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LIVER DISEASE RESEARCH PUBLICATIONS IN INDIA: A SCIENTOMETRICS ANALYSIS

[1]*LEKHA K, [2]DR L N UMADEVI

[1*]RESEARCH SCHOLAR, DEPT. OF LIBRARY AND INFORMATION SCIENCE, ANNAMALAI UNIVERSITY, ANNAMALAI NAGAR- 608 002, TAMILNADU, INDIA, EMAIL: lekhakrishnapillai19@gmail.com
[2]ASSISTANT PROFESSOR OF LIBRARY AND INFORMATION SCIENCE, ANNAMALAI UNIVERSITY, ANNAMALAI NAGAR- 608 002, TAMILNADU, INDIA, EMAIL: lnumadevi2007@gmail.com.

ABSTRACT
This paper attempts to analyse the growth and development of Liver Disease, as reflected in publication output covered by Web of Science online database during 2014-2024. The study concentrates on year wise distribution, document type, author's research productivity along with top ten contributing authors, top journals of publication, countries of contribution, institution focussed, word wise and language wise distribution of publication output in the area of Liver Disease Research. The study unveils that multi authors have accorded 4938 articles during 2014to 2024.
Keywords: Liver Disease, Scientometric Research, Local and Global citation scores.

INTRODUCTION

Around 2 million individuals worldwide die annually from liver disease. The liver is a vital organ that plays a critical role in metabolism, converting nutrients from food into substances the body can use or store. However, liver dysfunction caused by infection, disease, or other factors can disrupt these essential processes, leading to severe and potentially irreversible conditions like liver cirrhosis, cancer, and hepatitis. Hepatitis, which involves inflammation of the liver, is one of the most common and serious liver-related disorders. It is often caused by viral infections, with hepatitis B and C being particularly prevalent and capable of progressing to chronic, life-threatening diseases. According to the World Health Organization, there are an estimated 1.4 million new cases of viral hepatitis globally each year. Many other liver diseases and disorders remain poorly understood, underscoring the need for continued research and medical advances in this area. Overall, the liver's central role in metabolism makes it a critical organ, and dysfunction can have wide-ranging and severe health consequences.

Liver Disease in India: An Overview:

Liver disease poses a significant public health challenge in India, exerting a substantial strain on the country's healthcare system. As a vital organ responsible for maintaining overall health, liver disease can lead to severe and potentially life-threatening complications, such as liver failure, cirrhosis, and hepatocellular carcinoma**.** Approximately 1.4 million cases of hepatitis are reported worldwide each year, resulting in over 300,000 deaths

Epidemiology of Liver Disease in India

According to the World Health Organization (WHO), liver disease is the 10th leading cause of death in India. The country accounts for approximately 10% of the global liver disease burden.

The prevalence of liver disease in India varies across different regions and populations. However, the most common causes of liver disease in India are:

1. Viral hepatitis (B and C): India has a high prevalence of viral hepatitis, with approximately 40 million people infected with hepatitis B and 12 million with hepatitis C.
2. Alcoholic liver disease: Excessive alcohol consumption is a significant risk factor for liver disease in India.
3. Non-alcoholic fatty liver disease (NAFLD): The rising prevalence of obesity and diabetes in India has contributed to an increase in NAFLD cases.

Challenges and Opportunities

While liver disease poses a significant challenge to India's healthcare system, there are opportunities for improvement:

1. Increased awareness: Educating the public about liver disease risk factors, prevention, and treatment options can help reduce the burden.
2. Improved diagnosis and treatment: Enhancing diagnostic facilities and access to treatment, including antiviral therapy and liver transplantation, can improve patient outcomes.
3. Research and development: Investing in research on liver disease, including its causes, prevention, and treatment, can help develop effective solutions.

Scientometrics

Scientific literature is mirror of scientific research around the world. At first, scientometrics was limited to measuring science communication while bibliometrics was designed to deal with more general information processes. Scientometrics is a field of study that looks at how scientific research is conducted and how it can be evaluated. It's also used to determine the social relevance and impact of scientific discoveries. Scientometrics is the study of the

characteristics of scientific activity, productivity, and progress. It deals with mapping science in order to improve it. Scientometric research is growing at a rapid pace, with bibliometric and economic analysis playing an important role. The origins of scientometric research can be traced back to the early 19th century; it was during this time that laws of bibliometrics were developed' Lotka's law, Bradford's law, and Zipf's law. These laws continue to be studied and form the basis of scientometric literature development.

Scientometrics, which began by measuring science communication, now analyses various aspects of scientific research, including evaluation, social relevance, and the impact of discoveries. This field focuses on the characteristics, productivity, and progress of science, to improve the scientific process. The scientometric analysis provides a way to quantify the growth of scientific expertise, enabling researchers to access data relevant to their work.

Scientometrics has become an increasingly important tool for understanding the scientific and technological progress of the world. The evaluation of research activities is a valuable way to develop new scientific knowledge. The publication of scholarly works is becoming an increasingly important concern for researchers, scientists, scholars, and library professionals as they need to keep themselves up-to-date on new information in their field. Thus, the present study is an attempt to explore the characteristics of the "Scientometrics Analysis on Liver disease Research publication."

Objectives

The main objective of the study is to analyze the following bibliometric characteristics of Liver Disease Research:

1. To analyze the Relative Growth Rate in the area of Liver Disease during 2014 – 2024
2. To ascertain the Document type wise distribution
3. To study the Collaboration pattern country wise
4. To examine the Author wise Contribution in Liver Disease.
5. To identify the Language wise and Institution Wise Contribution in Liver Disease.
6. To ascertain the Document type wise distribution in Liver Disease Research.

METHODOLOGY

The necessary information was gathered from Web of Science database for the period 2014-2024. It tends to be seen that almost 4938 bibliographic records of contribution in field of Liver Disease over the time of 11 Years. A total of 4938 records were downloaded and analyzed by using the Histcite software applications as per the objectives of the study. The investigation plans to examine the push regions of research focus on Liver Disease research. It is systematic in nature with the reasonable factual instruments applications in strengthening the empirical validity.

Data collection

The research output on Liver Disease and scientometrics was obtained from various sources, including journal articles, conference papers, reviews, short surveys, notes, editorial press releases, and letters. The data for the present study was downloaded from the Web of Science database, covering the period from 2014 to 2024. The researcher then downloaded the data in the form of Notepad files, converted the bibliographical details to Microsoft Excel format using PHP (Hypertext Preprocessor) scripting, and rearranged the unique data to eliminate duplicates. In total, the researcher retrieved 4938 records for analysis in the present study. The data were downloaded and exported to excel file to tabulate them (Data as per on 13^{h} October 2024).

Limitations

This study focuses exclusively on research related to liver disease, including the specific areas of disease category, genetic liver disorders, and liver cancer. The analysis is limited to the medical field and does not cover any other themes. The study examines research output and performance in the domain of liver disease research from 2014 to 2024. One of the limitations of the study is that the scope is confined to cover only the publications cited in Web of Science.

Analysis and Interpretation

Table - 1: Year wise publication Liver Disease Research

Sl.No	Publication Year	Recs	Percent	TLCS	TGCS
1	2014	297	6	231	8978
2	2015	306	6.2	208	10047
3	2016	341	6.9	252	10146
4	2017	355	7.2	274	14061
5	2018	415	8.4	289	10994
6	2019	513	10.4	329	16333
7	2020	496	10	308	15098
8	2021	637	12.9	166	10527
9	2022	713	14.4	105	7739

10	2023	782	15.8	20	4585
11	2024	83	1.7	0	923
Total		**4938**	**100**		

Note: TLCS: Total Local Citation Score, TGCS: Total Global Citation Score

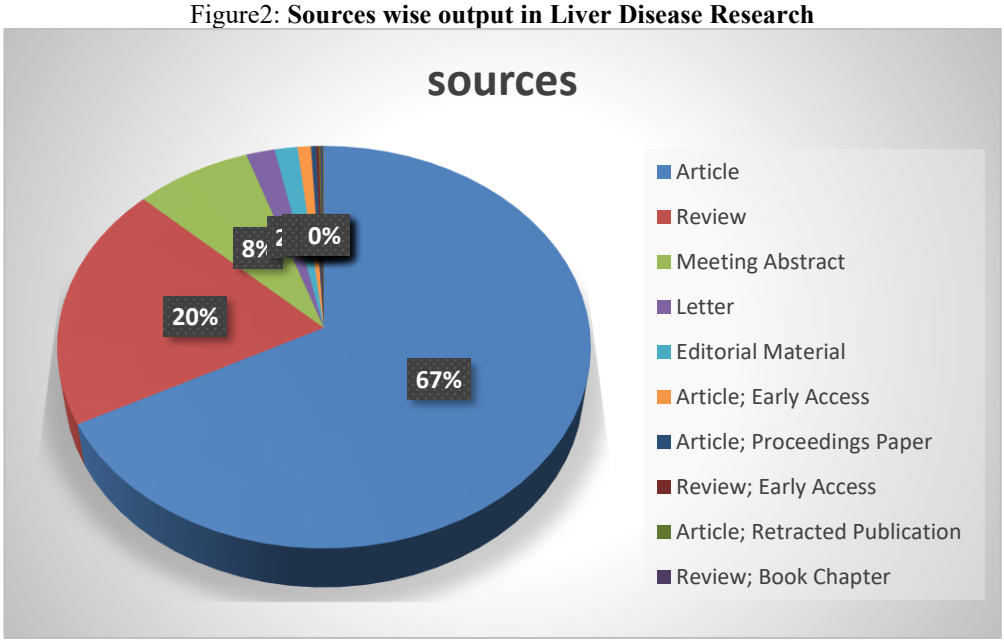
Figure1: **Year wise publication Liver Disease Research**

During the span of 2014-2024 scientists all over the world have produced a total of 4938 publications on Liver Disease research. Table-1 shows the year wise distribution of papers published. It shows that the publication of output is gradually increased and decreased trend. There were only 297 records in 2014 and then it increased steadily and reached 782 in 2023. It is clearly stated that in future the research productivity in Liver Disease research is increasing trend.

Table - 2: Sources wise output in Liver Disease Research

S.NO	Document Type	Recs	Percent	TLCS	TGCS
1	Article	3322	67.3	1688	71408
2	Review	974	19.7	410	35543
3	Meeting Abstract	382	7.7	5	71
4	Letter	94	1.9	26	449
5	Editorial Material	75	1.5	39	776
6	Article; Early Access	44	0.9	0	102
7	Article; Proceedings Paper	17	0.3	8	494
8	Review; Early Access	9	0.2	0	240
9	Article; Retracted Publication	5	0.1	2	115
10	Review; Book Chapter	5	0.1	1	119
11	Article; Book Chapter	4	0.1	3	64
12	Editorial Material; Early Access	2	0	0	2
13	Article; Data Paper	1	0	0	25

Figure2: **Sources wise output in Liver Disease Research**



The source wise output in country level of Liver Disease research is given in Table 2. It shows 13 document types researched for this study yielding a total of 4938 records during the course of study. The productivity of liver disease research is spread over a variety of publication media like Journal Articles, Review, Proceedings papers, Meeting abstracts, Article; Early Access, Book review, etc. The most scholarly communication of scientific research is published in Journals (3322, 67.3%, TLCS is 1688 and TGCS is 71408), followed by review and other forms.

Table - 3: Authorship pattern in Liver Disease Research

SL. NO	YEAR	SINGLE	DOUBLE	THREE	FOUR	FIVE	ABOVE FIVE	TOTAL
1	2014	6	33	43	60	41	114	297
2	2015	5	43	35	43	44	136	306
3	2016	2	46	49	48	44	152	341
4	2017	3	35	41	44	48	184	355
5	2018	11	36	63	70	42	193	415
6	2019	8	51	61	63	69	261	513
7	2020	15	47	49	79	56	250	496
8	2021	17	48	82	66	78	346	637
9	2022	13	64	72	72	66	426	713
10	2023	13	72	79	80	91	447	782
11	2024	9	8	12	10	8	36	83
Total		102	483	586	635	587	2545	**4938**

Figure3: Authorship pattern in Liver Disease Research

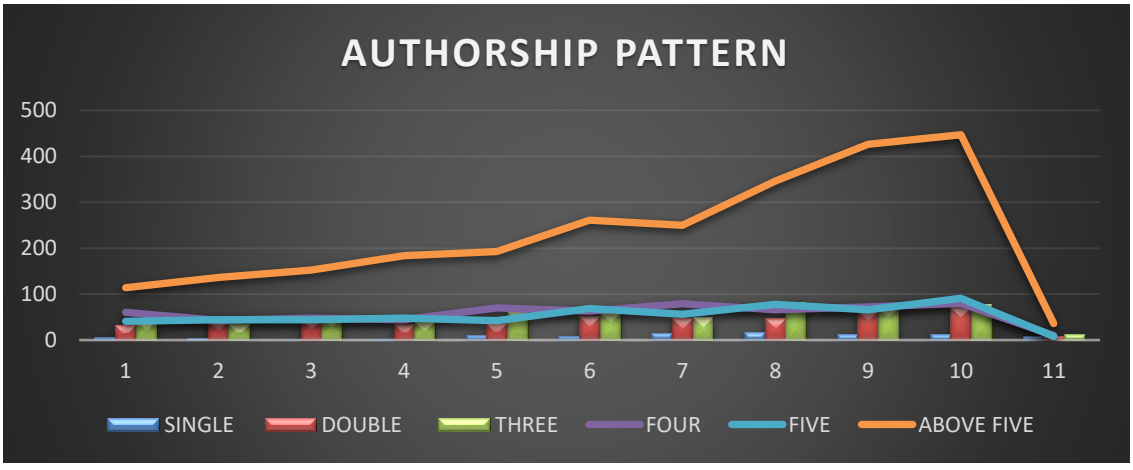


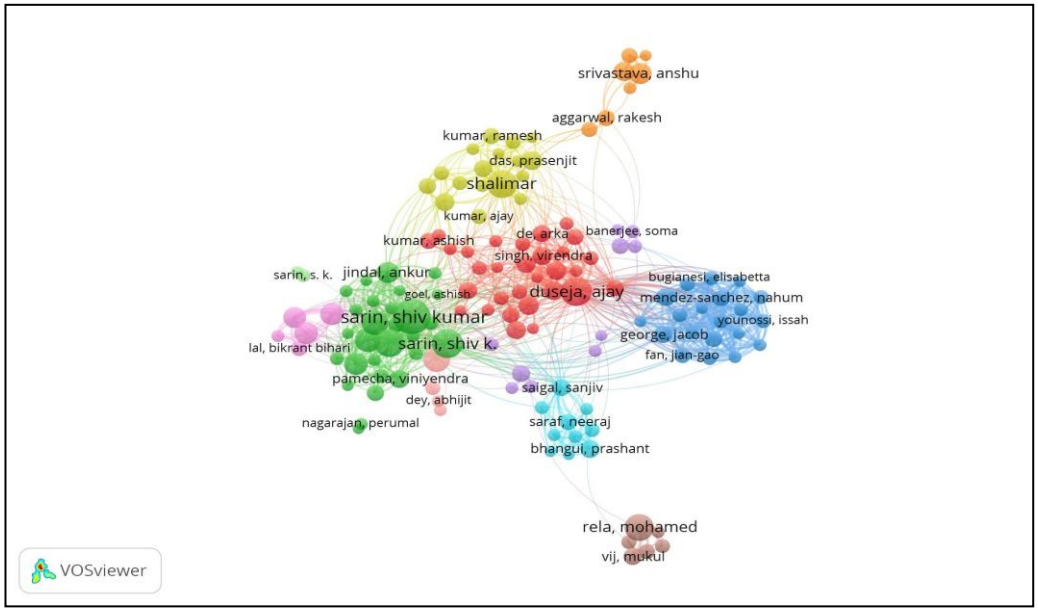
Table-3 illustrates the authorship pattern of contribution. It is noticed that the year 2021 marks highest contribution of 17 out of 102 records by single authors; 72 out of 483records by double author in the year 2023; 82 out of 586 records by three authors in the year 2021; 80 out of 635 records by four authors in the year 2023 and 91 out of 587 records by five authors in the year 2023. It is found that out of 4938 articles, above five authored articles are the highest with 2545. The single author contribution is low when related to multi authored papers. A prominent note of the study is that the majority of the articles are contributed by joint authors.

Table - 4: Top Ten Authors in Liver Disease Research

SL.NO	Author	Recs	Percent	TLCS	TLCS/t	TLCSx	TGCS	TGCS/t	TLCR
1	Sarin SK	202	4.1	438	70.81789	163	12439	2113.739	353
2	Kumar A	145	2.9	117	18.96598	49	2913	492.8127	103
3	Sharma S	102	2.1	44	7.109235	14	1397	267.5023	62
4	Kumar S	86	1.7	36	4.644841	14	1084	190.5695	20
5	Singh S	84	1.7	25	5.452381	9	1400	306.9372	38
6	Duseja A	81	1.6	128	21.08276	42	3012	531.7241	110
7	Kumar R	81	1.6	37	6.690476	17	1320	254.7544	28
8	Kumar M	80	1.6	103	16.26349	46	4812	724.1092	51
9	Rela M	76	1.5	126	17.59848	51	2066	360.6377	75
10	Kumar V	74	1.5	38	4.520599	13	2514	416.7335	41

TLCS/t - Total Local Citation Score per year
TGCS/t - Total Global Citation Score per year TLCR - Total Local Cited References

Figure4: **Top Ten Authors in Liver Disease Research**

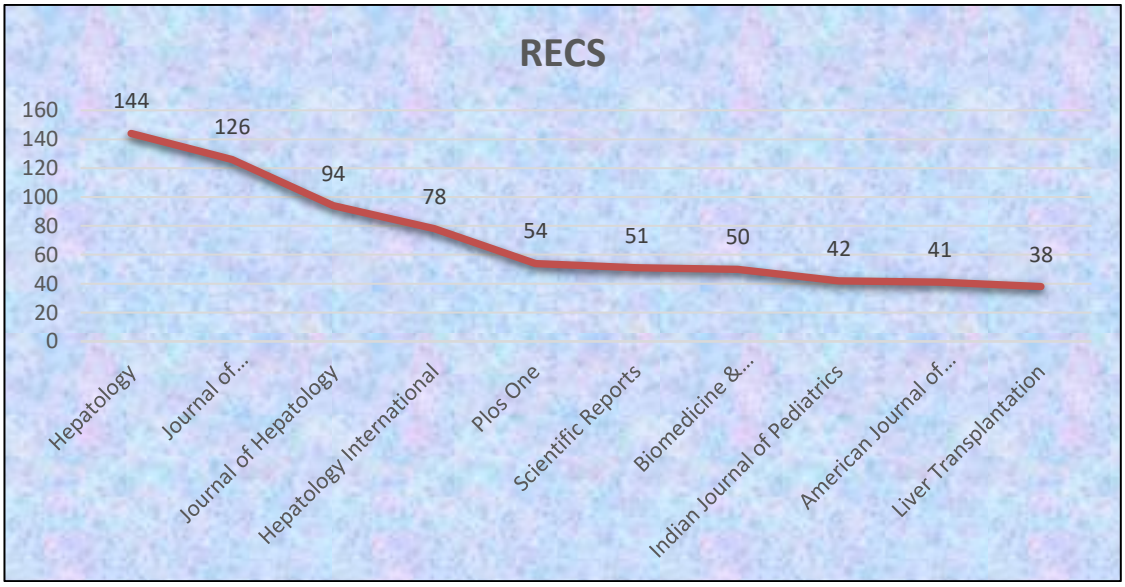


From 2014 to 2024, 4938 papers were published and Table-4 details the top 10 authors in liver disease research. This table highlights Sarin S K as the topper with 202records. He obtained 438 TLCS, 12439 TGCS and 383 TLCR. The second, third and fourth places are occupied by Kumar A, Sharma S, Kumar S.

Table - 5: Top Ten Journals in Liver Disease Research

SL.NO	JOURNAL	RECS	PERCENT	TLCS	TLCS/t	TGCS	TGCS/t	TLCR
1	Hepatology	144	2.9	94	17.55913	3189	734.6407	42
2	Journal of Gastroenterology And Hepatology	126	2.6	67	8.69798	1198	161.2573	14
3	Journal of Hepatology	94	1.9	152	29.64524	8092	1833.163	53
4	Hepatology International	78	1.6	210	30.97637	6334	933.0396	165
5	Plos One	54	1.1	0	0	901	105.0174	13
6	Scientific Reports	51	1	0	0	1050	201.2417	23
7	Biomedicine & Pharmacotherapy	50	1	17	2.315476	1506	243.673	15
8	Indian Journal of Pediatrics	42	0.9	20	2.273665	269	51.30606	26
9	American Journal of Gastroenterology	41	0.8	31	3.627706	300	49.61851	13
10	Liver Transplantation	38	0.8	46	7.338925	534	85.12569	23

Figure5: **Top Ten Journals in Liver Disease Research**



The literature of Liver Disease research (2014 to 2024) retrieved from Web of Science scattered over 10 top journals is sketched in table 5. The journal HEPATOLOGY occupies the top position with 144(2.9 %), TLCS 94, TLCS/t17.55913, TGCS 3189, TGCS/t 734.6 and TLCR 42 records followed by JOURNAL OF GASTROENTEROLOGY AND HEPATOLOGY and JOURNAL OF HEPATOLOGY that came second and third respectively. Journal of LIVER TRANSPLANTATION with 38 records ranks last among the 10 journals.

Table - 6: Top Ten Cited References in Liver Disease Research

Sl No	Cited References	Recs	Percent
1	LOWRY OH, 1951, J BIOL CHEM, V193, P265	186	3.8
2	OHKAWA H, 1979, ANAL BIOCHEM, V95, P351, DOI 10.1016/0003-2697(79)90738-3	156	3.2
3	ELLMAN GL, 1959, ARCH BIOCHEM BIOPHYS, V82, P70, DOI 10.1016/0003-9861(59)90090-6	86	1.7
4	MARKLUND S, 1974, EUR J BIOCHEM, V47, P469	86	1.7
5	JEMAL A, 2011, CA-CANCER J CLIN, V61, P134, DOI [DOI 10.3322/caac.20115, DOI 10.3322/CAAC.20107]	77	1.6
6	Kleiner DE, 2005, HEPATOLOGY, V41, P1313, DOI 10.1002/hep.20701	75	1.5
7	Moreau R, 2013, GASTROENTEROLOGY, V144, P1426, DOI 10.1053/j.gastro.2013.02.042	70	1.4
8	Livak KJ, 2001, METHODS, V25, P402, DOI 10.1006/meth.2001.1262	67	1.4
9	Younossi ZM, 2016, HEPATOLOGY, V64, P73, DOI 10.1002/hep.28431	64	1.3
10	AEBI H, 1984, METHOD ENZYMOL, V105, P121	61	1.2

Figure6: **Top Ten Cited References in Liver Disease Research**

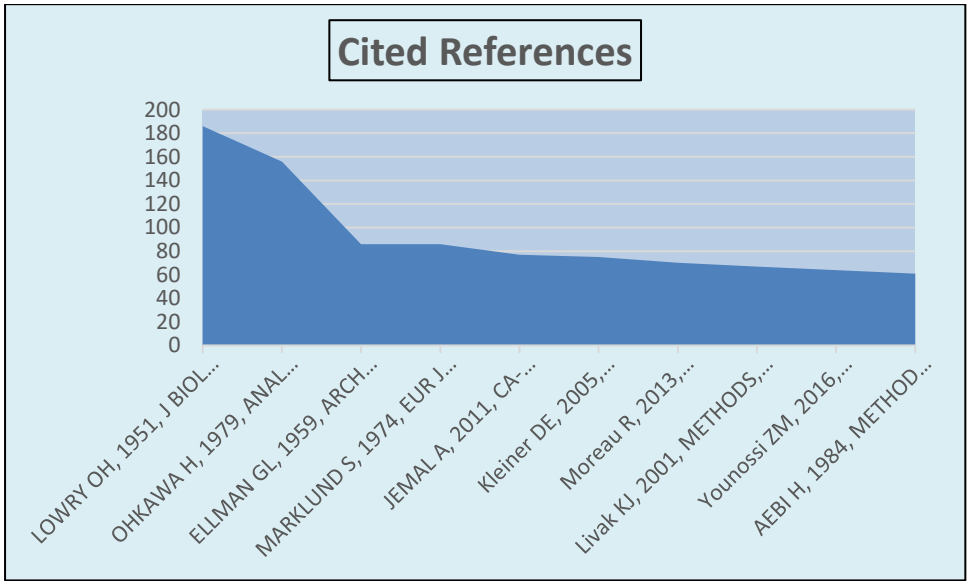


Table 6 gives the list of top 10 cited references of the study period. The article published in the 193th volume of the journal of the CC in the year 1951, authored by Oliver H Lowary is the highly cited reference during the period of study.186 records cited this particular article. Which got the major share percentage of total cited references with the value of 3.8%

Table-7 Top ten Institutions wise of Liver Disease Research

SL. NO	INSTITUTION	RECS	PERCENT	TLCS	TGCS
1	Institute of Liver & Biliary Science (ILBS)	330	6.7	505	14223
2	All India Institute Medical Science (AIMS)	291	5.9	189	5933
3	Postgraduate Institute of Medical Education and Research (PGIMER)	164	3.3	178	5962
4	Sanjay Gandhi Postgraduate Institute of Medical Science	82	1.7	100	2667
5	Academy of Science & Innovative Research(AcSIR)	74	1.5	23	1129
6	Council of Science & Industrial Research (CSIR)	74	1.5	20	1712
7	Aligarh Muslim University	69	1.4	27	1351
8	Christian Medical College & Hospital, Velloor	69	1.4	53	1385
9	Postgraduate Institute of Medical Education and Research (PGIMER)	67	1.4	61	1091
10	Jamia Hamdard	60	1.2	13	1516

Distribution of Institution wise of Liver Disease research is displayed in table 7. The research articles emerged from various research institutes, universities and Research centres. The Institute of Liver and Biliary Sciences (ILBS) tops with 330 articles (TLCS 505, and TGCS 14223), followed by All India Institute of Medical Science(AIIMS) with 291 articles (TLCS 189 and TGCS 5933) in the second position and Postgraduate Institute of Medical Education and Research (PGIMER) ranked third with 164 records (TLCS 178 and TGCS 5962) among the top 10 institution list. HistCite is designed to analyse and visualize literature searches made on Web of Science Core Collection.

Figure7: **Top Ten Cited References in Liver Disease Research**

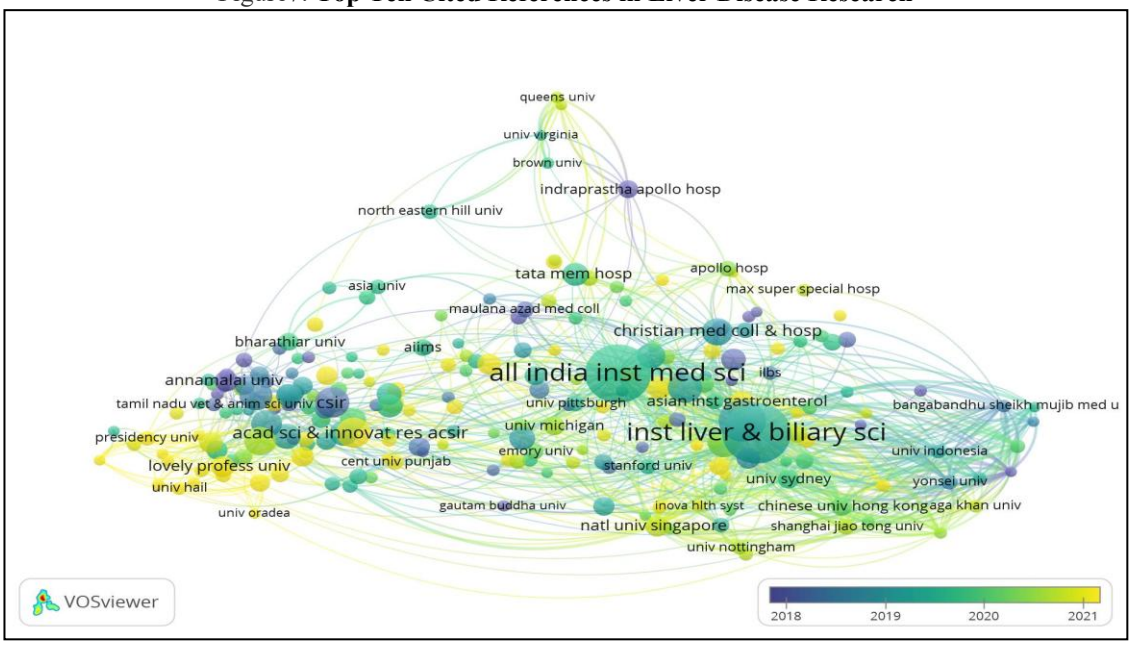


Table-8 Word wise of Liver Disease Research

SL NO	WORDS	RECS	PERCENT	TLCS	TGCS
1	Liver	1678	34	1146	32792
2	Disease	1072	21.7	521	24341
3	Patients	552	11.2	307	8588
4	Induced	498	10.1	173	8519
5	Fatty	418	8.5	281	12296
6	Chronic	367	7.4	350	5322
7	Non	345	7	132	4935
8	Alcoholic	319	6.5	168	4358
9	Hepatitis	297	6	205	8530
10	Review	285	5.8	69	7980

Table – 8 provides a snapshot of the top 10 words of liver disease research. The increasing cases in liver disease Problems promote different areas of research exploration. The table grades liver as the major word in research with 1678 articles (34%, TLCS 1146 and TGCS 32792), Disease in the second place with 1072 records (21.7%, TLCS- 521 and TGCS- 24341) and Review as the least word in analysis with 285 articles (5.8%, TLCS- 69and TGCS- 7980) in the top 10 list.

Table-9 Languages wise of Liver Disease Research

S.NO	Language	Recs	Percent	TLCS	TGCS
1	English	4938	100	2182	109431

It is also important to identify the languages of publication as exhibited in (Table 9). English is the predominant language of publications. Out of the 4938 records retrieved, English occupies the first position with 4938 (100 %, 2182 TLCS and 109431 TGCS) records.

Major Findings

Year-wise Breakup of Publications in infertility

- Publication Trends over time: The study reveals a remarkable growth in Liver disease research publications over the years. In 2023, there were 782 publications, representing 15.8% of the overall publications, this is the highest publications.

- Annual Growth Rate (AGR): The Annual Growth Rate, calculated from 2014 to 2024, a substantial increase from 2014 onwards. The growth peaked from 2022 to 2023, indicating it was a period of accelerated research activity.

Document Type-wise Distribution of liver disease Publications

- Dominance of Article Publications: Most liver disease research publications were articles, constituting 67.3% of the total publications. It emphasises the significance of journal articles as the primary mode of scholarly communication in liver disease.

Authorship Pattern of Infertility Research

- Increasing Collaboration: The analysis of the authorship pattern revealed a rising trend in collaborative research. More Five author collaborations were the most prevalent.
- Top Productive Authors: Sarin SK, Kumar A, Sharma S emerged as the top three productive authors, each contributing significantly to the total number of publications.

CONCLUSION

Journals are crucial for scientific communication, with most research output published in articles. The quality and quantity of scientific works is often judged by the Liver Disease outputs mainly in the form of publications. The study period shows an increasing or decreasing trend in research paper publication. The present work had taken up a detailed analysis on research publications over a period of five years (2014-2024). In general, there is a progressive increase in the number of publications of research on Liver Disease Research. The highest percentage of publication has been published in the year 2023 (15.8%) and the lowest percentage of have been published in the year 2014 (6%) and the study highlights the dominance of multi-authored articles to single authored ones.

REFERENCES

1. Arunachalam, S., & Garg, K. C. (1986). Science on the periphery - a scientometric analysis of science in the Asian countries. Journal of Information Science, 12(3), 105-117.
2. Kumar P.S.G.(2002) A student manual of library and information science. B.R.Publishing, New Delhi.
3. Raja, S. and Balasubramani, R. (2011).Plasmodium falciparum research publication in India: A scientometric analysis. European Journal of Scientific Research, 56(3),
294-300.
4. Balasubramani R and Murugan C(2011)"Mapping of Tapioca (Sago) Research in India: A Scientometric Analysis" Library Philosophyand Practice, pp 1-12.
5. Surulinathi ,M. et al. (2013) Continent wise Analysis of Green Computing Research: A Scientometric Study. Journal of Advances in Library and Information Science 2. (1) pp. 39-44
6. Alajmi, Q., Al-Sharafi, M. A., & Abuali, A. (2020). Smart learning gateways for Omani HEIs towards educational technology: Benefits, challenges and solutions. International Journal of Information Technology, 4(1), 12–17.
7. Cheng, B., Wang, M., Mørch, A. I., Chen, N.-S., Spector, J. M., et al. (2014). Research on e-learning in the workplace 2000–2012: A bibliometric analysis of the literature. Educational Research Review, 11, 56–72.
8. Dhawan, S. (2020). Online learning: A panacea in the time of COVID-19 crisis. Journal of Educational Technology Systems, 49(1), 5–22.
9. Kumar Basak, S., Wotto, M., & Belanger, P. (2018). E-learning, M-learning and D-learning: Conceptual definition and comparative analysis. E-Learning and Digital Media, 15(4), 191–216.
10. Moore, J. L., Dickson-Deane, C., & Galyen, K. (2011). e-Learning, online learning, and distance learning environments: Are they the same? The Internet and Higher Education, 14(2), 129–135.
11. Huynh, V. D. B., Nguyen, P. T., Nguyen, Q., & Vu, N. B. (2020). E-learning evolution and development from the perspectives of technology, education, and economy. Research in World Economy, 11(1), 11–19.