second, The citation per paper was also highest in 2011, with 12.29 citations per paper. Third, Out of Five publications of IJPER, which has received equal or more than 50 citations, four documents were published in 2011, and the fifth document was published in 2016. Fourth, The article "*Recent investigations of plant-based natural gums, mucilages, and resins in novel drug delivery systems*" published in 2011

Table 4: Annual citation structure of IJPER.									
Year	TP	TC	>=50	>=20	>=10	>=5	>=1	0	CP
2008	71	254	0	0	7	15	30	19	3.58
2009	56	176	0	1	3	11	22	19	3.14
2010	52	407	0	4	10	17	16	5	7.83
2011	58	713	4	6	7	12	21	8	12.29
2012	58	256	0	1	7	10	34	6	4.41
2013	57	157	0	1	2	10	31	13	2.75
2014	59	179	0	1	3	9	31	15	3.03
2015	43	145	0	1	5	5	25	7	3.37
2016	121	401	1	0	4	25	62	29	3.31
2017	196	476	0	1	7	21	118	49	2.43
2018	113	179	0	1	1	8	66	37	1.58
2019	168	183	0	1	2	4	75	86	1.09
2020	209	82	0	1	0	1	42	165	0.39
Total	1261	3608	5	19	58	148	573	458	

TP: Total Publications; TC: Total Citations; CP: Citations per paper

has received the highest number of citations(90). The majority of the publications of IJPER have received less than five citations(1031, 81.76%). Approximately half of the publications (573,45.44%) have received one or more than one but less than five citations, followed by publications (458,36.32%) that have not been cited yet. The 230 publications have received more than five citations. Among these,148 publications have been cited by five or more than five times but less than ten; 58 publications have received ten or more than ten. Still, less than twenty citations and 10 publications have received twenty or more than twenty but less than fifty citations.

Authorship Pattern

Table 5 presents the year-wise authorship pattern of single and multi-authored publications of IJPER. The results show that most publications were by two or more authors (1200,95.16%). Among these, the highest proportion of publication contributed by three authors (304, 24.11%), followed by four authors (265, 21.02%), two authors(250,19.83%), five authors (201, 15.94%), and more than five authors(180, 14.27%) and a very few publications was by single authors(61,4.84%).

This indicates the positive trends of collaborative publications in IJPER. The study observed that the average number of authors in multi-authored publications were approximate four authors (3.93)

The degree of collaboration (DC) is calculated using the formula given by K. Subramanyam.[35] The DC of 0.95
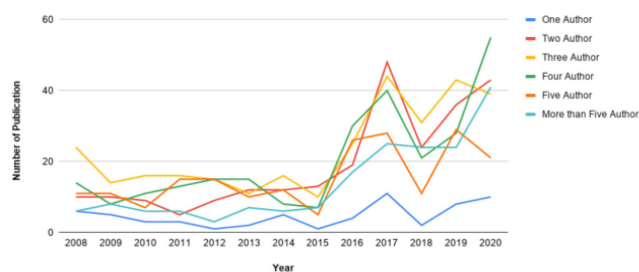

Figure 2: Annual Authorship Pattern.

shows the dominance of collaborative publications in the IJPER.

The paper entitled "Fabrication of poly (Sebacic acid-co-ricinoleic-ester anhydride) with β-cyclodextrin-loaded doxorubicin implants and *in vitro* characterization" published in 2020 and "Anti-tubercular potency and computationally-assessed drug-likeness and toxicology of diversely substituted indolizines" published in 2019 consists of most number of 12 authors.

Figure 2 presents the evolution of the number of authors from 2008 to 2020. The Figure reflects that the single author publications were declining compared to multi-author publications.

H classic Publications

The concept of H-classics influenced from *h*-index and was devised by Martínez, Herrera, Contreras, Ruíz, and amp; Herrera-Viedma, 2014. It is defined as "H-Classics of a research area A could be defined as the H-core of A that is composed of the H highly cited papers with

Table 5: Authorship pattern of IJPER.											
Year	One Author	Two Author	Three Author	Four Author	Five Author	More than Five Author	TA	TP	TCP	AM	DC
2008	6	10	24	14	11	6	246	71	65	3.69	0.92
2009	5	10	14	8	11	8	208	56	51	3.98	0.91
2010	3	9	16	11	7	6	186	52	49	3.73	0.94
2011	3	5	16	13	15	6	226	58	55	4.05	0.95
2012	1	9	15	15	15	3	219	58	57	3.82	0.98
2013	2	12	11	15	10	7	214	57	55	3.85	0.96
2014	5	12	16	8	12	6	206	59	54	3.72	0.92
2015	1	13	10	7	5	7	158	43	42	3.74	0.98
2016	4	19	25	30	26	17	481	121	117	4.08	0.97
2017	11	48	44	40	28	25	717	196	185	3.82	0.94
2018	2	24	31	21	11	24	445	113	111	3.99	0.98
2019	8	36	43	28	29	24	645	168	160	3.98	0.95
2020	10	43	39	55	21	41	828	209	199	4.11	0.95
Total	**61**	**250**	**304**	**265**	201	180	4779	1261	1200	3.93	0.95
%	4.84	19.83	24.11	21.02	15.94	14.27					

TA: Total Authors
TP: Total publications
TMP: Total Multi-authored publications
AM: Average Multi-authored publications (ratio of Total Number of Co-Authors and Total number of Multi-authored publications)
DC: Degree of Collaboration

more than H citations received".[36] Table 4 presents the 20 H-classics publications which have received at least 20 citations. Out of twenty H-classics publications, half of the documents were published in 2011 (10, 50%), followed by four publications in 2010 and one publication in 2009, 2012, 2014,2016, 2017, 2020. No publications were reported from the years 2008, 2013,2015, 2018,2019.

Prolific Authors

Table 7 presents the most prolific authors in terms of the number of publications. The results show that the author Gadad topped the list with 14 publications, followed by Attimarad with 12 publications, Dandagi with 11 publications, and Nair with 10 publications. Further in the detailed analysis found that top four prolific authors are affiliated with two institutions,i.e., KLEU Belgaum and King Faisal University. The authors Yadav of GIPER, Satara have obtained the highest number of citations (111) on 08 publications with an average of approximately 14(13.88) citations per paper. Table 8 shows the country-wise distributions of publications of IJPER during the period under study. The majority of the publications were contributed by the authors of India (892,70.74%). One possible reason

for this is that IJPER is published in India. The 892 publications from India obtained 2884 citations (79.93% of total citations the IJPER received) with 3.23 citations per paper. The 17 publications of South Africa has the highest number of citation per paper (5.06 CPP)

Prolific Country

Table 9 presents the Affiliation-wise distribution of the number of documents published in IJPER. Out of 11 top institutions, ten institutions were from India, followed by one from Saudi Arabia. KLEU Belgaum (34) has contributed the highest proportion of publications in the IJPER. The only institution outside India, i.e., King Faisal University, has authored 22 publications with the highest number of citations (93) and citations per paper(4.23).

Science Mapping Analysis

In this section, a more detailed analysis using different graphics of author, keywords, citations, publications, etc. were carried out to characterize various features of IJPER. This study presents a Sankey diagram, keywords analysis (co-occurrence network of keywords and tree-map), and map visualization of country collaboration.

Sl. No.	Authors	Title	Year	TC
		Table 6: H classic publication.		
1	Avachat A.M., Dash R.R., Shrotriya S.N.	Recent investigations of plant-based natural gums, mucilages, and resins in novel drug delivery systems	2011	90
2	Mourya V.K., Inamdar N., Nawale R.B., Kulthe S.S.	Polymeric micelles: General considerations and their applications	2011	60
3	Rengasamy G., Jebaraj D.M., Veeraraghavan V.P., Mohan S.K.	Characterization, partial purification of alkaline protease from the intestinal waste of Scomberomorus guttatus and production of laundry detergent with alkaline protease additive	2016	59
4	Mishra R., Amin A.	Formulation and characterization of rapidly dissolving films of cetirizine hydrochloride using pullulan as a film-forming agent	2011	57
5	Yadav A.V., Murthy M.S., Shete A.S., Sakhare S.	Stability aspects of liposomes	2011	51
6	Mohanambal E., Arun K., Abdul Hasan Sathali A.	Formulation and evaluation of pH-triggered in situ gelling system of levofloxacin	2011	48
7	Mitkari B.V., Korde S.A., Mahadik K.R., Kokare C.R.	Formulation and evaluation of topical liposomal gel for fluconazole	2010	46
8	Sharma R., Walker R.B., Pathak K.	Evaluation of the kinetics and mechanism of drug release from econazole nitrate nanosponge loaded carbapol hydrogel	2011	44
9	Grampurohit N., Ravikumar P., Mallya R.	Microemulsions for topical use- A review	2011	42
10	Goyal A., Kumar S., Nagpal M., Singh I., Arora S.	Potential of novel drug delivery systems for herbal drugs	2011	35
11	Bandawane D., Juvekar A., Juvekar M.	Antidiabetic and antihyperlipidemic effect of Alstonia scholaris linn bark in streptozotocin induced diabetic rats	2011	34
12	Koland M., Charyulu R.N., Prabhu P.	Mucoadhesive films of losartan potassium for buccal delivery: Design and characterization	2010	29
13	Rajamanikandan S., Sindhu T., Durgapriya D., Sophia D., Ragavendran P., Gopalakrishnan V.K.	Radical Scavenging and Antioxidant Activity of Ethanolic Extract of Mollugo nudicaulis by Invitro Assays	2011	28
14	Singh D., Singh M., Saraf S., Dixit V.K., Saraf S.	Optimization and characterization of gentamicin loaded chitosan microspheres for effective wound healing	2010	28
15	Nayak A.K., Pal D.	Tamarind seed polysaccharide: An emerging excipient for pharmaceutical use	2017	24
16	Yadav A.V., Shete A.S., Dabke A.P.	Formulation and evaluation of orodispersible liquisolid compacts of aceclofenac	2010	24
17	Nayak A.K., Pal D., Pradhan J., Ghorai T.	The potential of trigonella foenum-graecum l seed mucilage as suspending agent	2012	23
18	Fadholly A., Ansori A.N.M., Proboningrat A., Nugraha A.P., Iskandar R.P.D., Rantam F.A., Sudjarwo S.A.	Apoptosis of hela cells via caspase-3 expression induced by chitosan-based nanoparticles of Annona squamosa leaf extract: *In vitro* study	2020	21
19	Attimarad M., Nagaraja S.H., Aldhubaib B.E., Nair A., Venugopala K.N.	Simultaneous determination of metformin and three gliptins in pharmaceutical formulations using RP HPLC: Application to stability studies on Linagliptin tablet formulation	2014	20
20	Praveen C., Amit A., Prashant M., Pramod K., Devidas S.	Development and *in vitro* evaluatio n of thermorevesible nasal gel formulations of rizatriptan benzoate	2009	20

SI. No.	Author	TP	TC	Affiliations	Country	CP
1	GADAD AP	14	40	KLEU Belgaum	India	2.86
2	ATTIMARAD M	12	67	King Faisal University	Saudi Arabia	5.58
3	DANDAGI PM	11	27	KLEU Belgaum	India	2.45
4	NAIR AB	10	44	King Faisal University	Saudi Arabia	4.40
5	VENUGOPALA KN	9	58	Durban University of Technology	South Africa	6.44
6	GÜNEY K	8	18	Kastamonu University	Tukey	2.25
7	SREEHARSHA N	8	14	King Faisal University	Saudi Arabia	1.75
8	YADAV AV	8	111	GIPER, Satara	India	13.88
9	Saraf S	8	48	PRSU, Raipur	India	6.00
10	AL-DHUBIAB BE	7	25	King Faisal University	Saudi Arabia	3.57
11	GEZICI S	7	26	KAU, Kilis	Tukey	3.71
12	SANJAY PAI PN	7	0	Goa college of Pharmacy	India	0.00

Table 7: Most prolific authors (number of publication>=7).

TP: Total Publications; TC: Total Citations; CP: Citations per paper

Table 8: Top 14 prolific countries (Number of publications >=10).

SI. No.	Country	TP	%	TC	CP
1	India	892	70.74	2884	3.23
2	Turkey	96	7.61	252	2.63
3	Malaysia	51	4.04	108	2.12
4	Saudi Arabia	47	3.73	129	2.74
5	China	44	3.49	55	1.25
6	Pakistan	17	1.35	21	1.24
7	South Africa	17	1.35	86	5.06
8	Iran	16	1.27	46	2.88
9	Serbia	15	1.19	31	2.07
10	Egypt	13	1.03	46	3.54
11	Poland	12	0.95	16	1.33
12	United States	12	0.95	21	1.75
13	South Korea	11	0.87	26	2.36
14	Algeria	10	0.79	17	1.70

TP: Total Publications; TC: Total Citations; CP: Citations per paper

Table 9: Top 11 prolific institutions (number of publications >=15).

SI. No.	Affiliation	Country	TP	TC	CP
1	KLEU College of Pharmacy, Belgaum	India	34	91	2.68
2	Manipal College of Pharmaceutical Sciences	India	31	42	1.35
3	Manipal Academy of Higher Education	India	26	41	1.58
4	K.L.E. Academy of Higher Education and Research	India	23	25	1.09
5	King Faisal University	Saudi Arabia	22	93	4.23
6	Birla Institute of Technology, Mesra	India	21	19	0.90
7	JSS College of Pharmacy, Mysore	India	18	65	3.61
8	NGSM Institute of Pharmaceutical Sciences	India	17	63	3.71
9	Vellore Institute of Technology	India	16	15	0.94
10	Sinhgad College of Pharmacy	India	16	131	8.19
11	Jadavpur University	India	15	82	5.47

TP: Total Publications; TC: Total Citations; CP: Citations per paper

The open-source environment R and VOS viewer were used for the analysis.

Author, Keywords, and Affiliation Relationship

Figure 3 presents the Sankey diagram, also known as three field plots of relations between Author, Author's keywords, and their affiliations. The analysis shows that two affiliations (King Faisal University, Kastamonu University) and five authors (Attimarad M, Nair AB, Venugopala KN, Sreeharsha N, Guney K) have a strong relationship with the research topics like (pharmacokinetics, hptlc, antimicrobial activity, HPLC etc.)

Keywords Analysis

The treemap of words in the title of the publication of IJPER was done in two ways. At first, each occurrence of one word in the title was extracted, also known as uni-gram tokenization. These uni-gram tokens were visualized as a treemap, as shown in Figure 4(i). Secondly,
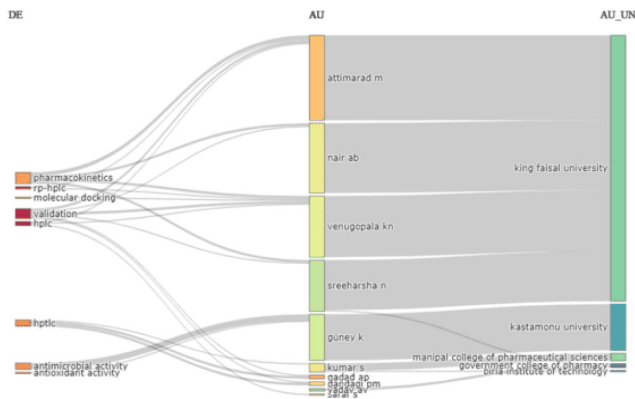
Figure 3: Three Field Plot of Author (Middle), Author Keywords (Left), and Affiliations (Right).

the occurrence of two consecutive words in the title was extracted, also known as bi-gram tokenization. These bigram tokens were visualized as a treemap, as shown in Figure 4(ii). The results show that most studies include word evaluation, development, formulation, drug, activity and method, drug delivery, dosage form, RP, HPLC, HPLC method, and pharmacy students.

The network illustrating the co-occurrence of keywords is presented in Figure 5, using VOS viewer software. The minimum number of co-occurrence of keywords was set to 4. The 183 keywords that met the threshold were analyzed. It is observed from Figure 5 that the most commonly used keywords by the authors of IJPER are
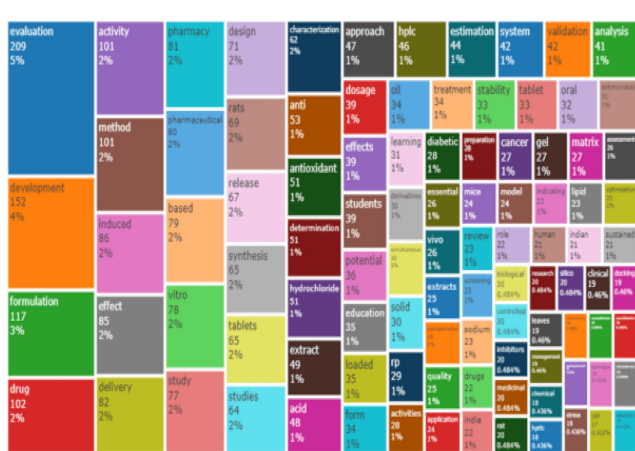
Figure 4(i): Treemap of Bi-gram in the Title of Publication of IJPER.

Figure 4(ii): Treemap of Bi-gram in the Title of Publication of IJPER.
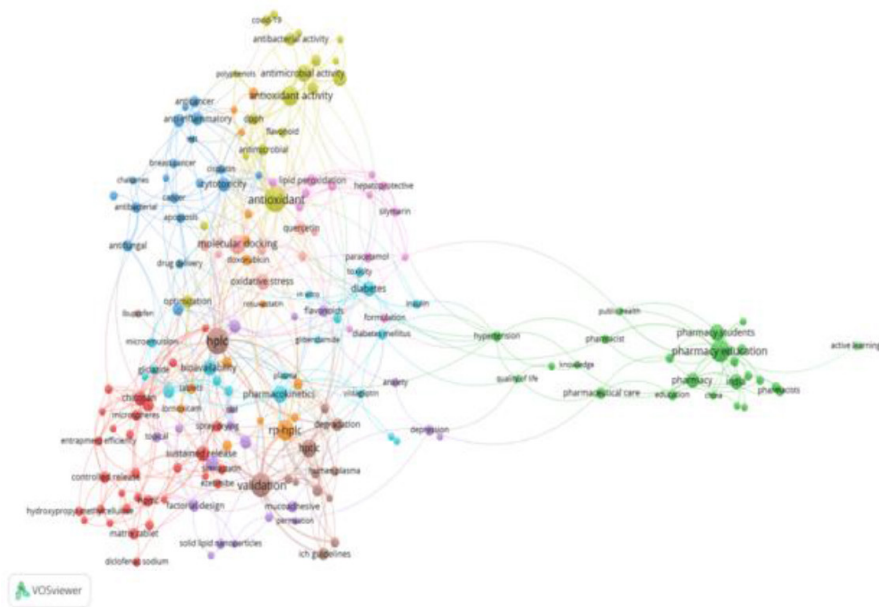
Figure 5: Co-occurrence Network of Author keywords.
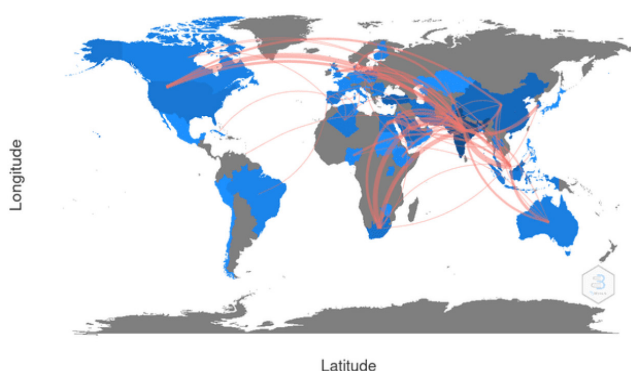
Figure 6: Country Collaboration Map.

antioxidant, validation, HPLC, RP-HPLC, pharmacy education. These results complement the scope of the IJPER that connects with the topic of pharmaceutical research, curriculum design, teaching and learning, laboratory innovations, etc.

Country Collaboration Network Analysis

Figure 6 shows the network illustrating the collaborations in the publications of IJPER. R was used for plotting the map. The condition of a minimum of one edge was set before the analysis. The results show that the publications of IJPER have collaboration from around the globe. Further, the results show that the most collaborative publications were from India and Saudi Arabia,[22] followed by India and Malaysia.[11] The study found that after India, Saudi Arabia had extensive collaborations with other countries. Saudi Arabia has 09 collaborative publications with South Africa and 06 with Egypt.

LIMITATIONS

The present study is based on Scopus data from 2008 to 2020 of IJPER; the results may vary on data from different sources. Our sample consists of 52 issues of volumes from 42 to 54, this data may not fully represent the journal, but the analysis of this gave us the trend of publications in IJPER in the last 13 years.

CONCLUSION

The present study revealed that the number of publications in IJPER is increased with an annual growth rate of 9.41%. The results show that the average length of publications of IJPER is 8(7.76), with the leading publication are in the range of six to ten pages. The journal IJPER is famous worldwide as there are upward trends in collaborative research between Indian and international authors. The collaborative research is remarkable in the IJPER as only 61 studies are from

single authors, while 1200 publications are from multiple authors. Further, the study found that the journal has 20 classic publications with a maximum number of citations of 90. The Indian authors and institutions are most prolific in publishing in the journal. The journal has obtained 3608 citations during the period under study, with five publications having citations of more than fifty. The results indicated that the top five common keywords were antioxidant, validation, HPLC, RP-HPLC, pharmacy education. The results of this study are encouraging as IJPER had observed international collaboration supported high-quality research in pharmaceutical research, curriculum design, teaching and learning, laboratory innovations, etc.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

1. Schwert GW. J Financ Econ. 1993, "The journal of financial economics: A retrospective evaluation (1974;33(91):369-424.

2. Indian journal of pharmaceutical education and research [Internet]. Ijper.org. [cited May 20 2021] Available from: https://www.ijper.org/.

3. Wulff E. Spanish National Oncological Research Center (CNIO): A bibliometric portrait. Clin Transl Oncol. 2018 Dec;20(12):1612-6. doi: 10.1007/s12094-018-1897-1, PMID 29796995.

4. Prathap G. Benchmarking research performance of the IITs using. Curr Sci" and" Scopus" bibliometric databases. 2013 Oct 25:1134-8.

5. Hadimani N, Mulla KR, Kumar NS. A bibliometric analysis of research publications of Indian Institute of Science Education and Research, Thiruvananthapuram. J Adv Libr Sci. 2015;2(1):28-35.

6. Mukherjee B. Research in Indian CSIR laboratories: A bibliometric study. SRELS J Inf Manag. 2017 Aug 23;54(4):165-74. doi: 10.17821/srels/2017/v54i4/118103.

7. Oh J, Kim A. A bibliometric analysis of COVID-19 research published in nursing journals. Sci Ed. 2020 Aug 20;7(2):118-24. doi: 10.6087/kcse.205.

8. Kalra G, Kaur R, Ichhpujani P, Chahal R, Kumar S. COVID-19 and ophthalmology: A scientometric analysis. Indian J Ophthalmol. 2021 May 1;69(5):1234-40. doi: 10.4103/ijo.IJO_3284_20, PMID 33913867.

9. Pathak M. COVID-19 research in India: A quantitative analysis. Indian J Biochem Biophys (IJBB). 2020 Jun 14;57(3):351-5.

10. Mukherjee B. Analysis of global research trends in coronaviruses: A bibliometric investigation. JSCIRES. 2020 May;9(2):185-94. doi: 10.5530/jscires.9.2.22.

11. Sweileh WM. Bibliometric analysis of global scientific literature on vaccine hesitancy in peer-reviewed journals (1990-2019). BMC Public Health. 2020 Dec;20(1):1252. doi: 10.1186/s12889-020-09368-z, PMID 32807154.

12. Gupta BM, Ahmed KM, Dhawan SM, Gupta R. Yoga research a scientometric assessment of global publications output during 2007-16. Pharmacogn J. 2018;10(3):394-402. doi: 10.5530/pj.2018.3.65.

13. Gupta B, Ahmed KM, Dhawan S, Gupta R. *Aloe vera* (Medicinal Plant) Research: A Scientometric Assessment of Global Publications Output during 2007-16. Pharmacogn J. 2017;10(1):01-8. doi: 10.5530/pj.2018.1.1.

14. Thompson DF. Bibliometric analysis of pharmacology publications in the United States: A state-level evaluation. JSCIRES. 2019;7(3):167-72. doi: 10.5530/jscires.7.3.27.

15. Ahmed KKM, Dhawan SM, Gupta BM, Bansal M. Highly cited publications output by India in clinical pharmacology during 2000-14: A scientometric assessment. J Young Pharm. 2017 Apr 1;9(2):145-7. doi: 10.5530/jyp.2017.9.30.

16. Al-Aqeel S, Mendes AM, Taisir H, Fernandez-Llimos F. International collaboration in pharmacy practice research: A bibliometric analysis. Res Social Adm Pharm. 2020;16(11):1513-8. doi: 10.1016/j.sapharm.2020.05.019. PMID 32482589.

17. Ammed K K MK, Gupta R, Gupta BM. Pharmocology research in India: A Scientometric analysis of publications output, 2003-12. Indian J Pharm Educ Res. 2014 Apr 1;48(2):16-34. doi: 10.5530/ijper.48.2.4.

18. Alhaider I, Mueen Ahmed KK, Gupta BM. Pharmaceutical research in the Kingdom of Saudi Arabia: A scientometric analysis during 2001-2010. Saudi Pharm J. 2015 Jul 1;23(3):215-22. doi: 10.1016/j.jsps.2013.07.008, PMID 26106268.

19. Grover S, Gupta BM, Dhawan SM. Research on bipolar disorder from India: A bibliometric analysis of papers published during 2000-19. Asian J Psychiatr. 2021 Jan 1;55:102532. doi: 10.1016/j.ajp.2020.102532.

20. Zyoud SH, Waring WS, Al-Jabi SW, Sweileh WM. Bibliometric profile of global scientific research on digoxin toxicity (1849-2015). Drug Chem Toxicol. 2020 Nov 1;43(6):553-9. doi: 10.1080/01480545.2018.1518453, PMID 30239237.

21. Zheng CL, Wang YF, Qiu Q, Li G, Xu Y. Bibliometric profile of research on antibiotics in sediments during 1958-2016. Curr Sci. 2019 Jul 10;117(1):37. doi: 10.18520/cs/v117/i1/37-45.

22. Musa TH, Idriss Arbab AA, Musa HH. Bibliometric analysis of Asian Pacific Journal of Tropical Medicine from 2008 to 2019. IJPHS;9(2). doi: 10.11591/ijphs.v9i2.20430.

23. Zhang Y, Quan L, Du L. The 100 Top-cited articles in main allergy journals: A bibliometric analysis. Iran J Allergy Asthma Immunol. 2019 Nov 5;18(6):688-700. doi: 10.18502/ijaai.v18i6.2182, PMID 32245313.

24. Balica A, Kohut A, Tsai TJ, Groszmann YS, Brandt JS. A bibliometric analysis of citation classics in the journal of ultrasound in medicine. J Ultrasound Med. 2020 Jul;39(7):1289-97. doi: 10.1002/jum.15220, PMID 31944354.

25. Lee S. Annual report of the productivity and bibliometrics of the Korean Journal of anesthesiology. Korean J Anesthesiol. 2021 Feb;74(1):1-3. doi: 10.4097/kja.21015, PMID 33535726.

26. Arakeri G, Patil S, Quadri MFA, Alqahtani KM, Rao Us V, Paiva Fonseca F, *et al*. A bibliometric analysis of the top 100 most-cited articles in the Journal of Oral Pathology and Medicine (1972-2020). J Oral Pathol Med. 2021 Apr 2;50(7):649-59. doi: 10.1111/jop.13181, PMID 33811413.

27. Restrepo G, Willett P. The Journal of Mathematical Chemistry: A bibliometric profile. J Math Chem. 2017 Sep;55(8):1589-96. doi: 10.1007/s10910-017-0747-7.

28. Wang P, Zhu F, Song H, Hou J. A Bibliometric Profile of *Current Science* between 1961 and 2015. Curr Sci. 2017 Aug 10;113(3):386-92. doi: 10.18520/cs/v113/i03/386-392.

29. Seetharam A, Ali MT, Wang CY, Schultz KE, Fischer JP, Lunsford S, *et al*. Authorship trends in the journal of orthopaedic research: A bibliometric analysis. J Orthop Res. 2018 Nov;36(11):3071-80. doi: 10.1002/jor.24054, PMID 29774959.

30. Kulkarni AP, Poshett B, Narwade GR. A bibliometric analysis. 2009 Dec. Indian J Pharm Educ Res. 1996-2006;56(4):242-8.

31. Gorraiz J, Schloegl C. A bibliometric analysis of pharmacology and pharmacy journals: Scopus versus Web of Science. J Inf Sci. 2008 Oct;34(5):715-25. doi: 10.1177/0165551507086991.

32. Cobo MJ, López-Herrera AG, Herrera-Viedma E, Herrera F. An approach for detecting, quantifying, and visualizing the evolution of a research field: A practical application to the fuzzy sets theory field. J Inf. 2011 Jan 1;5(1):146-66. doi: 10.1016/j.joi.2010.10.002.

33. Van Eck NJ, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. Scientometrics. 2010 Aug 1;84(2):523-38. doi: 10.1007/s11192-009-0146-3, PMID 20585380.

34. Aria M, Cuccurullo C. Bibliometrix: An R-tool for comprehensive science mapping analysis. J Inf. 2017 Nov 1;11(4):959-75. doi: 10.1016/j.joi.2017.08.007.

35. Subramanyam K. Bibliometric studies of research collaboration: A review. J Inf Sci. 1983 Jan;6(1):33-8. doi: 10.1177/016555158300600105.

36. Martínez MA, Herrera M, Contreras E, Ruíz A, Herrera-Viedma E. Characterizing highly cited papers in Social Work through H-Classics. Scientometrics. 2015 Feb 1;102(2):1713-29. doi: 10.1007/s11192-014-1460-y.

PICTORIAL ABSTRACT
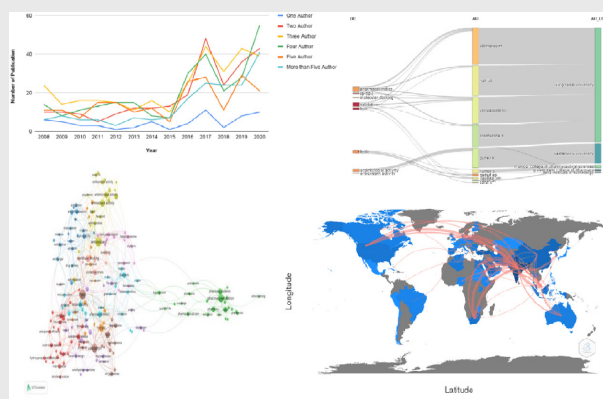
SUMMARY

The present study has used bibliometric methods to analyze scholarly work published in the IJPER Journal. The study found that IJPER is a global journal where collaborative research between Indian and international authors has been published. Also, most of the studies published by the journal were by two or more authors.

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