

Scientometric Profile of Dentistry, Oral Surgery & Medicine Research in India with reference to Web of Science (WoS) citation database during 2007 -2016

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ABSTRACT

Objective: This study analyzes the research activities of India in Dentistry, Oral Surgery & Medicine Research during 2007–2016, based on the total publication output, its growth rate, quality of papers published and rank of India in the global context. Patterns of international collaborative research output and the major partner countries of India are also discussed. This study also evaluates the research performance of different types of research institutes, universities and research foundations and the characteristics of published literature in Indian and foreign journals. It also analyzes the medical research output by disease and organs. **Materials and Methods:** The publication data on Dentistry, Oral Surgery & Medicine has been retrieved by using Web of Science (WoS) database. **Results:** total number of 2934 publications as indexed in web of science database during 2007-2016. The results show that there insignificant growth in Dentistry, Oral Surgery & Medicine literature published from India. It may be researcher, institutions or India's collaboration with other countries, in all aspects considerable growth can be observed **Conclusion:** High quality research in India is grossly inadequate and requires strategic planning, investment and resource support. There is also a need to improve the existing dental education system, which should foster research culture.

Keywords: Scientometrics Dentistry, Oral Surgery & Medicine Research, India, publication output.

INTRODUCTION

The dentist assumes an important position in the health-care system because he alone can diagnose, intercept, treat, cure or prevent any disease or abnormality of the oral cavity. The primary job of dentist is to educate and motivate the patients to maintain oral hygiene because most of the dental & periodontal diseases are caused by poor oral hygiene.

There are various branches of dentistry in developed nations. The prominent ones are— Orthodontics, Periodontics, Pedodontics, Prosthodontics, Endodontics, Oral and Maxillo- facial Surgery, Cosmetic & Esthetic Dentistry, Oral Pathology, Forensic Dentistry, Oral Medicine, Crown & Bridge Dentistry, Preventive Dentistry, Operative Dentistry, Implant Dentistry, Community Dentistry.

But in India one may specialize only in the following branches by doing MDS after BDS: (i) Orthodontics: A specialized branch of dentistry that corrects malocclusion and restores the teeth to proper alignment and function with the help of different types of appliances, which may be removable or fixed, (ii) Periodontics: The branch of dentistry that deals with diseases of supporting structures of the teeth, including the gums, and bones, (iii) Pedodontics and Preventive Dentistry: is concerned with dentistry related to dental problems in children with their prevention. It involves application of all measures, which can effectively be used to prevent, intercept, control the progressive advance of already existing dental abnormalities and to promote optimum oral & general health through education, (iv) Prosthodontics: A specialty of dentistry that involves diagnosis, treatment planning, and fabrication of artificial parts to replace missing teeth and their associated structures, (v) Operative Dentistry and Endodontics: Operative Dentistry deals with the defects of teeth such as abrasion, erosion, attrition, dental caries, hypoplasia, and discoloration. Endodontics deals with injuries or diseases of the pulp or nerves of the tooth by treating them with Root Canal Therapy (RCT). It is estimated that today's general dentist spends 60–80% of his time dealing with such defects; (vi) Oral and Maxillofacial Surgery: is concerned with the extraction of the teeth, surgery of the oral structures, injuries, deformities of the teeth, jaws, and associated structures, (vii) Oral Pathology: deals with the pathology of the oral cavity. It analyzes the oral tissue samples, salivary secretions, and other related structures to identify causes of oral diseases, (viii) Oral medicine: deals with the medicines used in dental practice, and (ix) Community Dentistry: The science & art of preventing and controlling dental diseases and promoting dental health through organized community effects. It is concerned with dental health education of public with the help of dental health programs & researches. (Eghbal et al., 2012 [1]).

India has about 260 dental colleges with a workforce of more than 11000 teaching faculty, an intake of more than 1750 postgraduate students per year and produces approximately 17000 dental graduates per year to cater to the dental needs of the population. Some colleges offer both B.D.S. and M.D.S. courses while other only either of the two. Apart from graduate and postgraduate courses, some institutes also offer diploma courses of 2 years in dental hygiene and dental mechanics. Dental schools in India fall into one of three major categories: (a) governmental dental schools as a part of governmental supported university system, (b) private dental school affiliated with a government funded university, and (c) private dental school as a part of private university.

The first dental colleges and hospitals in India were opened in 1883. Dr. Rafuddin Ahmed established the first official, fully functional, autonomous dental institution in Calcutta in 1920. This institution offered a diploma of licentiate in dental science (L.D.Sc.) upon successful completion of a two-year program. In 1926, the duration of the institution's program of study increased to 3 years for the L.D.Sc. and to a 4-year program for a bachelor of dental surgery degree (B.D.S.) in 1935. The Indian Dental Association was founded immediately after India gained independence in 1947. The Dental Council of India (DCI) was established as a result of the Dentist Act of 1948, which was intended to regulate dental practice and promote scientific advances. DCI is still the premier governing body of dental education in India. Its responsibilities include the regulation of dental education, profession, and ethics and liaising with the government to obtain administrative approval for dental college and higher educational courses. (Kaur & Gupta, 2010, [2]).

Dentist can also be involved in researches like finding out the correlation between oral diseases and heart problems, diabetes, and respiratory ailments, causes of oral cancer, etc. Another area of research could be the synthesis and analysis of new dental materials for oral applications or electrical stimulation of the muscles of mastication. One of the most Important requirements of the dental profession is that as a dentist, you keep yourself constantly updated with the latest technologies, treatment methods and materials.

Thus India has a great potential to contribute to dental research. Despite this huge number of patients and dental workforce, our representation in dental research committees and peer reviewed indexed dental literature is negligible. (Gupta and Drawn 2008; Wale et al. 2007; Gupta and Drawn 2005; Kaur and Gupta; 2009; Gupta 2010).

1. OBJECTIVES

The main focus of the study is: (i) to analyze the year wise growth of Indian literature on Dentistry, Oral Surgery & Medicine (ii) to analyze bibliographic Forms types in Dentistry, Oral Surgery & Medicine; (iii) to analyze the preferred languages; (iv) to analyze the productivity and quality of 15 major institutions participating in research in dental sciences; (iv) to analyze the pattern of research collaboration and major collaborating partners in dental sciences; and (v) to analyze the productivity and quality of leading 15 authors in research in dental sciences.

2. RELATED STUDY

Only few scientometrics studies are undertaken in the field of Dentistry, Oral Surgery & Medicine in India. Among such studies (Shamim, 2017[3]) studied Bibliometric and scientometric information regarding the trends in dental science articles in medical journals from India is evident in the literature. More recently, the publication trends of oral pathology articles published in a pathology journal from Iran were reported. This study aimed to audit the dental science articles published in 62 issues of The Iranian Journal of Medical Sciences (IJMS) from 2002 to 2015 over a 14-year period. (Kaur & Gupta, 2010[2]) observed the study examines India's performance based on its publication output in dental sciences during 1999–2008, based on several parameters, including the country annual average growth rate, global publication share & rank among 25 most productive countries of the world, national publication output and impact in terms of average citations per paper, international collaboration output and share and contribution of major collaborative partners, contribution and impact of select top 25 Indian institutions and select top 15 most productive authors, patterns of communication in national and international journals and characteristics of its 45 high cited papers. The study uses 10 years (1999– 2008) publications data in dental sciences of India and other countries drawn from Scopus international multidisciplinary bibliographical database. (Eghbal et al., 2012 [1]). have highlighted study on Iran's 20-year prospective national vision document, Iran may be seen as the most developed country in science and technology in the region by 2025. In this report, bibliometric indicators are used to compare the research productivity in endodontics between Iran and 28 selected Asian countries.

3. MATERIALS AND METHODS

This study based on Indian publication data in Dentistry, Oral Surgery & Medicine, retrieved from the Clarivate analytics Web of Science (WoS), Science citation database for the 10 years (2007-2016). Search string used for the data retrieval is SU=(Dentistry, Oral Surgery & Medicine) Refined by Countries/Territories: India AND Timespan=2007-2016. Databases=SCI-EXPANDED, this search criteria yielded 2934 records. The citations received by papers are considered. The institutional performance was measured on the number of quantitative and qualitative indicators, such as the number of papers, average citation per paper (ACPP), h-index (HI) and share of international collaborative papers (ICP) and share of high cited papers (HCP). It is based on the highest number of papers included that have had at least the same number of citations.

4. RESULTS AND DISCUSSION

4.1. Growth of India's Dentistry, Oral Surgery & Medicine publications output from 2007 to 2016

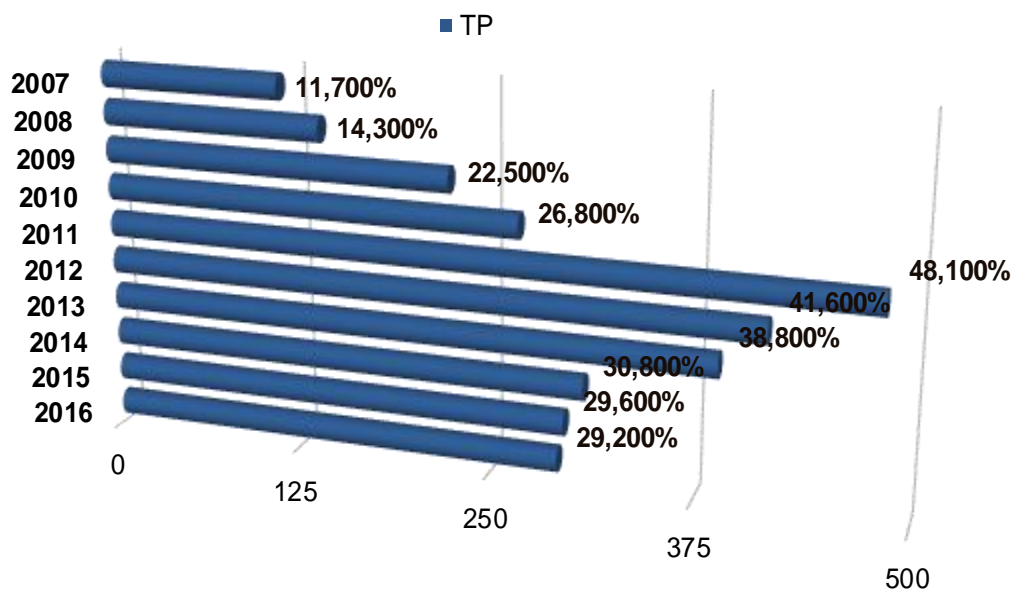
Table:1. Year wise Growth rate of India's Dentistry, Oral Surgery & Medicine publications output

Year	TP	TC	ACP	H Index
2007	117	1443	12.33%	20
2008	143	1851	12.94%	25
2009	225	1951	8.67%	22
2010	268	2166	8.08%	22
2011	481	2346	4.88%	21
2012	416	2081	5%	18
2013	388	1499	3.86%	16
2014	308	1029	3.34%	14
2015	296	619	2.09%	10
2016	292	210	0.72%	6

TP=Total Publications, TC=Total Citations, ACP=Average citations per Year and h - Index

Figure 1. 3D Scene Chart representing Growth rate of publications in Dentistry

Growth of Dentistry, Oral Surgery & Medicine Research Output



The present study revealed that 2934 papers were published during the period 2007 - 2016 and growth of publications is furnished in Table - 1. It has been observed that during the 2007 - 2016. It is found from table 1 that Highest number of publications 481 (48.100%) were produced in the year 2011. It is followed by 412 (41.600%) in the year of 2012, and lowest publications 117 (11.700%) were published in the year of 2007. While during the period of 2007 to 2011 there steady growth in the research publications and h - index also a close watch on the publications revealed that during the period, there is a declining trend on equine research as the number of publications is slowly decreasing as the number of publications during 2013 to 2016. The declining trend needs to be taken care of by the stakeholders of equine research.

4.2. Bibliographic forms of India’s Dentistry, Oral Surgery & Medicin

Table. 2. Bibliographic forms of India’s Dentistry, Oral Surgery & Medicine

Document Types	Records	% of 2934
Article	2248	15.623
Letter	258	1.793
Review	194	1.348
Meeting abstract	174	1.209
Editorial material	53	0.368
Proceedings paper	22	0.153
Correction	7	0.049
Retracted publication	2	0.014

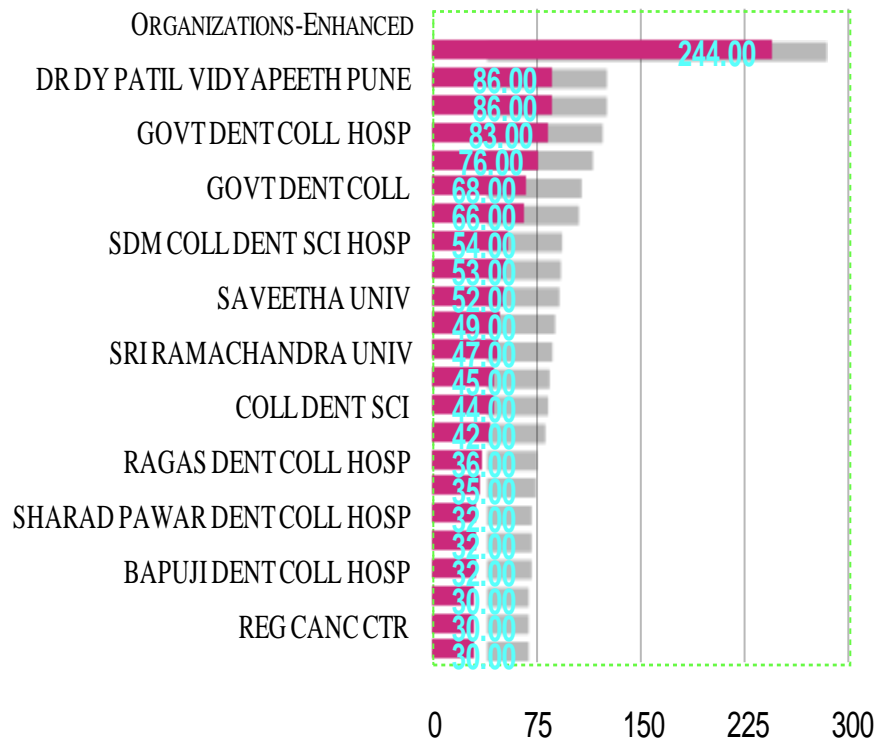
Figure 2 gives an idea about publications which published in different type of Bibliographic forms documents found in the collected records. It is evidence that the journal is the most preferred medium of all the forms, of the total research literature output in Dentistry, Oral Surgery & medicine, 76% is in the form of articles followed by Letters 9% , Reviews 1.348%, Meeting abstract 1.209%, Proceedings papers 0.153% , Corrections 0.49% and lastly retracted publications 0.014%.

4.3. Preferred from language wise in Dentistry, Oral Surgery & Medicine

The study found that English is the preferred language by the authors of equine research to publish their research papers as 99.93% (2932) were published in English language and followed by Portuguese 0.069% (02). The only two languages preferred by the authors.

4.4. Indian Institutional wise research output

Fig.: 2; Indian Institutional wise research output



Based on publications output data for India in Dentistry, Oral Surgery & Medicine , a total of 25 institutions were identified as high productive ones published. These top 25 institutions together contributed 1352 in the total research output by India in Dentistry, Oral Surgery & Medicine. These institutions along with their publications output are: maniple university (244 papers), Dr DY Patel Vidayapeeth, Pune, All India Institute of Medical Sciences (86 papers), Government Dental college and Hospital Bangalore (83 papers), Government Dental college and Research Institute (76 papers), Government Dental College (68 papers), Tata memorial Hospital Mumbai (66 papers), SDM College of Dental Science and Hospital, Dharwad (54 papers), Amrita Vishwa Vidyapeetham University (53 papers), Saveetha University (52 papers), Maulana Azad memorial Institute of Dental Science, New Delhi (49 papers), Sri Ramachandra University University (47 papers), PGIMER Chandhigrah (45 papers), College of Dental Science, Davanagere (44 papers), AB Shetty Memorial Institute of Dental Science Mangalore (42 papers), Ragas Dental College and Hospital Chennai (36 papers) and remaining 7 institutions were produced 221 publications during the study period 2007 - 2016.

4.5. India's author productivity and quality profile

Table.3. Rank with highly cited papers in research output of India's Dentistry, Oral Surgery & Medicine

Rank with Citations	Titel	Authors	Source	Vol. Issue & Year
1 151	Smoking interferes with the prognosis of dental implant treatment: a systematic review and meta-analysis	Strietzel, FP; et al	Journal of clinical periodontology	34. 06. 2007
2 137	Pathogenesis of oral lichen planus - a review	Roopashree, MR; et al	Journal of oral pathology & medicine	39. 10. 2010
3 103	Efficacy of revascularization to induce apexification/apexogenesis in infected, nonvital, immature teeth: A pilot clinical study	Shah, N ; et al	Journal of endodontics	34. 08. 2008
4 94	Orthodontic pain: from causes to management - a review	Krishnan, V	European journal of orthodontics	29. 02. 2007
5 87	On a Path to Unfolding the Biological Mechanisms of Orthodontic Tooth Movement	Krishnan, V & Davidovitch, Z	Journal of dental research	88. 07.2009
6 77	Rote of tobacco smoking, chewing and alcohol drinking in the risk of oral cancer in Trivandrum, India: A nested case-control design using incident cancer cases	Muwonge, R ; et al	Oral oncology	44. 05. 2008
7 73	Corrosion behaviour of Ti-15Mo alloy for dental implant applications	Kumar, S ; et al	Journal of dentistry	36. 07. 2008
8 62	Effect of periodontal therapy on pregnancy outcome on women affected by periodontitis	Tarannum, F & Faizuddin, M	Journal of periodontology	78. 11. 2007
9 63	Clinical Effect of Subgingivally Delivered Simvastatin in the Treatment of Patients With Chronic Periodontitis: A Randomized Clinical Trial	Pradeep, AR & Thorat, MS	Journal of periodontology	81. 02. 2010

Table 3 depicts highly cited papers from India in Dentistry, Oral Surgery & Medicine published in various journals during 2007 - 2016. Most frequently cited one was "Smoking interferes with the prognosis of dental implant treatment: a systematic review and meta-analysis" with 151 citations written by Strietzel, FP; et al which published in Journal of Clinical Periodontology (2007), P Pathogenesis of oral lichen plans a review with 137 citations written by Roopashree M R and others which published in Journal of Oral Pathology and Medicine (2010), On a Path to Unfolding the Biological Mechanisms of Orthodontic Tooth Movement study with 103 citations written by She N and others which published in Journal of Endodontics (2008), Orthodontic pain: from causes to management - a review with 94 citations written by Krishna V which published in European Journal of Orthodontics (2007).

4.6 Research area wise distribution of publication.

Table: 4. Research Area wise research output in India's Dentistry, Oral Surgery & Medicine publications output

Table 4. Shows research area wise distributions of publications on Dentistry, Oral Surgery & Medicine published 2007 - 2016 according to Web of Science (WoS) database. As already discussed Dentistry, Oral Surgery & Medicine is playing significant role in many other domains like Oncology, Surgery and Pediatrics many more. Oncology top the list with 331 publications and it is also received; Surgery having 306 publications and Pediatrics having 262 publications.

4.7 Sources wise distribution of publication

Research Areas	Records	% of 2934
Dentistry oral surgery medicine	2934	20.391
Oncology	331	2.3
Surgery	306	2.127
Paediatrics	262	1.821
Radiology nuclear medicine medical imaging	62	0.431
Pathology	56	0.389
Geriatrics gerontology	48	0.334
Materials science	36	0.25
Public environmental occupational health	8	0.056
Engineering	7	0.049
Education educational research	7	0.049

Table: 5. Source wise research output in India's Dentistry, Oral Surgery & Medicine publications output

Source Titles	Records	% of 2934
Oral Oncology	331	2.3
Journal of Clinical Paediatric Dentistry	202	1.404
Journal of Oral and Maxillofacial Surgery	153	1.063
International Journal of Oral and Maxillofacial Surgery	115	0.799
Journal of Periodontology	110	0.764
British Journal of Oral Maxillofacial Surgery	109	0.758
Oral Surgery Oral Medicine Oral Pathology Oral Radiology	103	0.716
• Journal of Endodontics	100	0.695
• Oral Health Preventive Dentistry	98	0.681
• Oral Surgery Oral Medicine Oral Pathology Oral Radiology and Endodontology	85	0.591
Journal of prosthodontics implant esthetic and reconstructive dentistry	84	0.584
Quintessence international	68	0.473
American journal of orthodontics and dentofacial orthopedics	65	0.452
Dentomaxillofacial radiology	62	0.431
Journal of oral pathology medicine	56	0.389
Journal of prosthetic dentistry	51	0.354
Journal of oral implantology	50	0.347
Oral diseases	49	0.341
Gerodontology	48	0.334
Medicina oral patologia oral y cirugia bucal	47	0.327
Dental traumatology	46	0.32
Journal of cranio maxillofacial surgery	44	0.306
Angle orthodontist	44	0.306

Journals are main source for publishing research work. Table 3 shows top 23 Journals which published papers on India's Dentistry, Oral Surgery & Medicine during 2007 – 2016 as per Web of Science Citation database. Some journals are *Oral Oncology* 331 (2.3%), *Journal of Clinical Pediatric Dentistry* 202 (1.404%), *Journal of Oral and Maxillofacial Surgery* 153 (1.063%), *International Journal of Oral and Maxillofacial Surgery* 115 (0.799%), *Journal of Periodontology* 110 (0.764%), *British Journal of Oral Maxillofacial Surgery* 109 (0.758%) and lowest articles published in the journal 44 (0.306%) in *Journal of Cranio maxillofacial surgery*.

Findings

The findings of the present lead to the following concluding remarks. The Scientometric analysis of the India's Dentistry, Oral Surgery & Medicine from 2007 – 2016 for period of study. The journals has Finding of growth of publication of Dentistry, Oral Surgery & Medicine research output brings out the research paper published trend in increasing. The overall study period the highest percentage publication published in 2013.

Conclusion

Dentistry, Oral Surgery & Medicine plays a revolutionary part in Medical, present study is an overview of Dentistry, Oral Surgery & Medicine research in India during 2012-2016. For analyzing gathered data many scientometric techniques has been used. Assessment of research activity is very important get knowledge of present situation in that particular field. After analyzing total number of 2712 publications as indexed in web of science database during 2012-2016. The results show that there insignificant growth in Dentistry, Oral Surgery & Medicine literature published from India. It may be researcher, institutions or India's collaboration with other countries, in all aspects considerable growth can be observed.

Conclude that dental science research is in poor state of affairs in India, both in terms of output as well as in quality. Therefore, heavy investment is required in terms of R&D investment from the government to upgrade this field and increase the research output. The government should come out with special schemes to promote R&D in this area. In order to upgrade quality in research, increase in international collaboration and wider participation in international conferences/seminars may be encouraged for those who have involved in R&D work.

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