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Decadal Research Productivity on Oral Leukoplakia: A Bibliometric Study

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Abstract

Oral cancer is a premalignant stage of Squamous cell carcinoma but treatable if detected in early stage. India is having a large number of cases of Oral Leukoplakia in the world but lack of awareness of early symptoms may leads to terrible outcomes. The purpose of the study is to assess and analyze the research productivity for an oral disease 'Oral Leukoplakia' from 2013 -2022 using bibliometric methods. Data for the study has been extracted from the renowned indexing and abstracting database 'Scopus'. The data is limited to only Scopus database, which may not capture all relevant publications. To analyze the data percentage and frequencies of each category is calculated and descriptive statistics are used to summarize the findings. The findings, however, offer valuable insights into the current research landscape of oral leukoplakia, identifying areas for further exploration. Practical implications of this research lie in fostering awareness and collaboration among researchers, institutions, and countries, ultimately contributing to improved understanding and management of oral leukoplakia. The study's originality lies in its bibliometric approach, providing a quantitative analysis of the research output and impact in the specified period.

Keywords: Oral Leukoplakia, Oral Cancer, Leukoplakia, Research Output, Bibliometrics, Scopus

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INTRODUCTION

In the last few decades' different kinds of cancer has become the routine disease which leads to big counts of death irrespective of age. "According to the Global Cancer Observatory (GLOBOCAN) estimates, there were 19.3 million incident cancer cases worldwide for the year 2020. India ranking with third after China and the United States of America. GLOBOCAN predicted that cancer cases in India would increase to 2.08 million, accounting for a rise of 57.5 per cent in 2040 from 2020" (Sathish Kumar et.al. 2022).

Oral cancer is among the top three types, with India being the Oral cancer capital of the world. Many people are losing their lives every hour in India due to oral cancer. "In India, around 77,000 new cases and 52,000 deaths are reported annually, which is approximately one-fourth of global incidences. The increasing cases of oral cancer has remained a paramount concern to community health as it is one of the most prominent type of cancer in India. As compared to the west, the concern of oral cancer is significantly higher in India as about 70% of the cases is reported in the advanced stages (American Joint Committee on Cancer, Stage III-IV). Because of detection in the late phase, the chances of cure are very low, almost negative; leaving five-year survival rates around 20% only" (Borse, Konwar & Buragohain, 2020). Thus, less awareness regarding symptoms of early stage of oral cancer is considered the main cause for detection at later stage. Most of the cancers are detected at later stages when the outcome of treatment is poor. Early detection and screening could restrict transformation to malignant condition.

According to Aggarwal & Bhateja (2018) "Leukoplakia is derived from the Greek word- Leucos meaning white and Plakiameans patch. The term leukoplakia is used to denote a white lesion that is precancerous. A white patch or plaque that cannot be characterized clinically or pathologically as any other disease". According to WHO, Leukoplakia is "a predominantly white patch or plaque that cannot be characterized clinically or pathologically as any other disorder, it carries an increased risk of cancer development either in or close to the area of the leukoplakia or elsewhere in the oral cavity or the head-and-neck region" Van (2015).

Here's a more concise and academically structured version of your paragraph:
It is important to note that the definition of oral Leukoplakia proposed by the World Health Organization (WHO) has undergone several modifications over time. According to Abidullah et al. (2014), WHO first defined leukoplakia in 1978 as "a white patch on the oral mucosa that cannot be scraped off and cannot be classified as any other diagnosable disease." In 1984, the definition was revised to specify that oral leukoplakia is not associated with any physical or chemical causative agent other than tobacco use. Subsequently, in 1986, WHO defined oral Leukoplakia as "a predominantly white lesion of the oral mucosa that cannot be characterized as any other definable disease?" The most recent modification, introduced in 2005, described Leukoplakia as "a white plaque of questionable risk, having excluded other known diseases or disorders that do not carry an increased risk for cancer." In the same study he further reported that oral Leukoplakia commonly occurs on the lips, buccal mucosa, gingiva, and tongue. The site of occurrence varies according to tobacco consumption habits. For instance, among beedi smokers, lesions are more frequently observed on the anterior buccal mucosa, whereas in tobacco chewers, they are more commonly found on the posterior buccal mucosa.

To know the trend, growth and impact of this field, bibliometric analysis is considered as an effective metrics so, in this paper effort has been made to provide an overview of research in this area by assessing research productivity, analyzing citations patterns, distribution of subjects etc. in this field.

OBJECTIVES

- To identify various publication on oral Leukoplakia from 2013-2022
- To know the total research output on oral Leukoplakia and assess the year wise productivity from 2013-2022
- To identify the distribution of subjects and top preferred subjects for publications
- Exploring most preferred sources of publications with most prolific authors
- To reflect the specific countries and institutions that contributed highest literature on oral Leukoplakia

METHODOLOGY

This study adopted a quantitative, descriptive bibliometric research design to analyse publications trends, country and institutional contributions etc. based on research output on Oral Leukoplakia indexed in a bibliographic and citation database. For thes study Scopus database is used as data collection tool. This is a renowned database for peer-reviewed literature. The Scopus database was selected as the primary data source due to its wide coverage of medical and dental journals.

For this purpose, data was extracted in June, 2023 using the string (TITLE-ABS-KEY (Leukoplakia) AND PUBYEAR > 2012 AND PUBYEAR < 2023). As a result, 3160 publications appeared on Lleukoplakia. The retrieved data was exported to Microsoft Excel for analysis. To summarize, the data percentage and frequencies of each category is calculated to reflect the specific countries, institutions, sources, authors etc. That contributed the highest literature. The study is limited to the publications indexed in this database only.

LITERATURE REVIEW

Dol, J. et al. (2024) analyzed the research trends on perinatal depression between 1920 and 2020 using WoS database. Parmar, S. et al. (2022) studied the research productivity of oral submucous fibrosis and detailed the total impact of research publication, collaborations, prolific authors & institutions. Sengupta, N et al. (2020) analyzed hundred highly cited papers on dental stem cells up to 2019 using science citation index-expanded tool of Scopus database. Citation pattern, most preferred journals, highly contributing countries and organizations were discussed. Patil, M et al. (2020) studied the publications on Leukoplakia produced from Central India through Web of Science database. Total productivity, citation pattern, highly contributed authors, national and international collaboration was well discussed in the study. Liu, et al. (2019) identified the 100 most cited articles on Oral Leukoplakia using Scopus database. The found the citation pattern, preferred sources of publications, prolific authors and highly contributing countries and institutions. Foy, J.P M et al. (2018) conducted a bibliometric analysis of articles and reviews on oral erythroplakia and leukoplakia up to 2016 using the SCOPUS database. They analyzed the authorship pattern, topmost sources of publications and contributing countries and suggested to encourage international collaboration. Some other studies of Dinesh Kumari (2023) and Mahindru etc. (2023) were also consulted for interpreting and analysis of data.

DATA ANALYSIS AND INTERPRETATIONS

Yearly distribution of publications and citations

Table 1 describes the yearly data on citations and publications from 2013 to 2022. The average citations per paper (ACPP) provide insights into the impact of each paper. The ACPP ranged from 29.02 to 35.51 that changes over the years, but the overall ACPP showed a positive development. Analyzing the data, several trends can be observed. The number of publications shows some variations during the study period, ranging from as low as 233 in 2013 to as high as 436 in 2021. The percentage of total publications indicates a positive growth during this time period. The total number of citations (TC) also fluctuates, with the lowest value of 8273 in 2013 and the highest value of 14577 in 2021. The data reflects that number of papers and citations has varied over the years, but there has been a general upward trend in the percentage of total publications and citations. The average number of citations per paper is calculated by dividing the total number of citations by the total number of papers.

Table 1: Research output and citation pattern.

Year	TP	%	TC	%	ACPP
2013	233	7.37	8273	8.01	35.51
2014	274	8.67	8353	8.09	30.49
2015	315	9.97	9142	8.86	29.02
2016	268	8.48	9219	8.93	34.40
2017	291	9.21	8995	8.71	30.91
2018	264	8.35	8853	8.58	33.53
2019	337	10.66	10023	9.71	29.74
2020	346	10.95	12005	11.63	34.70
2021	436	13.80	14577	14.12	33.43
2022	396	12.53	13781	13.35	34.80
Total	3160	100.00	103221	100.00	32.66

(TP=Total Publications; TC=Total Citations; ACPP=Average Citations Per Paper).

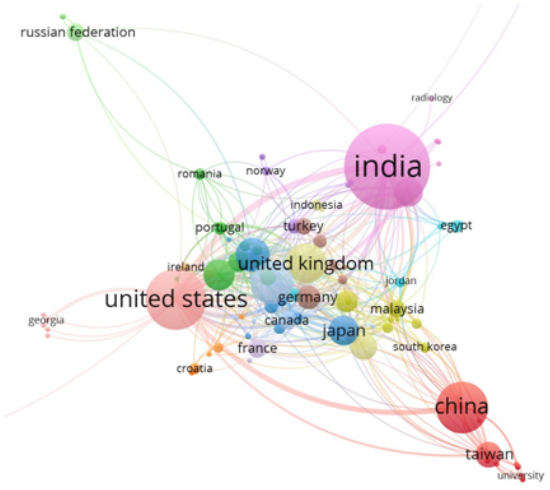


Figure 1: Top contributing countries.

Subject wise distribution of papers

This table illustrates subject wise share of papers during the study period based on a total of 4631 observations (N=4631). Highest number of publications was produced in the Medicine, accounting for 2458 which represents 53.08 % of the total. Dentistry follows with 854 (18.44%) and Biochemistry, Genetics and Molecular Biology have 807 publications, accounting for 17.43%. Similarly, Computer Science is at tenth position with 42 (0.91%) publications. The number of total publications in subject category is more than to the total number of publications as in Scopus subject classification some journals are indexed in more than one subject category. The table provides an overview of the subject classification of the publications, indicating the prevalence of Medicine and Dentistry as the most represented subject areas.

Table 2: Preferred subjects for publications.

Subject	TP	% (N=4631)
Medicine	2458	53.08
Dentistry	854	18.44
Biochemistry, Genetics and Molecular Biology	807	17.43
Pharmacology, Toxicology and Pharmaceutics	159	3.43
Immunology and Microbiology	98	2.12
Health Professions	60	1.30
Nursing	56	1.21
Chemical Engineering	54	1.17
Multidisciplinary	43	0.93
Computer Science	42	0.91
Total	4631	100.00

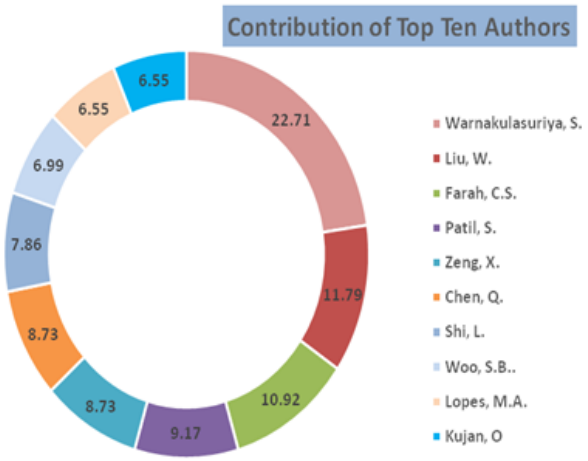


Figure 2: Top contributing authors.

Highly Productive Countries

The table demonstrates data of top contributed countries on this area during the study period. India contributed the highest publication with 809, accounting for 25.60% of the total publications. The USA followed with 520, representing 16.46% of the total. China secured third with 397 (12.56%) of the total.

These three countries produced more than 50% of total publications collectively which indicates their prominence in the publications, while the other countries have relatively lower TPs. Rest top countries are highlighted in the table with their corresponding publications. This table shows that these top ten countries produced 85.19% of total publications.

Table 3: Top ten countries in terms of publications on Leukoplakia.

Country	TP	% (N=3160)
India	809	25.60
USA	520	16.46
China	397	12.56
UK	195	6.17
Brazil	191	6.04
Italy	152	4.81
Japan	125	3.96
Spain	120	3.80
Germany	93	2.94
Saudi Arabia	90	2.85
Total	2692	85.19

Type of source preferred for publications

The table presents the source wise distribution of publications on 'Oral Leukoplakia'. The table highlights that journals are the most preferred source of authors for publication on this subject with 3070 (97.15%) publications followed by 'Book' with 49 (1.55%) output, 'Conference Proceedings' with 18 (0.57%) and Book Series with 09 (0.28%). Nine (09) publications are observed in unidentified category.

Table 4: Source type for publication of papers.

Source	TP	%
Journal Articles	3070	97.15
Book	49	1.55
Conference Proceeding	18	0.57
Book Series	14	0.44
Unidentified	9	0.28
Total	3160	100.00

Preferred source for publications on Leukoplakia

This table provides an overview of the distribution of publications across various Oral and Medicine journals. Among top ten sources 'Journal of Oral Pathology and Medicine' have the highest number of publications with 100 (3.16%) papers. 'Oral Oncology' and 'Oral Diseases' have produced equal 91 (2.88%) papers during the study period on 'Oral Leukoplakia'. A total of 559 (17.69%) publications of total publications (3160) are contributed by these top ten sources. All these sources are highlighted in the below table with their corresponding value.

Table 5: Top ten sources preferred for publications.

Source	TP	% (N=3160)
"Journal of Oral Pathology and Medicine"	100	3.16
"Oral Oncology"	91	2.88
'Oral Diseases"	91	2.88
"Journal of Oral and Maxillofacial Pathology"	52	1.65
"Medicina Oral Patologia Oral Y Cirugia Bucal"	42	1.33
"Oral Surgery Oral Medicine Oral Pathology and Oral Radiology"	40	1.27
"Journal of Clinical and Diagnostic Research"	37	1.17
"Indian Journal of Public Health Research and Development"	37	1.17
"Journal of Indian Academy of Oral Medicine and Radiology"	36	1.14
Journal of Voice	33	1.04
Total	559	17.69

Institutional contribution on Leukoplakia

The Table presents the number of publications (TP) and their percentage (%) for several institutions. "Saveetha Dental College and Hospitals" and "Saveetha Institute of Medical and Technical Sciences" have the highest TP with 73 and 65 publications, respectively. King's College of London contributed 57 publications followed by Shanghai Jiao Tong University School of Medicine with 56 publications. The remaining top institutions contribute to a total of 246 publications, comprising 7.78% of the total. All top ten institutes contribute 15.73 % of total publications.

Table 6: Top Institutional Contribution.

Institution	TP	% (N=3160)
Saveetha Dental College and Hospitals	73	2.31
Saveetha Institute of Medical and Technical Sciences	65	2.06
King's College London	57	1.80
Shanghai Jiao Tong University School of Medicine	56	1.77
Shanghai Ninth People's Hospital, Shanghai JiaoTong University School of Medicine	49	1.55
Universidade de São Paulo	48	1.52
Sichuan University	42	1.33
West China School/Hospital of Stomatology Sichuan University	37	1.17
Sree Balaji Dental College & amp; Hospital (SBDCH)	36	1.14
Chinese Academy of Medical Sciences & Peking Union Medical College	34	1.08
Total	497	15.73

Table 7: Most Prolific Authors.

Author	TP(N=3160)	%(N=3160)	%(N=229)
Warnakulasuriya, S.	52	1.65	22.71
Liu, W.	27	0.85	11.79
Farah, C. S.	25	0.79	10.92
Patil, S.	21	0.66	9.17
Zeng, X.	20	0.63	8.73
Chen, Q.	20	0.63	8.73
Shi, L.	18	0.57	7.86
Woo, S. B.	16	0.51	6.99
Lopes, M. A.	15	0.47	6.55
Kujan, O.	15	0.47	6.55
Total	229	7.25	100.00

Top ten prolific authors

Table presents the total papers (TP) and percentage (%) contributions by various authors during the during the period under study. It shows the top ten productive authors with their publications. The author Warnakulasuriya, S. contributed highest number of publications (52), accounting for 1.65% of total followed by Liu, W. with 27 (0.85%) publications. This table shows that overall these top ten authors contributed approximately 7.25% of the total publications.

Authorship pattern of publications on Oral Leukoplakia

Table 8 shows the authorship pattern during 2013-22. The table shows a trend of increasing research paper publications over the years. Papers with multiple authors (e.g., three to six authors) are the most common types of papers published across the years. The number of papers with “More than 6" authors have increased over the years, indicating a trend of collaboration and multi-authorship in research 2019, 2020, and 2021 appear to be the years with the highest number of papers published.

Table 8: Authorship pattern of publications .

Year	Authorship Pattern(No. of Authors)									
	No Author	One	Two	Three	Four	Five	Six	>6	Total	CI
2013	0	15	46	34	36	28	29	45	233	4.21
2014	4	17	41	33	46	43	32	58	274	5.13
2015	3	13	34	53	47	45	51	69	315	6.19
2016	2	09	37	41	42	31	41	65	268	5.28
2017	02	15	30	37	37	50	43	76	290	5.90
2018	01	15	29	29	45	40	33	72	264	5.33
2019	0	23	44	44	44	49	52	81	337	6.62
2020	02	14	32	59	36	56	59	88	346	7.08
2021	02	15	42	56	57	60	71	134	437	9.27
2022	03	12	30	53	56	67	60	115	396	8.39
Total	19	148	365	439	446	469	471	803	3160	63.39

CI: The “CI" column gives the cumulative index, which shows the total number of papers published up to that specific year. It indicates a steady growth in research output over the years.

CONCLUSION

The study shows the bibliometric analysis of 3160 publications on oral leukoplakia that shows that number of papers and citations has varied over the years, but there has been a general upward trend in the percentage of total publications and citations. Subject wise distribution reveals that the highest number of publications is produced in the Medicine, accounting for 2458 followed by Dentistry with 854 publications. The country wise analysis demonstrate that India contributed the highest publication with 809, accounting for 25.60% of the total publications followed by USA with 520. This shows that developing countries are dominating in this field over the developed countries. The study reveals that the majority of publications published on the Oral Leukoplakia were journal articles (97.15%) followed by book chapters (1.55 %). Journal of Oral Pathology and Medicine is the most preferred source on this subject and Saveetha Dental College and Hospitals contribute maximum publications (73) in this field. Among the top contributing authors Warnakulasuriya, S. is on top with 52 publications on this subject during the study. The present study reflects the dominance of multiple authors' publications in the authorship pattern.

USEFULNESS/IMPLICATION

The finding of this study provides an overview on oral leukoplakia research from 2013-2022. The study highlights the distribution of subject, most productive authors, sources , countries and institutions in this area. These findings provide a comprehensive roadmap for researchers to identify influential collaborators, high-impact journals, countries, institutions and emerging regional hubs within the intersection of Oral Leukoplakia studies. The study highlights that universities & research institutes are the primary drivers of progress in this domain. The governments can collaborate with these institutes for advancement in this field. The study contributes to the understanding of the current state of knowledge in this field and highlights trending areas for further research and collaboration.

Disclosure statement

The authors declare no conflict of interest.

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The research received no external funding.

Data availability

We affirm that the data supporting the findings of this study are available within the manuscript and/or supplementary materials. Any additional data or materials required for verifying the study's findings can be made available upon reasonable request.

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