Original Article

PubMed-Indexed Dental Publications from Iran:
A Scientometric Study

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Abstract

Objectives: Scientometric methods and the resulting citations have been applied to investigate the scientific performance of a nation. The present study was designed to collect the statistical information of dental articles by Iranian authors published in PubMed.

Materials and Methods: We searched the PubMed database for dental articles of Iranian authors until June 31, 2015. All abstracts were manually reviewed in order to exclude false retrievals. The number of articles per dental subspecialties, distribution of research designs, Scopus/Google Scholar citation of each article, number of authors and affiliation of the first/corresponding author were extracted and transferred to Microsoft Excel. The data were further analyzed to illustrate the related scientometric indicators.

Results: A total of 3,835 articles were retrieved according to the selection criteria. The number of PubMed-indexed publications between 2008 and 2015 showed a seven-fold increase. The majority of articles were written by four authors (24.56%). Systematic reviews and clinical trials constituted 9.20% of all publications. The number and percentage of articles with ≥4 citations from Google Scholar (n=2024; 52.78%) were higher than those from Scopus (n=1015; 26.47%). According to affiliated departments of the first authors, the top three dental subspecialties with the highest number of publications belonged to endodontics (19.82%), orthodontics (11.13%) and oral and maxillofacial surgery (10.33%). Moreover, the majority of articles originated from Shahid Beheshti- (14.47%), Tehran- (13.72%) and Mashhad- (12.28%) University of Medical Sciences.

Conclusions: Analysis of PubMed-indexed dental publications originating from Iran revealed a growing trend in the recent years.

Keywords: Bibliometrics; Iran; Publications

INTRODUCTION

Iran is home to one of the world's oldest civilizations in Southern and Western Asia. The 18th-largest country in the world in terms of area at 1,648,195 km², Iran has a population of around 79 million [1].

While the publication of scientific results is the main aim of research activity, scientometric methods (the study of research output in the form of scientific articles) and the resulting citations have been applied to investigate the scientific performance of a nation [2]. Universal databases, which are being used in such studies include the Thomson-Reuter Institute of Scientific Information/Web of Science database (ISI), PubMed, Scopus and Google Scholar [3,4]. PubMed, as a trouble-free, fast and open database, has indexed ≥5,650 journals since 1950 and has become one of the most reliable web based resources for clinicians as well as researchers in biomedical/

dental sciences [5].

Biomedical/Dental research as the leading science has had great impact on researchers, health professionals and policy makers; these sciences weigh heavily on the measurements of national competitiveness [6]. Over the past 30 years, Iran has invested profoundly on its research infrastructure in many fields of science and technology i.e. medicine/dentistry/pharmacology, space sciences, nanotechnology, biotechnology and nuclear technology; in the new millennium, Iran has experienced a remarkable growth in the field of biomedical/dental research [7]. While less than 1% of Iran's Gross Domestic Product (GDP) was allocated to research until 2011, there is a national plan for increasing this to 3% by 2016.

The objective of the present study was to investigate the quantity as well as the quality of PubMed-indexed published dental articles originnated from Iran. The number of articles and contributors, patterns of research designs, most selected scientific journals for each subspecialty, research output of various scientific groups/ universities, characteristics of frequently cited papers and Scopus/Google Scholar citation for each subspecialty were evaluated.

MATERIALS AND METHODS

In order to access published articles by the Iranian authors in PubMed-indexed journals, a limited search of affiliations was conducted using the following keywords: dental OR endodont* OR orthodont* OR periodont* OR pedodont* OR prosthodont* OR oral OR dentistry. The next step was to search without limitations using the words Iran OR Iranian. Finally, using advanced search, the above results were combined and the articles that had been published by June 31, 2015 were extracted. The abstracts (and full texts where necessary) were reviewed, and articles in which at least one Iranian author from an Iranian university or institute had contributed were selected and then analyzed.

The following data were extracted from each article and transferred to Microsoft Excel: Year of publication, field of study, name of journal, affiliation of the first/corresponding author, number of authors, Scopus/Google Scholar citation and study design. The field of study of each article was determined twice, i.e. according to I) affiliated department of the first author and II) that of corresponding author. In case any of these were not available or were not relevant to the fields of dentistry, title and content of the article were used. Hence, all data that were affected by this grouping were also presented twice. No statistical analyses were performed.

RESULTS

From a total of 1,257,305 dental publications, 3,835 publications were included according to the selection criteria. Overall, the most frequent fields of study were endodontics and orthodontics, whilst the least frequent fields of study were dental materials, community oral health (COH) and oral radiology (Fig. 1A). It is worthy of mention that 124 and 262 studies were grouped as "unknown" considering the affiliation of the first author and corresponding author for grouping, respectively. This group consisted of studies that could not be categorized into one specific field (of study) based on the previously mentioned criteria. The aforementioned group was not shown in any of the relevant Figures or Tables.

The number of publications in each field was categorized according to the year of publication in the past 10 years (Table 1). The average growth in the number of dental publications indicated a positive trend; the results in relation to the number of dental publications in the field of endodontics indicated a decline from 2010 to 2011 (Fig. 1B). The publications in each field were presented according to the title of journal, and Table 2 shows the three journals with the highest number of publications in each field. The
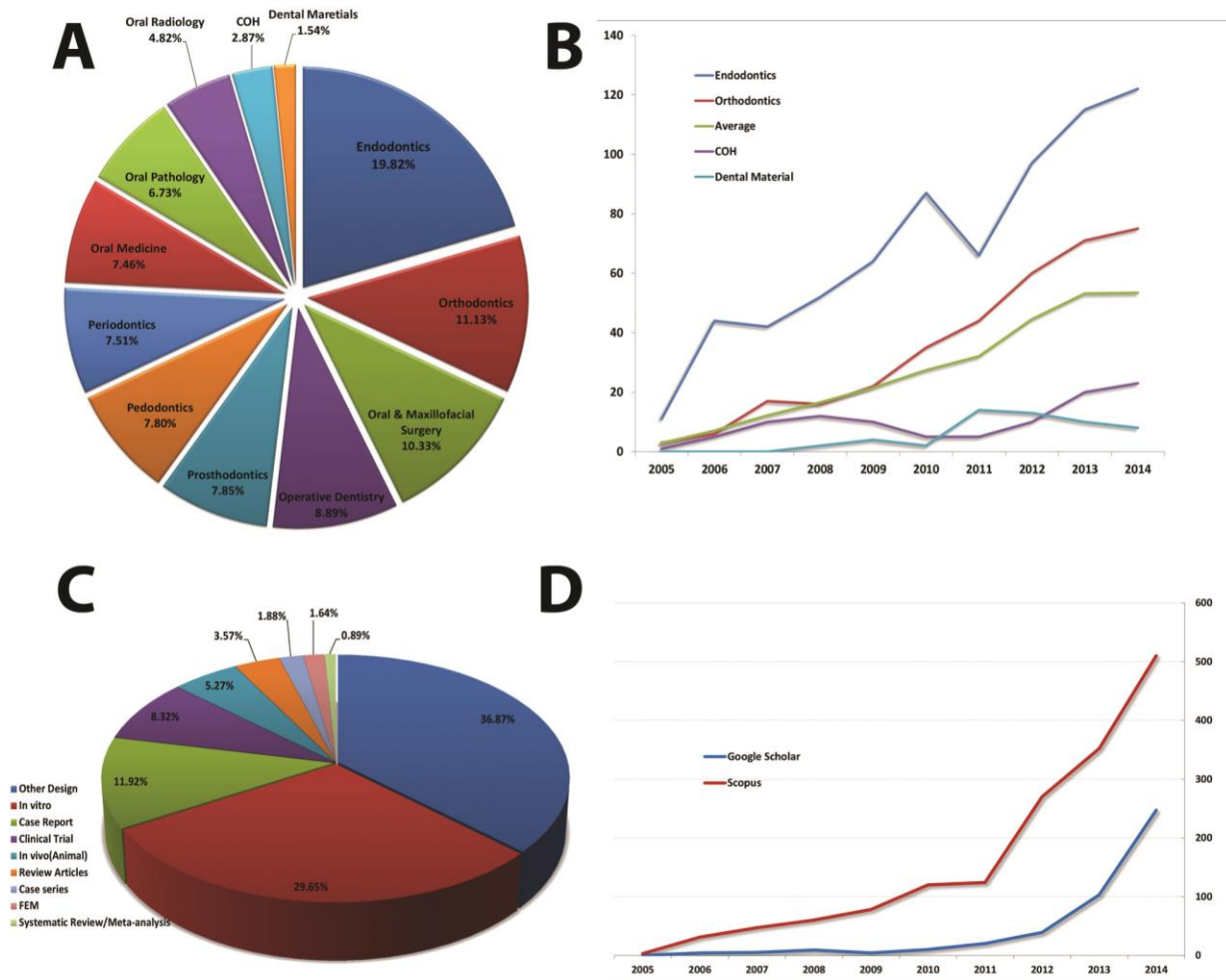
Fig. 1: **(A)** Distribution of articles according to related scientific group (based on the affiliation of the first author); **(B)** Trend of publications of four scientific groups as well as the average of all scientific groups (based on the affiliation of the first author); **(C)** Distribution of Iranian Dental articles according to research design; **(D)** The number and trend of articles with zero citation in Google Scholar and Scopus

Impact Factor (IF) of the journals in 2014 is also presented; "Iranian Endodontic Journal" and "Journal of Endodontics" had the highest number of articles and IF, respectively (Table 2).

Overall, the most frequent study design belonged to the 'others' group, which included letter to editor, epidemiological studies, descriptive studies, diagnostic accuracy studies, the introduction of a new method, health education, hypothesis and cross sectional studies; meta-analysis and systematic review studies were the least frequent study designs (Fig. 1C).

Table 3 presents the three articles with the highest number of citations according to Google Scholar in each subspecialty. The highest number

of citations was in the field of endodontics. Although no statistical analyses were performed. Table 4 shows the top 10 universities with the highest number of dental publications and their three most active scientific groups. The universities of Tehran, Shahid Beheshti and Mashhad had produced the highest number of dental publications amongst all medical universities in Iran.

The number of authors varied from one to 16; the majority of articles were written by four authors (Table 5). The number and percentage of citations of Iranian dental articles in Google Scholar and Scopus are presented in Table 6; Figure 1D shows a sharply increasing trend for

Table 1: Number of articles according to related scientific group in the recent 10 years

Subspecialty	Authors	R	N	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Endodontics	C	1	736	11	43	43	57	64	84	66	88	108	116
	F		760	11	44	42	52	64	87	66	97	115	122
Orthodontics	C	2	427	3	6	16	16	24	33	46	61	73	73
	F		427	3	6	17	16	22	35	44	60	71	75
Oral & Maxillofacial Surgery	C	4	319	7	3	11	18	24	29	26	42	53	49
	F	3	396	7	3	11	19	33	35	39	47	68	70
Operative Dentistry	C	3	329	3	4	11	9	24	29	37	50	63	72
	F	4	341	3	4	13	9	24	30	39	57	66	67
Prosthodontics	C	6	287	3	6	6	18	22	32	35	39	43	37
	F	5	301	4	6	6	18	26	34	31	42	48	39
Pedodontics	C	8	271	0	1	9	17	15	23	29	37	42	52
	F	6	299	0	1	9	18	15	22	41	40	50	57
Periodontics	C	9	263	1	6	10	13	11	20	23	61	50	45
	F	7	289	2	8	12	14	12	17	28	58	60	48
Oral Medicine	C	5	288	0	4	11	16	29	34	34	31	48	51
	F	8	286	0	4	12	17	26	35	30	37	45	48
Oral Pathology	C	7	280	1	2	7	8	13	16	28	42	57	64
	F	9	258	2	2	10	16	16	18	26	38	48	48
Oral Radiology	C	10	175	1	2	4	5	9	10	23	33	32	29
	F		185	1	2	4	6	6	9	22	35	37	36
Community Oral Health	C	11	119	1	5	10	11	11	3	10	11	21	26
	F		110	1	5	10	12	10	5	5	10	20	23
Dental Materials	C	12	79	0	0	2	1	4	4	18	15	17	10
	F		59	0	0	0	2	4	2	14	13	10	8

C= corresponding author, F= First author; R=Rank; N = Total Number of Articles

articles with no previous citations in Google Scholar and Scopus.

DISCUSSION
Scientometric markers are progressively used to assess the patterns of research performed by scientists/researchers, universities/institutes and countries [8]. Objective scientometric indices have been specified for such assessments during the previous six to seven decades. The application of scientometric techniques/rankings based on various indices has led to more inter-regional competition among the Europe and the United States, west and east and the forthcoming Asian countries [2,9]. Our results demonstrated that the number of PubMed-indexed dental publications originating from Iran had an increasing trend in the recent years. The past three decades have been marked by near constant tensions in the Middle East, including the imposed Iraq-Iran war, after which Iraq's scientific system progressively collapsed and not until recently has it displayed any signs of recovery.

In contrast, Iran has displayed one of the fastest growth rates in scientific production that the world has witnessed [10]. Iran has progressed successfully in its agenda to improve

Table 2: Three most selected Journals by scientific groups

Subspecialty	Authors	R	Scientific Journals							
				No.	IF		No.	IF		No.	IF
Endodontics	F	1	Iran Endod J	262	-	J Endod	70	3.37	Aust Endod J	41	0.58
	C			256			67			39	
Orthodontics	F	2	J Dent (Tehran)	47	-	Dent Res J (Isfahan)	43	-	Aust Orthod J	23	0.43
	C			48			39			22	
Oral & Maxillofacial Surgery	F	3	J Oral Maxillofac Surg	76	1.42	J Craniofac Surg	42	0.67	Oral Surg Oral Med Oral Pathol Oral Radiol	22	1.26
	C	4		72			41			21	
Operative Dentistry	F	4	Dent Res J (Isfahan)	43	-	J Contemp Dent Pract	37	-	J Dent (Tehran)	31	-
	C	3		42			40			34	
Prosthodontics	F	5	J Dent (Tehran)	37	-	J Dent Res Dent Clin Dent Prospects	27	-	J Prosthet Dent	26	1.75
	C	6		35			28				
Pedodontics	F	6	J Dent (Tehran)	43	-	J Dent Res Dent Clin Dent Prospects	39	-	Dent Res J (Isfahan)	21	-
	C	8		41			36			19	
Periodontics	F	7	J Dent (Tehran)	34	-	Dent Res J (Isfahan)	30	-	J Dent Res Dent Clin Dent Prospects	17	-
	C	9	Dent Res J (Isfahan)	31	-	J Dent (Tehran)	27	-		20	
Oral Medicine	F	8	J Dent Res Dent Clin Dent Prospects	46	-	Med Oral Patol Oral Cir Bucal	18	1.17	Dent Res J (Isfahan)	18	-
	C	5		49		Dent Res J (Isfahan)	19	-	Med Oral Patol Oral Cir Bucal	17	1.17
Oral Pathology	F	9	Dent Res J (Isfahan)	28	-	J Dent Res Dent Clin Dent Prospects	21	-	Asian Pac J Cancer Prev	19	2.51
	C	7		31			20			17	
Oral Radiology	F	10	Dent Res J (Isfahan)	28	-	J Dent Res Dent Clin Dent Prospects	21	-	Imaging Sci Dent	18	-
	C						23		Iran J Radiol	17	0.60
Community Oral Health	F	11	Oral Health Prev Dent	11	0.50	J Dent (Tehran)	6	-	Community Dent Oral Epidemiol	5	2.02
	C					East Mediterr Health J	9	-	J Dent (Tehran)	7	-
Dental Materials	F	12	J Endod	3	3.37	Int Endod J	3	2.97	Lasers Med Sci	3	2.48
	C		Int Endod J	4	2.97	Lasers Med Sci	4	2.48	Iran Endod J	4	-

C= corresponding author, F= First author; R=Rank; No= Number of published articles; IF= Journal's impact factor (2014)

its (inter) national profile in biomedical research by continuously increasing the quantity/quality of publications in peer reviewed scientific PubMed-indexed journals [7,11]. A recent study

Table 3: Three most cited articles in Google Scholar (GS) according to related scientific group

	Authors	R	First Ranked Article	GS	S	Second Ranked Article	GS	S	Third Ranked Article	GS	S
Endodontics	F / C	1	Mineral trioxide aggregate: a comprehensive literature review--Part I: chemical, physical, and antibacterial properties.	502	269	Oral pyogenic granuloma: a review.	329	111	Human saliva penetration of coronally unsealed obturated root canals.	322	146
Orthodontics	F / C	2 / 3	Effects of low-level He-Ne laser irradiation on the gene expression of IL-1beta, TNF-alpha, IFN-gamma, TGF-beta, bFGF, and PDGF in rat's gingiva.	145	84	Alveolar bone resorption and the center of resistance modification (3-D analysis by means of the finite element method).	108	51	Oral health in Iran.	104	36
Oral & Maxillofacial Surgery	F	3	Maxillofacial fractures in Hamedan province, Iran: a retrospective study (1987-2001).	142	53	Marrow-derived mesenchymal stem cells-directed bone regeneration in the dog mandible: a comparison between biphasic calcium phosphate and natural bone mineral.	103	51	Salivary gland tumors in an Iranian population: a retrospective study of 130 cases.	98	41
	C	4				Salivary gland tumors in an Iranian population: a retrospective study of 130 cases.	98	41	Keratocystic odontogenic tumor: a 10-year retrospective study of 83 cases in an Iranian population.	98	37
Periodontics	F	4	Sinus augmentation using human mesenchymal stem cells loaded into a beta-tricalcium phosphate/hydroxyapatite scaffold.	126	84	Treatment of severe physiologic gingival pigmentation with free gingival autograft.	111	36	Comparative evaluation of the effects of Nd:YAG and Er:YAG laser in dentin hypersensitivity treatment.	109	61
	C	6	Treatment of severe physiologic gingival pigmentation with free gingival autograft.	111	36	Effects of periodontal treatment phase I on birth term and birth weight.	76	39	Hyperlipidemia in patients with periodontitis.	67	30
Prosthodontics	F	5	An assessment of crown-to-root ratios with short sintered porous-surfaced implants supporting prostheses in partially edentulous patients.	119	53	Evaluation of "golden proportion" in individuals with an esthetic smile.	112	39	Flapless implant surgery: review of the literature and report of 2 cases with computer-guided surgical approach.	60	34
	C		Evaluation of "golden proportion" in individuals with an esthetic smile.	112	39	Flapless implant surgery: review of the literature and report of 2 cases with computer-guided surgical approach.	60	34	Computer-assisted implantology: historical background and potential outcomes-a review.	51	24

C= corresponding author, F= First author; R=Rank; S=SCOPUS

Table 3: Continued

	Authors	R	First Ranked Article	GS	S	Second Ranked Article	GS	S	Third Ranked Article	GS	S
Pedodontics	F	6	Comparison of zinc oxide and eugenol, and Vitapex for root canal treatment of necrotic primary teeth.	103	44	Induced in vitro differentiation of neural-like cells from human exfoliated deciduous teeth-derived stem cells.	67	35	Diagnosis and management of supernumerary (mesiodens): a review of the literature.	65	***
	C	7				Comparison of mineral trioxide aggregate and formocresol as pulp medicaments for pulpotomies in primary molars.	63	26	An epidemiological survey of the time and sequence of eruption of permanent teeth in 4-15-year-olds in Tehran, Iran.	49	20
Oral Medicine	F	7	Inhibitory activity of garlic (Allium sativum) extract on multidrug-resistant Streptococcus mutans.	94	27	The effect of topical application of pure honey on radiation-induced mucositis: a randomized clinical trial.	84	51	Hepatitis B virus infection in dentistry: a forgotten topic.	80	37
	C	8							Correlation between clinical and histopathologic diagnoses of oral lichen planus based on modified WHO diagnostic criteria	79	46
Operative Dentistry	F	8	The effect of ceramic and porous fillers on the mechanical properties of experimental dental composites.	89	53	The effect of hydrogel and solution of sodium ascorbate on bond strength in bleached enamel.	82	32	Microleakage of direct and indirect composite restorations with three dentin bonding agents.	61	21
	C	9									
Oral Radiology	F	9	Prevalence of dental developmental anomalies: a radiographic study.	88	33	Radiographic evaluation of the mental foramen in a selected Iranian population.	64	23	Dental age assessment among Iranian children aged 6-13 years using the Demirjian method.	54	22
	C	10									
Community Oral Health	F	10	Feeding habits as determinants of early childhood caries in a population where prolonged breastfeeding is the norm.	76	35	Early childhood caries and dental plaque among 1-3-year-olds in Tehran, Iran.	62	19	Survival after diagnosis of cancer of the oral cavity.	57	39
	C	11				Diagnosis and management of supernumerary (mesiodens): a review of the literature.	65	-	Early childhood caries and dental plaque among 1-3-year-olds in Tehran, Iran.	62	19

C= corresponding author, F= First author; R =Rank; S=SCOPUS; ***= Not indexed in Scopus

Table 3: Continued

	Authors	R	First Ranked Article	GS	S	Second Ranked Article	GS	S	Third Ranked Article	GS	S
Dental Material	F	11	Storage effect of a pre-activated silane on the resin to ceramic bond.	68	37	Push-out bond strength of mineral trioxide aggregate in the presence of alkaline pH.	55	31	Improved drug loading and antibacterial activity of minocycline-loaded PLGA nanoparticles prepared by solid/oil/water ion pairing method.	49	36
	C	12	Push-out bond strength of mineral trioxide aggregate in the presence of alkaline pH.	55	31	Comparison of debonding characteristics of metal and ceramic orthodontic brackets to enamel: an in-vitro study.	47	18	Effect of surface acid etching on the biaxial flexural strength of two hot-pressed glass ceramics.	37	12
Oral Pathology	F	12	Evaluation of oral mucosal lesions in 598 referred Iranian patients.	54	-***	Influence of white versus gray mineral trioxide aggregate on inflammatory cells.	50	29	Histopathologic comparison of normal and hyperplastic condyles.	46	24
	C	2	Mineral trioxide aggregate (MTA) and calcium hydroxide as pulp-capping agents in human teeth: a preliminary report.	304	148	Prevalence of traumatic injuries to maxillary permanent teeth in 9- to 14-year-old school children in Yazd, Iran.	59	28	Evaluation of oral mucosal lesions in 598 referred Iranian patients.	54	-

C= corresponding author, F= First author; R =Rank; S=SCOPUS; ***= Not indexed in Scopus

reported that Iran performed higher than the expected level in six out of the 62 subfields of Life Sciences; these include andrology, dentistry, oral surgery and medicine, ecology, entomology, mycology and orthopedics. In addition, andrology is the sole subfield in Life Sciences in which Iran has performed above the global average [12]. The growth rates in the subfields of dentistry, oral surgery and medicine are in the second place and may pass the global trend in the near future. The positive trend in dental research output from Iran can be attributed to the focus on research by policy-makers, a national commitment by research policy change and a drastic rise in research resources. The research budget allocated to the health sector doubled from 1997 to 2005, and there was a significant growth in the number of health/medical/dental researchers. The number of dental research centers in the country increased from one in 1995 to ~20 in 2012. Such achievements were a result of a national movement in Iran to develop research in a broad-spectrum.

Research productivity is the amount of research performed by scientists within a certain time span [13]. Research productivity evaluation is a critical issue because it serves to verify the existing knowledge in an institution, determine the efficiency in addition to the quality of their research and discover less frequently researched subjects; this evaluation provides a basis for promotion decisions, funding allocations and educational reform; it lately serves as an indicator of university quality as well [14]. Our results revealed that endodontic researchers had the highest number of publications, particularly in the "Iranian Endodontic Journal". The most frequently cited articles also belonged to the field of endodontics. Furthermore, endodontic groups were the most frequently rated active research groups in the top ten dental schools. It has been demonstrated that endodontic research productivity in Iran is positive and is favorable in comparison to other regional countries [9,15,16], which is in accord with the current results.

Our results demonstrated that 3.73% of the articles were written by one author, while the majority of them (~46%) were written by three or

Table 4: Top ten dental schools and top three disciplines that had the highest scientific paper production.

Top Ten Dental Schools in Iran	Authors	R	N	Top Three disciplines (Number of Articles)					
				First Ranked		**Second Ranked**		**Third Ranked**	
Shahid Beheshti	F	1	555	Endodontics	131	Oral Surgery	75	Orthodontics	63
	C	2	494	Endodontics	132	Oral Surgery	64	Community Oral Health	54
Tehran	F	2	526	Endodontics, Prosthodontics		80		Orthodontics	67
	C	1	508	Prosthodontics	84	Endodontics	72		62
Mashhad	F	3	471	Endodontics	103	Orthodontics	82	Oral Surgery	59
	C		461		123		89	Oral Pathology	56
Isfahan	F	4	379	Prosthodontics	67	Operative Dentistry	61	Endodontics	46
	C		359		62		59		41
Shiraz	F	5	353	Endodontics	56	Orthodontics	52	Operative Dentistry	39
	C		341	Orthodontics	53	Endodontics	52	Oral Pathology	38
Tabriz	F		330	Endodontics	82	Operative Dentistry		Pedodontics	34
	C	6	337		75		49	Pedodontics, Periodontics, Prosthodontics	35
Azad (Tehran)	F	7	231	Endodontics	50	Orthodontics	44	Oral Surgery	40
	C		207	Orthodontics	49	Endodontics	38	Dental Material	26
Hamadan	F	8	167	Endodontics	45	Operative Dentistry, Oral Surgery			22
	C		153		38	Oral Medicine	24	Operative Dentistry	22
Kerman	F	9	132	Endodontics	50	Oral Medicine	30	Pedodontics	14
	C		128		56		31		10
Yazd	F	10	131	Orthodontics	31	Endodontics	29	Oral Radiology	20
	C		124	Endodontics	30	Orthodontics	28		

C= corresponding author, F= First author; R=Rank; N= Total Number of Articles

four authors. Iranian researchers in the fields of dentistry, oral surgery and medicine have collaborated well with each other domestically. This may be due to several factors, including the nature of their research, availability of the Internet and e-mail correspondence as well as communication between graduate students and their advisers. In relation to this, researchers should be motivated for international collaborations.

Randomized clinical trials, systematic reviews and meta-analyses provide the highest level of evidence [17,18]. They have a remarkable role in scientific grading thus being useful for decision making, treatment planning, practical guidelines and health policy decisions [19]. Our results similar to previously reported results showed that systematic reviews and clinical trials constituted

Table 5: Number and percentage of authors per article

Number of Author(s)	Number of Articles	Percent
1	143	3.73
2	498	12.99
3	812	21.17
4	942	24.56
5	700	18.25
6	413	10.77
7	198	5.16
8	81	2.11
9	32	0.83
10	7	0.18
11	8	0.21
16	1	0.03
Total	3835	100.00

Table 6: Number and percentage of citations of Iranian dental papers in Google Scholar and Scopus

Citations	GS*	Percentage	S**	Percentage
0	726	18.93%	1954	50.95%
1	453	11.81%	370	9.65%
2	341	8.89%	269	7.01%
3	291	7.59%	227	5.92%
4	226	5.89%	163	4.25%
5	208	5.42%	106	2.76%
6	158	4.12%	103	2.69%
7	158	4.12%	79	2.06%
8-10	353	9.20%	169	4.41%
11-15	283	7.38%	148	3.86%
16-20	170	4.43%	80	2.09%
21-30	192	5.01%	82	2.14%
>30	276	7.20%	85	2.22%
Total	3835	100.00%	3835	100.00%

*= Number of citation in Google Scholar; **= Number of citation in Scopus

~9% of all dental publications from Iran [20]. Higher number of articles with high level of evidence indicates higher quality of publications, and such a low proportion of high quality publications is not a phenomenon limited to dentistry; it may be related to the challenges/difficulties in designing/conducting such trials/studies. Moreover, ~51% of all dental articles from Iran had zero citation in Scopus, which may be interpreted as an inferior quality of such publications; however, as demonstrated in Fig. 1D, these articles were mainly published in the recent years and because of the increasing trend of publications, they may be cited in the near future. The authors of the articles were categorized based on the department of first author and corresponding author. Reporting the department of the author is not a gold standard method for reporting this variable since an author may have some articles in the fields other than his department field especially in dental materials and dental education. We used this method of categorization since it was the best available method.

CONCLUSION

Considering the results of Iranian PubMed-indexed publication analysis in the field of dentistry, Iranian dental research output was promising and showed an increasing trend in the recent years.

REFERENCES

1- IRAN. Available at: http://en.wikipedia.org/wiki/Iran [cited 2016 2016/02/05].

2- Hu X, Rousseau R. A comparative study of the difference in research performance in biomedical fields among selected Western and Asian countries. Scientometrics. 2009 Nov;81(2):475-91.

3- Yousefy A, Malekahmadi P. A survey of scientific production and collaboration rate among of medical library and information sciences in ISI, scopus and Pubmed databases during 2001-2010. J Educ Health Promot. 2013 Aug 31;2:47.

4- Falagas ME, Pitsouni EI, Malietzis GA, Pappas G. Comparison of PubMed, Scopus, web of science, and Google scholar: strengths and weaknesses. FASEB J. 2008 Feb;22(2):338-42.

5- Number of Titles Currently Indexed for Index Medicus® and MEDLINE® on PubMed®. Available at: https://www.nlm.nih.gov/bsd/num_titles.html [cited 2016 2016/7/26].

6- Adams J. Benchmarking international research. Nature. 1998 Dec 17;396(6712):615-8.

7- Malekzadeh R, Mokri A, Azarmina P. Medical science and research in Iran. Arch Iran Med. 2001 Jan;4(1):27-39.

8- Taubes G. Measure for measure in science. Science. 1993 May 14;260(5110):884-6.

9- Eghbal MJ, Davari Ardakani N, Asgary S. A scientometric study of PubMed-indexed endodontic articles: a comparison between Iran and other regional countries. Iran Endod J. 2012 Spring; 7(2): 56-9.

10- 30 years in science: Secular movements in knowledge creation. Available at: http://www.science-metrix.com/30years-Paper.pdf. [cited 2016 2016/02/05]

11- Badri S, Akhoundi MS, Fard MJ, Momeni N,

Hedayati Z, Vakili V. Orthodontic research output from iran in international and national journals. Journal of dentistry (Tehran, Iran). 2014 Jan;11(1):67-74.

12- Sotudeh H. Are Iranian scientists recognized as their productivity enhances? A comparison of Iran's impact to global norms in different subfields of Science Citation Index during 2002–2005. Scientometrics. 2010 Apr;83(1):39-54.

13- Print M, Hattie J. Measuring quality in universities: An approach to weighting research productivity. J High Educ. 1997 Jun;33(4):453-69.

14- Vinluan LR. Research productivity in education and psychology in the Philippines and comparison with ASEAN countries. Scientometrics. 2012 Apr;91(1):277-94.

15- Yaminfirooz M, Motallebnejad M, Gholinia H, Esbakian S. Quantitative and Qualitative Evaluation of Iranian Researchers' Scientific Production in Dentistry Subfields. Acta Inform Med. 2015 Oct;23(5):301-5.

16- Asgary S, Sabbagh S, Eghbal MJ. Published Endodontic Articles in PubMed-Indexed Journals from Iran. Iran Endod J. 2012 Winter;7(1):1-4.

17- Oxford Centre for Evidence-based Medicine– Levels of Evidence (March 2009) Available at: http://www.cebm.net/oxford-centre-evidence-based-medicine-levels-evidence-march-2009/ [cited 2016 2016/7/26].

18- Asgary S, Mehrdad L, Kheirieh S. High-level evidences in endodontics. Scientometrics. 2013 Mar; 94(3):955-62.

19- Clancy CM, Cronin K. Evidence-based decision making: global evidence, local decisions. Health Aff (Millwood). 2005 Jan-Feb;24(1):151-62.

20- Sadeghi M, Shahravan A, Haghdoost AA, Asgary S, Rad M. Trend in dental research output in Iran over a period of 20 years (1990–2009). Int Dent J. 2012 Apr;62(2):84-9.