

Research Productivity of Liver Cancer: A Scientometric Study Based on Web of Science During 2020 - 2024

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Abstract: This paper presents the Scientometric analysis of global contributions to the disease of Liver Cancer during the years 2020-2024. The study's data was acquired from the Web of Science database. The obtained 7454 data were analyzed using the Bibexcel tool. Scientometric is often described as the quantitative study of science and scientific publications. Scientometric methods are used regularly for the Research Assessment Exercise (RAE) to determine funding allocation to research institutions. Scientometric focuses on measuring science and is concerned with the growth, organization, interdependence, and output of scientific fields. The research, analysis, and discussion on the yearly publication, authorship pattern, document type, country-wise, country collaboration, and institution-wise publication.

Keywords: Scientometric Analysis, Liver Cancer, Relative Growth Rate, Doubling Time, Degree of Collaboration, Web of Science.

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I. INTRODUCTION

Liver cancer, often called hepatic cancer, is a kind of cancer that starts in the liver. It's a serious and potentially life-threatening disease. Primary liver cancer is the most common type, with hepatocellular carcinoma (HCC) being the most prevalent form. Hepatitis B and C infections, as well as cirrhosis and aflatoxin exposure, are all risk factors. Symptoms often appear late, making early detection

challenging. Treatment options vary depending on the stage and overall health. The investigation will last five years, from 2020 to 2024. Coverage in the database Web of Science. The term "Liver Cancer" is used to obtain the results. The results 7454 were saved in the plain text file format. The data were analyzed with a toolbox named Bibexcel. This was developed by Olle person in 2017. This software is very useful for analyzing bibliographical data.

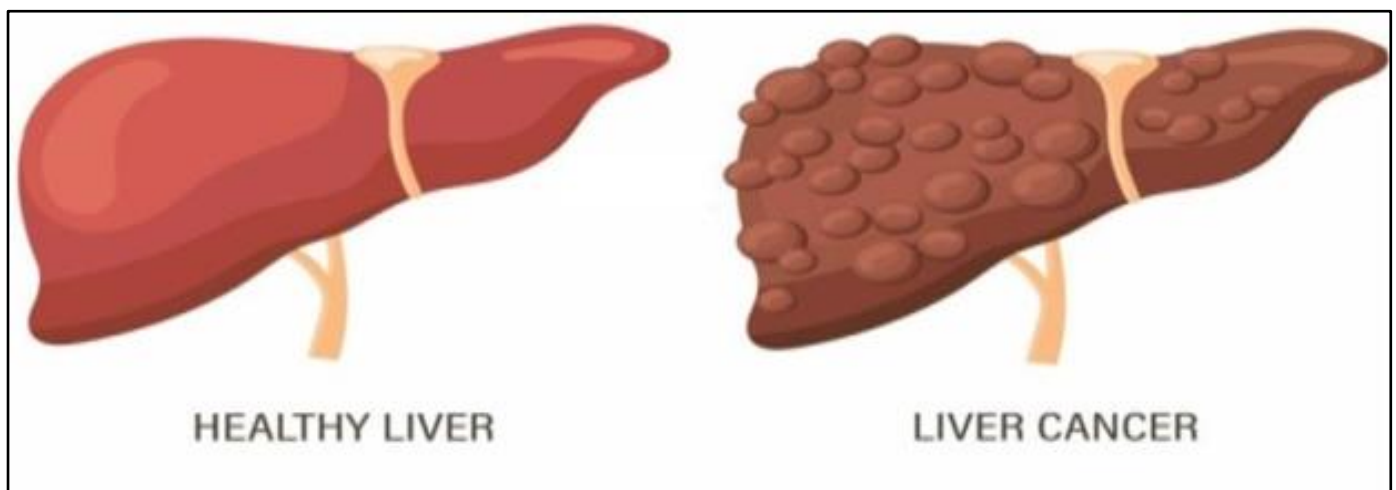


Fig 1 Healthy Liver and Liver Cancer

II. REVIEW OF LITERATURE

Rezaee-Zavareh, M. S., [et al.] (2024)³ carried out the study using scientometric analysis reveals a significant increase in AI-related publications related to liver cancer research. The study found 3950 eligible publications from 1968 to 2023, with most from China, the US, and Germany. The most common categories of AI applications in liver cancer research were medical image analysis for diagnosis (37%), diagnostic biomarkers modeling & bioinformatics (19%), and genomic or molecular analysis (18%).

Sadik Batcha, M. (2018)⁴ conducted a study on oral cancer, a common malignant tumor in India, and found that it is one of the three most common cancers in the country. Squamous cell carcinoma accounts for 90-95% of cases. From 2010 to 2017, there were 2,606 papers on oral cancer in India, ranking fourth globally. Between 2010 and 2017, about 75% of Indian articles were published, with the most papers appearing at Tata Memorial Hospital, All India Institute of Medical Sciences, and Annamalai University. Chaturvedi and Nagini are the most well-known Indian authors, having the most papers on oral cancer. Nearly 50% of Indian publications result from international collaborations with 114 countries.

Gomathi, P. &Sathiyapriya, C. (2016)¹ describes the study using the scientometric analysis of international contributions to bone cancer disease during the years 2000 to 2014 (14 Years). The Web of Knowledge database provided the data for the investigation. The downloaded 863 data were analyzed with the Bibexcel tool. Scientometric has typically been defined as the Quantitative study of Science and

Technology: Scientometric methods are used at regular intervals for the Research Assessment Exercise (RAE) to determine the allocation of funding to research institutions. Scientometric focuses on measuring science and is hence concerned with the growth, organization, interdependence, and output of scientific fields.

➤ Objectives of the study

The main objectives of the study are:

- To analyze the year-wise distribution of Liver Cancer Research
- To determine the authorship pattern of publication
- To observe the country-wise output of Liver Cancer Research
- To find out the Document type publications
- To determine the most productive institution, Global and nation-level
- To analyze the Keyword occurrence

III. METHODOLOGY

Data for this study was retrieved from the Web of Science database on 31st December 2024. The following search query was given the Keyword “Liver Cancer”. There were about 7454 publications retrieved during the period from 2020 to 2024. After downloading from the Web of Science in plain text format, each text file was exported to Bibexcel software, and analysis was done. VOSviewer and Pajak software were used for mapping and visualization.

➤ Data Analysis and Interpretation

Table 1 Year-Wise Publications of Liver Cancer Research

S. No	Year	Records	Cumulative Records	%	Cumulative %
1	2020	1252	1252	16.8	16.8
2	2021	1495	2747	20.05	36.85
3	2022	1532	4279	20.55	57.40
4	2023	1614	5893	21.65	79.06
5	2024	1561	7454	20.94	100
Total		7454		100	

Table1 shows that the year-wise distribution of Liver Cancer research during 2020-2024 (five years) was done. The total number of articles published was 7454. Out of 7454 articles, the topmost number of articles published in 2023

with 1614 (21.65%) records, followed by 1561 (20.94%) records in the year 2024 and 1532 (20.55%) records published in 2022. The least number of articles, 1252 (16.8%), were published in the year 2020.

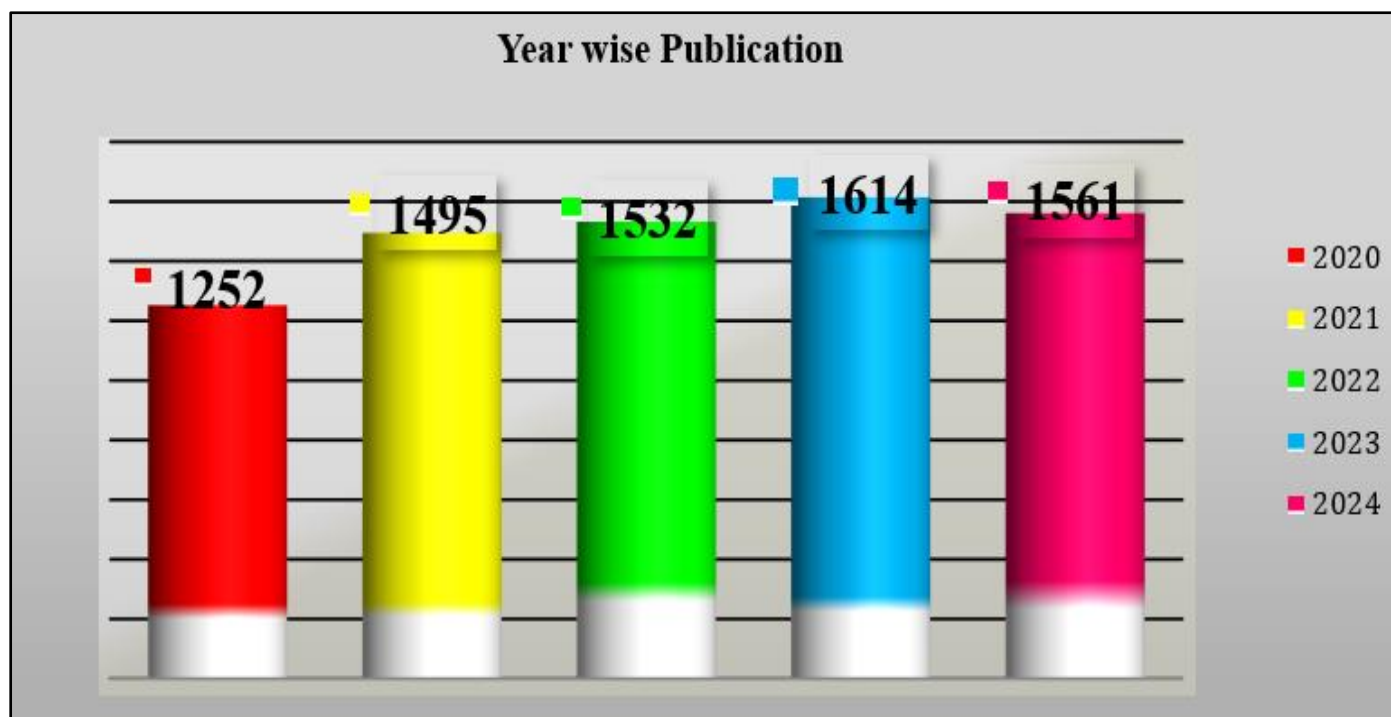


Fig 2 Year-Wise Publications of Liver Cancer Research

Table 2 Relative Growth Rate (RGR) and Doubling Time (DT)

Year	No. Of Articles	Cumulative Articles	Log (W1)	Log (W2)	R (a) (W2-W1)	Mean (a)	Doubling Time Dt (a)	Mean Doubling Time
2020	1252	1252	-	-	-	1.12	-	0.70
2021	1495	2747	7.31	7.99	0.61		1.14	
2022	1532	4279	7.33	8.36	1.03		0.67	
2023	1614	5893	7.39	8.68	1.29		0.53	
2024	1561	7454	7.35	8.92	1.56		0.44	
Total	7454					1.12		0.70

Table 2 that the Relative Growth Rate of Liver Cancer has consistently increased from 0.61 in 2021 to 1.56 in 2024. The mean Relative Growth Rate (RGR) has declined from 1.12 for the period 2020-2024. The Doubling time of research articles in Liver Cancer shows a decreasing trend of 1.14 years in 2021 to 0.44 years in 2024. The mean Doubling Time for research articles in Liver Cancer has decreased from 1.14 years for the period 2021 to 0.44 years for 2024 with an average Doubling Time of 0.70 years for the period.

Where

Mean Relative Growth = Mean Relative Growth Rate over the Specific Period interval.

$W1 = \log W1$ (Natural log of the initial number of the Publication)

$W2 = \log W2$ (Natural log of the initial number of the Publication)

$W2-W1$ = Unit Difference between the initial and final period

RGR = Relative Growth Rate per unit Publication per unit of time in Year.

➤ Year-Wise Authorship Pattern

Table 3 Year-Wise Authorship Pattern

S, No	Authorship Pattern	2020	2021	2022	2023	2024	Total
1	One Author	27	33	31	40	40	171
2	Two Authors	99	91	90	80	95	455
3	Three Authors	96	129	100	123	117	565
4	Four Authors	116	133	151	152	155	707
5	Five Authors	140	164	153	168	138	763
6	Six Authors	144	166	178	157	179	824
7	Seven Authors	111	121	150	156	136	674

8	Eight Authors	104	126	120	134	160	644
9	Nine Authors	89	96	97	115	88	485
10	Ten Authors	64	89	103	104	97	457
11	Above Ten Authors	262	347	359	385	356	1709
Total		1252	1495	1532	1614	1561	7454

The data about the number of authors year-wise has been given in Table 3 Regarding single-authored contributions by the years 2023 to 2024 have the highest contributions. The two authors contribute were in the year 2020 is the highest contributions. The study reveals that the

year-wise distribution of author groups and their publications count over a period of five years revealed interesting results. The table revealed that the number of multi-authored papers was steadily increasing during the period under study. The table shows the high productivity of collaborative authorship.

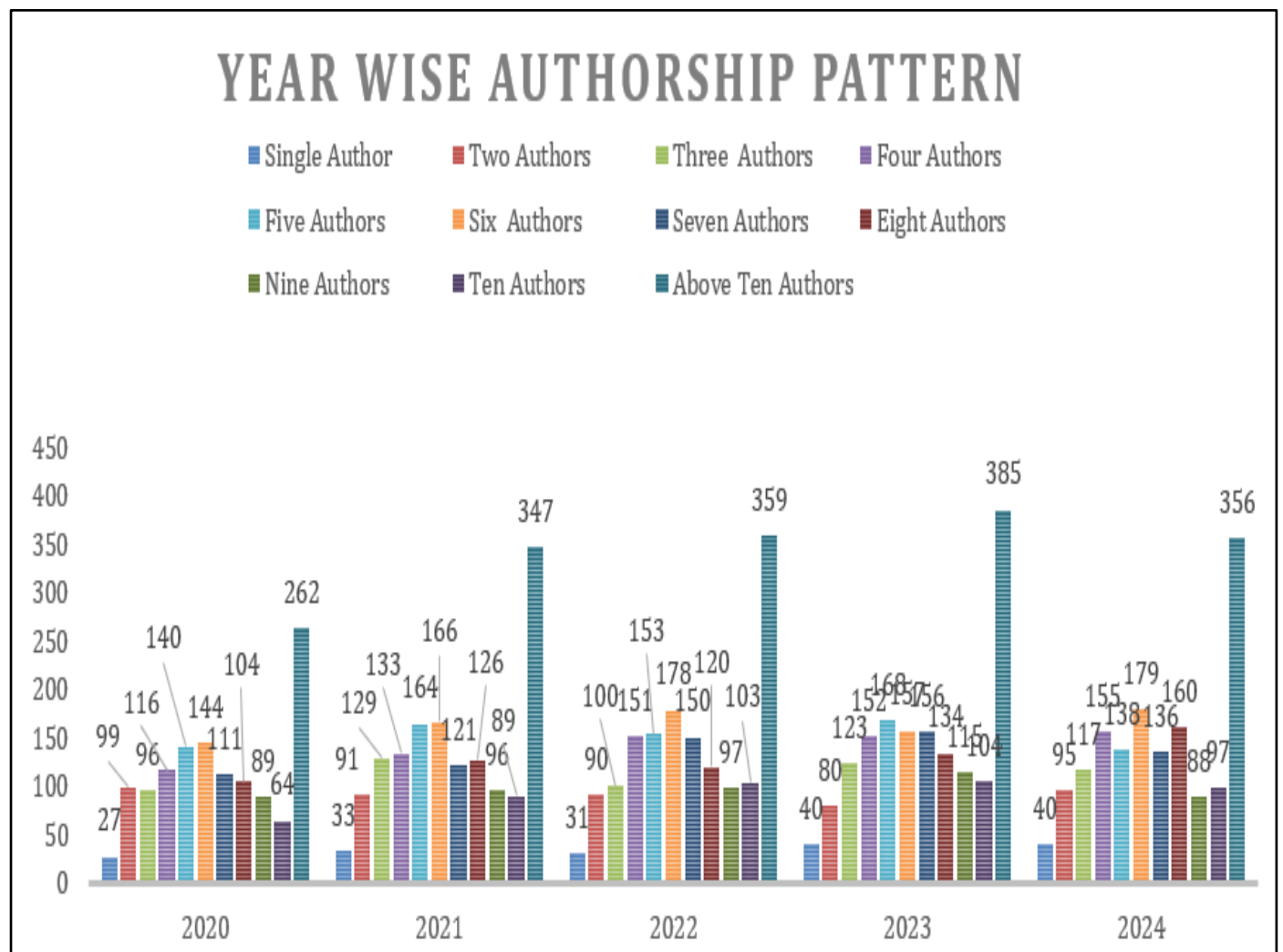


Fig 3 Year-Wise Authorship Pattern of Liver Cancer Research

Table 4 Degree of Collaboration

S. No	Year	Single Author		Multiple Authors		Total Publications	DC
		No. Of. output	%	No. Of. output	%		
1	2020	27	15.79	Of225	16.82	1252	0.98
2	2021	33	19.30	1462	20.07	1495	0.98
3	2022	31	18.13	1501	20.61	1532	0.98
4	2023	40	23.40	1574	21.61	1614	0.97
5	2024	40	23.40	1521	20.88	1561	0.97
Total (%)		171 (2.29%)	100	7283 (97.70%)	100	7454	0.98

Table 4 shows that the Degree of Collaboration (DC) evaluates the distribution of single Vs multi-author publications of Liver Cancer research during 2020-2024. In this present study, the average value is DC=0.98. The Degree of Collaboration in the field of Liver Cancer Literature is 0.98, which indicates the dominance of Single Versus Multiple Author Contribution. To determine the collaboration in quantitative forms, the formula suggested by K. Subramanyam (1983) was tested.

$$DC = \frac{NM}{NM + NS}$$

Where;

DC = Degree of Collaboration

Nm = Number of multi-authors

Ns = Number of single authors

$$DC = \frac{7283}{7283 + 171} = \frac{7283}{7454} = 0.98.$$

The degree of collaboration evaluates the distribution of single Vs multi authors publications of Liver Cancer research during 2020-2024. To determine the collaboration in quantitative forms, the formula suggested by K. Subramanyam (1983) was used.

Single-authored publications were 171 (2.29%) followed by multi-author publications i.e. 7283 (97.70 %) and degrees of collaboration is 0.98. The study reveals that the majority of the publications are by multi-authors.

Table 5 Author H-Index Top 10

S. No	h-index	Unit	Citation sum within h-core	All citations	All articles
1	19	Li J	650	1111	117
2	17	Zhang Y	792	1204	114
3	17	Wang Y	521	867	104
4	17	Liu Y	526	775	87
5	16	Li L	810	995	68
6	16	Li Y	481	800	101
7	15	Liu L	494	579	39
8	15	Wang L	628	842	77
9	14	Zhang J	425	565	63
10	14	Zhang B	540	642	35

Bibexcel tool is used to identify the h-index of authors. It is seen from table 5 shows that Li J has published 117 records with a total citation was 1111 and an h-index of 19. Zhang Y has 114 records, 1204 citations, and an h-index of

17, followed by with Wang Y 104 records and 867 citations and h-index was 17. It is also noted that Zhang B contributed 35 articles that stand at 10th position since it was the smallest quantity number of citations.

Table 6 Most Productivity Authors in India

S. No	Authors	Record Count	%
1	Kini J	4	11.76
2	Kulkarni S	4	11.76
3	Kumar A	4	11.76
4	Lal S	4	11.76
5	Abudoleh Sm	3	8.82
6	Bhangui P	3	8.82
7	Chakraborty S	3	8.82
8	Chakravarty R	3	8.82
9	Chauhan A	3	8.82
10	Goel M	3	8.82

Table 6 shows the top 10 Authors in India, during the study period. The highest number of publications produced by "Kini J" was 4 (11.76%), and the next most publications

produced by "Kulkarni S" was 4 (11.76%), followed by "Kumar" was 4 (11.76%).

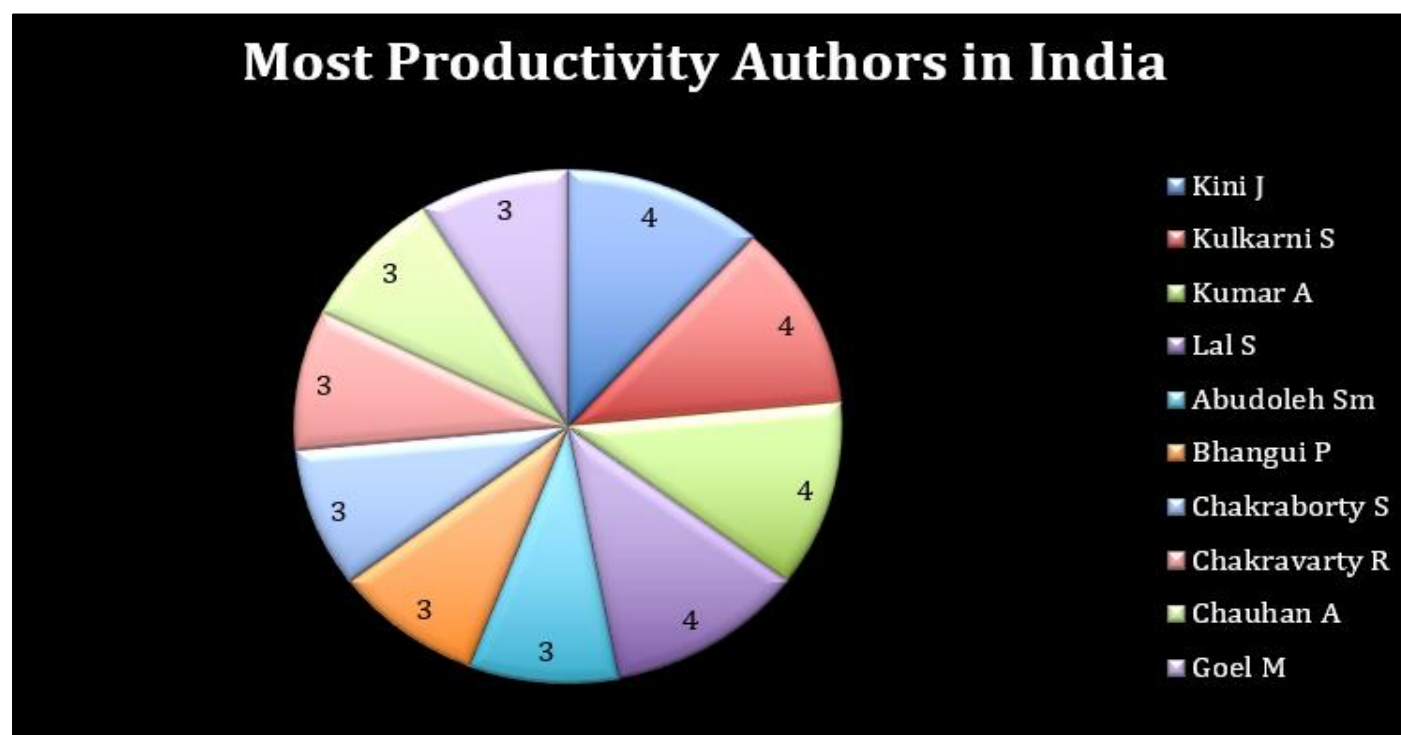


Fig 4 Top 10 Authors in India

Table 7 Authors' Collaboration (Top 25)

S. No	Authors	Collaborative Authors	Records	%
1	Lazaris A	Metrakos P	20	7.2
2	Fan J	Zhou J	14	5.0
3	Cao MM	Chen WQ	14	5.0
4	Mcglynn KA	Petrick JL	14	5.0
5	Li HL	Tan YT	12	4.3
6	Metrakos P	Rada M	12	4.3
7	Li HL	Xiang YB	12	4.3
8	Lazaris A	Rada M	12	4.3
9	Tan YT	Xiang YB	12	4.3
10	Zhang XH	Zhao LG	11	3.9
11	Wang K	Xing BC	11	3.9
12	Fan J	Wang XY	10	3.6
13	Jiang XX	Lu DD	10	3.6
14	Punt CJA	Swijnenburg RJ	10	3.6
15	Jiang XX	Wang LY	10	3.6
16	Lu DD	Wang LY	10	3.6
17	Cai JQ	Zhao H	10	3.6
18	Chen JH	Zhang R	10	3.6
19	Pan ZZ	Wu XJ	10	3.6
20	McGlynn KA	Zhang XH	10	3.6
21	Kubo S	Kudo M	9	3.2
22	Li J	Li Q	9	3.2
23	Li ZY	Tan YT	9	3.2
24	Cao MM	Li H	9	3.2
25	Li ZY	Xiang YB	9	3.2

Out of 60271 authors, the highest production of 10 and above authors was selected for creating a network. On the basis of 7454 results vector file was find out. The network

and vector file was called from Pajek. The size of ball is big, when the individual publications are very high. The arrow shows the number of collaborations.

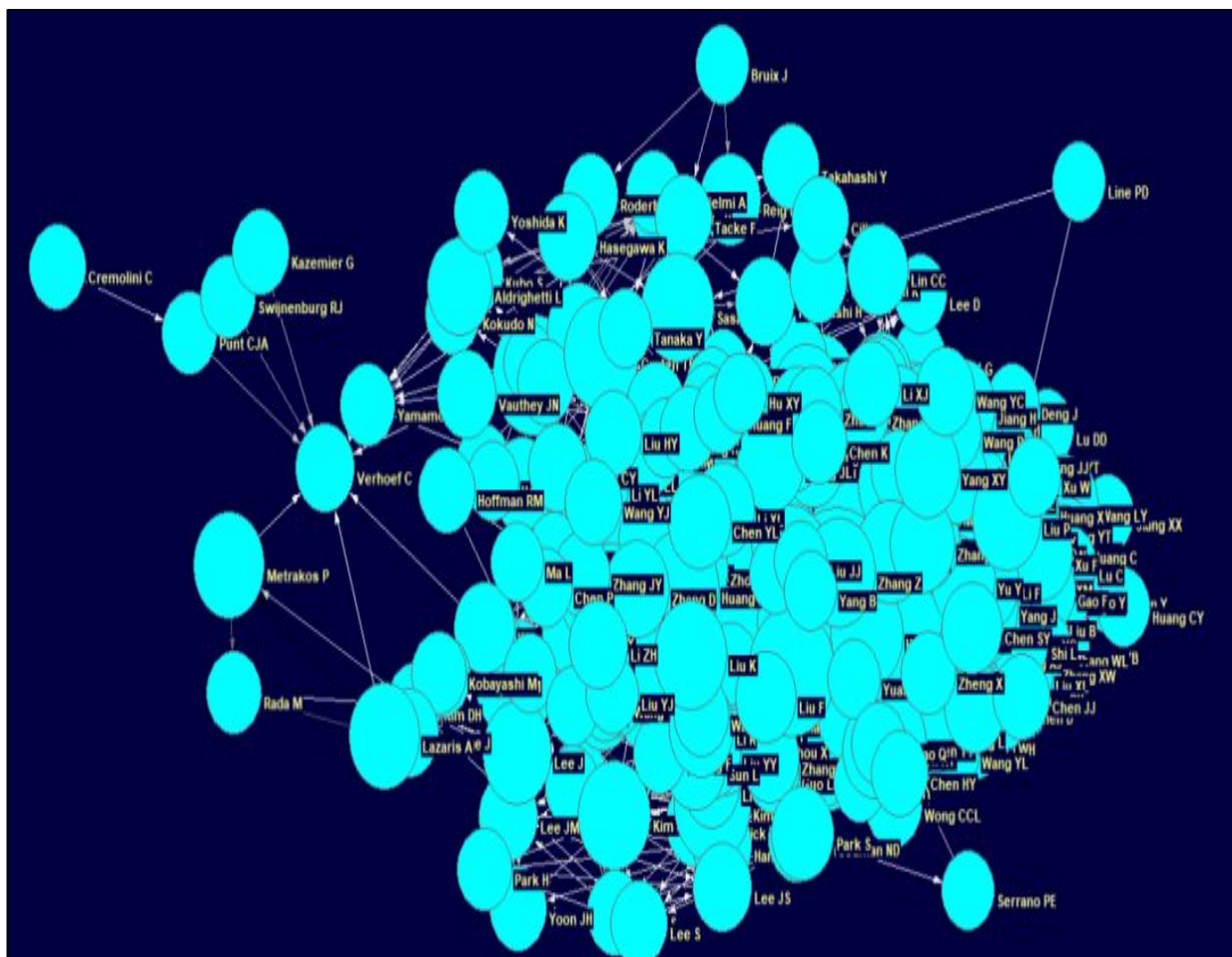


Fig 5 Authors Collaboration

Table 8 Country-Wise Publications (top 15)

S. No	Name of the Country	Records	%
1	Peoples R China	3599	45.23
2	USA	1352	16.99
3	Japan	480	6.03
4	Germany	359	4.51
5	Italy	321	4.03
6	South Korea	280	3.52
7	UK	264	3.32
8	France	210	2.64
9	Spain	210	2.64
10	Canada	168	2.11
11	India	167	2.10
12	Taiwan	162	2.04
13	Australia	138	1.73
14	Saudi Arabia	126	1.58
15	Netherlands	123	1.55

Table 8 shows that the Country-wise literature on Liver Cancer has been analyzed amongst the top 15 countries based on the extremely published articles. The country-wise literature on Liver Cancer has been analyzed among the top 15 countries based on the highly published article. The

country Peoples R China with 3599 publications. It is followed by the USA 1352 and India occupies 11th position with a total production of 167 publications on Liver Cancer research.

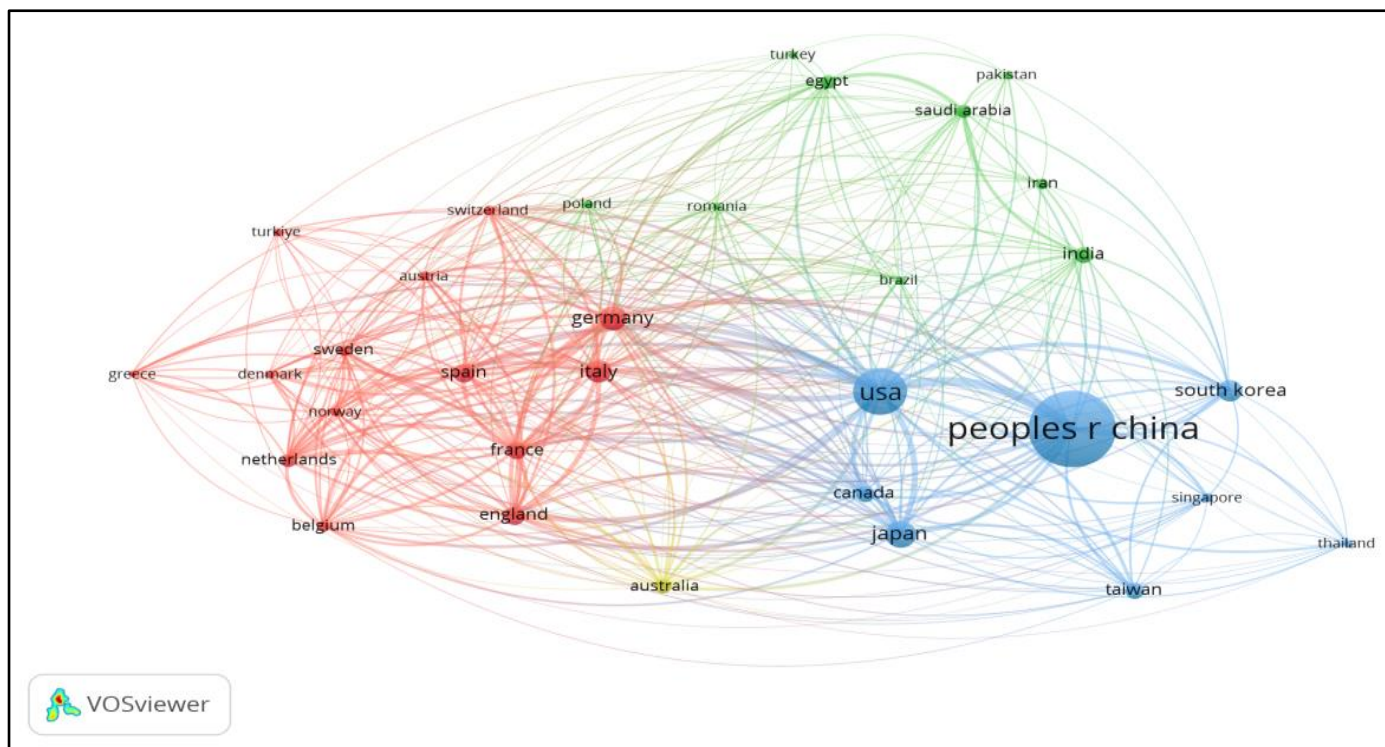


Fig 6 Country-Wise Publications of Liver Cancer Research

➤ Activity Index on Indian Publications

The Activity Index (AI) characterizes the relative research effort of a country in a given subject field. It is defined as;

$$AI = \frac{\text{given field's share in the country's publication output}}{\text{given field's share in the world's publication output}} \times 100$$

AI = 100 indicates that the country's research effort in the given field corresponds precisely to the world's average.

AI > 100 reflects higher activity than the world's average and AI < 100 indicates lower-than-average effort dedicated to the field under study. In the present context, AI in India has been calculated. Here AI is calculated as suggested by Karki (2000).

$$AI = \frac{\left\{ \frac{\text{India's Output in a particular year}}{\text{total Indian Output}} \right\}}{\left\{ \frac{\text{world's output in a particular year}}{\text{total World output}} \right\}}$$

Table 9 Activity Index on Indian Publication

Year	India Records	World Total	Activity Index of India
2020	22	1230	78.0458595
2021	39	1456	116.878743
2022	25	1507	72.3867461
2023	33	1581	91.0781852
2024	47	1514	135.457882
Total	167	7287	

The results of the Activity Index (AI) given in Table 9 show that India's research output on Liver Cancer research has been more than the World's from 2020 to 2024. The study has shown a higher activity index in the years 2024, and 2021.

However, the standard activity index for India for the year 2020-2024 (Five years), which indicates India's research output on Liver Cancer, precisely corresponded to the world's.

Table 10 Document Type Publications

S. No	Document Type	Records	Cumulative Records	%	Cumulative %
1	Article	4814	4814	64.58	64.58
2	Meeting Abstract	1106	5920	14.84	79.42
3	Review	721	6641	9.67	89.09
4	Editorial Material	282	6923	3.78	92.88
5	Letter	160	7083	2.15	95.02
6	Early Access	131	7214	1.76	96.78
7	Correction	102	7316	1.37	98.15

8	Retraction	54	7370	0.72	98.87
9	Retracted Publication	40	7410	0.54	99.41
10	Proceedings Paper	17	7427	0.23	99.64
11	News Item	14	7441	0.19	99.82
12	Book Chapter	7	7448	0.09	99.92
13	Expression of Concern	3	7451	0.04	99.96
14	Book Review	1	7452	0.01	99.97
15	Data Paper	1	7453	0.01	99.99
16	Meeting	1	7454	0.013	100
Total		7454		100	

In this table 10 the analysis of the distribution of Liver Cancer Research by document type was done. There are about 16 types of documents published in this study. The study is classified into broad groups Article, Meeting Abstract, Review, Editorial Material, Letter, Early Access, Correction, Retraction, Retracted Publication, Proceedings

Paper, etc. The majority of the contributions 4814 (64.58 %) are Articles, followed by Meeting Abstract 1106 (14.84 %). By and large, it is found that the scholarly communication of Liver Cancer research output is found through Articles and Meeting abstracts.

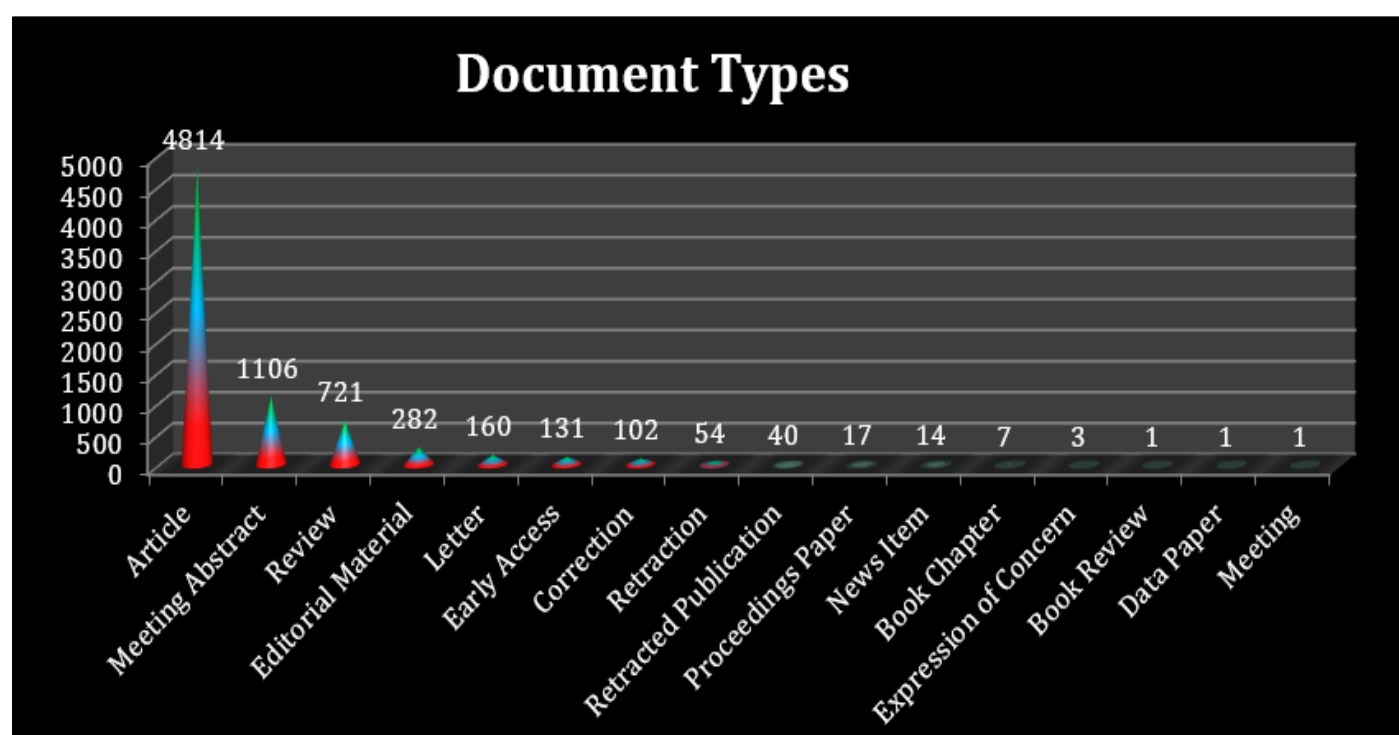


Fig 7 Document-Wise Publications of Liver Cancer Research

Table 11 Institution-Wise Publications (Top 10)

S. No	Affiliations	Records	%
1	FUDAN UNIVERSITY, Shanghai, China	226	13.71
2	SUN YAT SEN UNIVERSITY, Guangdong, China.	211	12.80
3	CHINESE ACADEMY OF SCIENCES, Beijing, China	188	11.40
4	SHANGHAI JIAO TONG UNIVERSITY, Shanghai, China	179	10.86
5	ZHEJIANG UNIVERSITY, Hangzhou, China	179	10.86
6	CHINESE ACADEMY OF MEDICAL SCIENCES PEKING UNION MEDICAL COLLEGE, Beijing, China	178	10.79
7	UNIVERSITY OF CALIFORNIA SYSTEM, U.S. state of California	129	7.82
8	UNIVERSITY OF TEXAS SYSTEM, U.S. state of Texas	123	7.46
9	PEKING UNION MEDICAL COLLEGE, Beijing, China	120	7.28
10	EGYPTIAN KNOWLEDGE BANK EKB, Cairo, Egypt.	116	7.03

Table 11 shows the top institution-wise distribution of publications during the study period. The highest number of publications produced by "Fudan University" was 226

(13.71%), the next most publications produced by "Sun Yat Sen University" was 211 (12.80%), followed by "Chinese Academy of Sciences" was 188 (11.40%).

Table 12 Indian Affiliations Wise Publication

S. No	Affiliations	Record Count	%
1	SAVEETHA INSTITUTE OF MEDICAL TECHNICAL SCIENCE, Chennai, Tamil Nadu	15	20.00
2	COUNCIL OF SCIENTIFIC INDUSTRIAL RESEARCH (CSIR) INDIA, New Delhi	9	12.00
3	INDIAN INSTITUTE OF TECHNOLOGY SYSTEM IIT SYSTEM, New Delhi	9	12.00
4	TATA MEMORIAL CENTRE TMC, Parel, Mumbai	8	10.67
5	NATIONAL INSTITUTE OF TECHNOLOGY NIT SYSTEM, Tiruchirappalli, Tamil Nadu	7	9.33
6	HOMI BHABHA NATIONAL INSTITUTE, Mumbai, Maharashtra	6	8.00
7	PONDICHERRY UNIVERSITY, Kalapet, Puducherry	6	8.00
8	ACADEMY OF SCIENTIFIC INNOVATIVE RESEARCH (ACSIR), Ghaziabad, Uttar Pradesh	5	6.67
9	AMITY UNIVERSITY, Noida, Uttar Pradesh, NOIDA	5	6.67
10	KONERU LAKSHMAIAH EDUCATION FOUNDATION K L DEEMED TO BE UNIVERSITY, Guntur, Andhra Pradesh.	5	6.67

Table 12 shows the top Indian Affiliations-wise distribution of publications during the study period. The highest number of publications produced by "Saveetha Institute of Medical Technical Science" was 15 (20%), the

next most publications produced by "Council of Scientific Industrial Research (CSIR) INDIA," was 9 (12%), followed by "Indian Institute of Technology System IIT System" was 9 (12%).

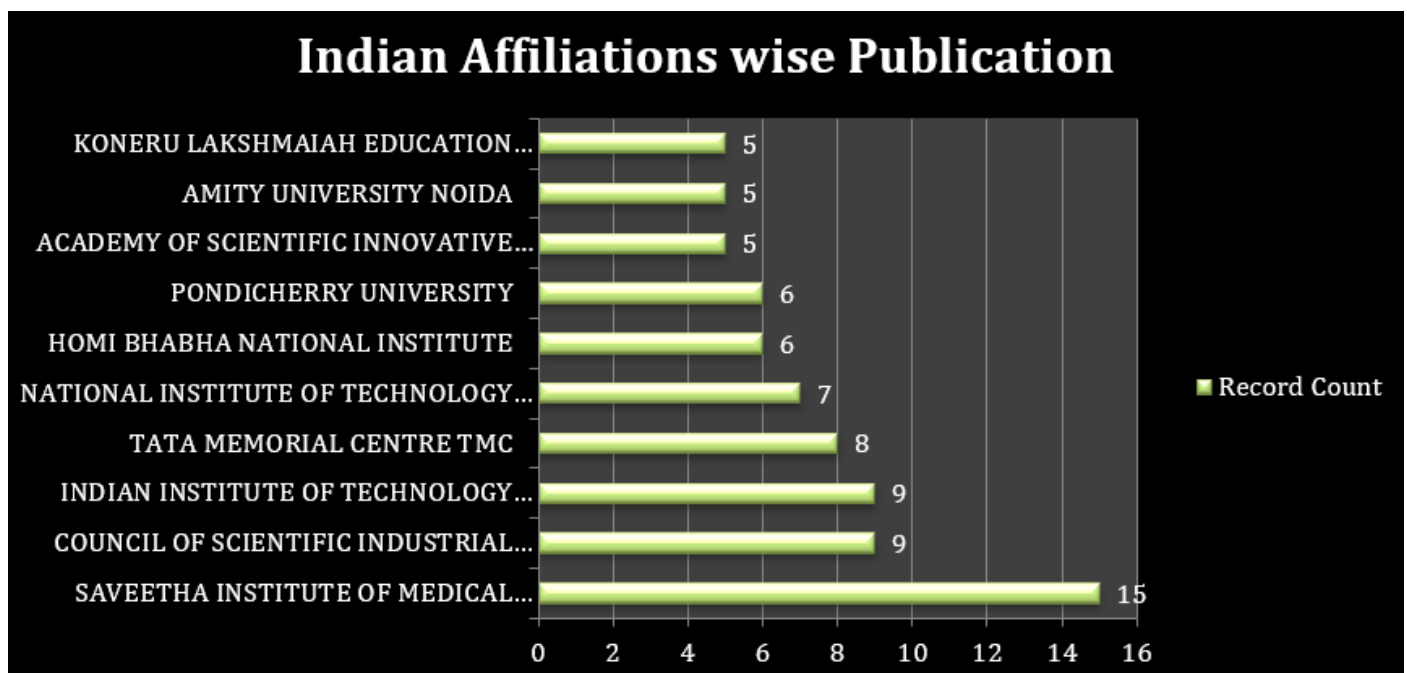


Fig 8 Indian Affiliations Wise Publication of Liver Cancer Research

➤ Zipf's Law of Word Occurrence

George Kingsley Zipf developed his law in 1935 to forecast how frequently words would appear in a book. The law states that the rank of a word on a list multiplied by its frequency will equal a constant if the words that appear in a fairly long text are listed in decreasing order of frequency.

$$r \times f = C$$

(where C is Constant)

Taking log on both sides, $\log f + \log r = \log C$

To apply this law, the terms were gathered from the article titles and arranged in decreasing order of word occurrence frequency.

Table 13 Ranking of Word Occurrence

S. No	Keywords	Frequency	Rank	Log F	Log R	Log C
1	Hepatocellular-carcinoma	1214	1	3.08	0	3.08
2	Expression	556	2	2.74	0.30	3.05
3	Survival	492	3	2.69	0.48	3.17
4	Apoptosis	326	4	2.51	0.60	3.11
5	Cells	317	5	2.50	0.70	3.20
6	Chemotherapy	277	6	2.44	0.79	3.22
7	Therapy	274	7	2.44	0.84	3.28
8	Resection	272	8	2.43	0.90	3.34
9	Metastasis	248	9	2.39	0.95	3.35
10	Proliferation	238	10	2.38	1	3.38
11	Activation	210	11	2.32	1.04	3.36
12	Rick	203	12	2.31	1.08	3.39
13	Sorafenib	196	13	2.29	1.11	3.41
14	Management	193	14	2.28	1.15	3.43
15	Disease	190	15	2.29	1.18	3.45
16	Surgery	188	16	2.27	1.20	3.48
17	Diagnosis	179	17	2.25	1.23	3.48
18	Hepatic resection	171	18	2.23	1.25	3.49
19	Immunotherapy	168	19	2.22	1.28	3.50
20	Liver cancer	140	20	2.15	1.30	3.45
21	Outcomes	140	21	2.15	1.32	3.47
22	Hepatectomy	131	22	2.12	1.34	3.46
23	Impact	123	23	2.09	1.36	3.45
24	Efficacy	114	24	2.06	1.38	3.44
25	Tumor microenvironment	108	25	2.03	1.40	3.43

Table 13 only includes terms that have a frequency of up to 6668. After this law was applied, the log of the frequency of terms that occurred was discovered. The

findings are nearly identical for each term when added to the log of their rank. Below is a log showing the frequency of the five most powerful terms that were used in titles.

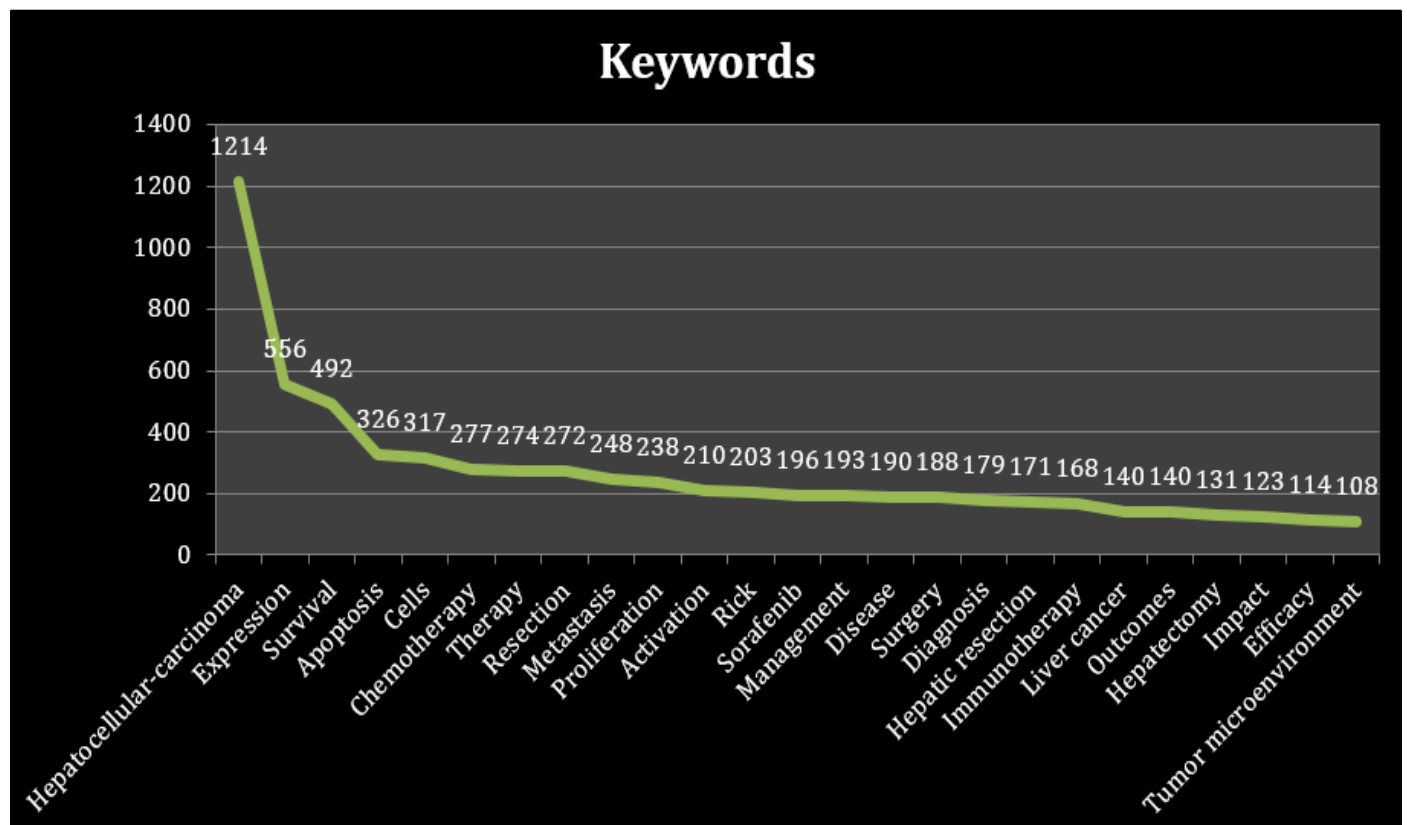


Fig 9 Keywords Wise Publications of Liver Cancer Research

➤ *Word: Hepatocellular-Carcinoma*

Frequency: 1214

Rank: 1

Log of Frequency + log of Rank

$\log 1214 + \log 1$

$= 3.08 + 0$

$= 3.08$

The very most searched keyword (i.e.) "Hepatocellular-carcinoma" occurs a lot of times and it is in the primary position and the not a large amount number of searches keyword occurs very last. This shows that only some keywords are used frequently for searching and leftover keywords are very rarely.

IV. FINDINGS

➤ *The Major Findings of the Present Study are:*

- The analysis of Liver Cancer research publications from 2020 to 2024 reveals a consistently growing trend in scholarly output, with a total of 7454 articles published within this period. Notably, 2023 saw the highest number of publications, reaching 1614 articles, representing 21.65% of the total output. While 2024 and 2022 also exhibited substantial publication numbers, the year 2020 marked the lowest output with 1252 articles.
- The research articles published by Liver Cancer Research during the period 2020-2024. A total of 7454 research articles were published. The increase in publications is connected to scientometric research. The Ratio of Growth is very high in the year 2021 (1.19).
- The Relative Growth Rate of Liver Cancer publications from 2020-2024 was 1.12, while the Doubling Time was 0.70 years, indicating rapid research growth. The Doubling Time showed a declining trend, signifying an accelerating pace of publications.
- The analysis of 7454 Liver Cancer research articles reveals a dominance of multi-authored publications, with 1709 attributed to teams of over ten authors. While single-authored articles represent only 171 collaborative efforts, particularly those involving larger author groups, are the primary mode of publication in this field.
- The single-author production is 171 (2.29%) and is pursued by the multi-author's dissemination of 7283 (97.70%). The level of joint effort assesses that the dissemination of single Vs multi authors' distributions of Liver Cancer was looked into during the years 2020-2024. The degree of collaboration was 0.98.
- Li J leads with the highest h-index (19) among the top authors, despite Zhang Y having more total citations. Zhang B, while contributing fewer articles, still ranks within the top ten authors by record count.
- The top three Indian authors, Kini J, Kulkarni S, and

Kumar, share the highest publication count of 4 each, representing 11.76% of the total. This indicates a relatively even distribution of publications among the leading Indian authors within the studied period.

- Liver cancer research demonstrates a strong preference for team research, as evidenced by a consistently high collaboration index. The increasing trend of the collaboration index, from 7.85 in 2020 to 8.44 in 2023, confirms a growing emphasis on collaborative efforts within the field.
- China leads significantly in liver cancer research publications with 3599 articles, followed by the USA with 1352. India ranks 11th among the top 15 countries, contributing 167 publications to the field.
- India's liver cancer research output has fluctuated compared to the global average, with higher activity indices in 2021 and 2024. However, the overall five-year activity index indicates that India's research output aligns closely with the world's average for the study period.
- Liver cancer research is primarily disseminated through articles, which constitute the majority (64.58%) of publications. Meeting abstracts also play a significant role (14.84%), indicating that conferences are a key venue for sharing research findings in this field.
- Fudan University is the leading institution in liver cancer research publications, followed closely by Sun Yat-Sen University and the Chinese Academy of Sciences. These three institutions are the top contributors within the study period.
- Saveetha Institute of Medical and Technical Sciences leads Indian affiliations in liver cancer research publications, followed by the Council of Scientific and Industrial Research (CSIR) INDIA and the Indian Institute of Technology (IIT) System, which share the second-highest publication count.
- The analysis of keyword usage in liver cancer research aligns with Zipf's Law, demonstrating that "Hepatocellular-carcinoma" is the most frequently used keyword, while others are used significantly less. The main keyword "Liver Cancer" ranks lower, indicating a preference for more specific terminology.

V. CONCLUSION

According to the findings of the study, the number of publications on Liver Cancer is increasing at a global level. The analysis of the authors, institutions, country, documents, authors collaboration, activity index and country collaboration, etc. helpful to the scientists and researchers in this field. It also throws light on those library and information scientists in this area, in acquiring and organizing information sources on this subject. It is found that China is the leading nation in the World doing intensive research and contributing to Liver Cancer publications. The institutions doing research in this field, identified in this study are of great help to the researchers and scientists in communicating and contacting them for research collaboration.

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