Original Article

Orthodontic Research Output from Iran in International and National Journals

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Abstract

Objective: The number of scientific papers is a conventional metric to measure a country's research performance in a particular area. The aim of this survey was to demonstrate statistical information about orthodontic research published in international and national journals.

Materials and Methods: Pubmed as an international and IranMedex and SID as national databases were searched between1997 and 2012. The keyword searching method was used in English and Persian. Abstracts were reviewed and unrelated articles were omitted. Data were obtained and transferred to Microsoft Excel to survey the scintometric indicators.

Results: According to the defined criteria, a total of 733 papers were found showing a considerable increase. Five hundred papers (68.2%) were published in domestic journals, and 233 (31.8%) were published in PubMed indexed journals. Most of the orthodontic articles originated from Shahid Beheshti University of Medical Sciences (22.9%). The Journal of Dental School, Shahid Beheshti University of Medical Sciences published most of the national papers (27.8%) and the Australian Orthodontic Journal published the majority of international papers (9.9%) In terms of study design, 52.5% of the articles were observational and 39.4% were interventional.

Conclusion: Orthodontic research production in Iran has made significant strides in the recent years and researchers should focus on the quality of the study in this field in order to apply research production in evidence base dentistry.

Key Words: Orthodontic; publication; Iran; Pubmed

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INTRODUCTION

Scientific publications are the best source to introduce new dental information and clinical applications to the dental profession. The evaluation of the number and trend of published articles can evaluate the scientific performance in this field in a country [1]. These can reflect the development of a country in different aspects including health care system and research progress. One of the most signif-

icant indicators for scientific progress is the number of scientific articles [2] of which bibliometric studies of research output are important in their assessment [3]. A set of mathematical and statistical methods is used to estimate and measure the quantity and quality of articles and publications are delineated as bibliometric analysis. This methodology has been employed in many fields of medicine [3-5] and research policy makers can use these data to focus on enhancing research on more needed topics [6].

As the effect of new medical sciences on public health are obvious, scientific productions in these fields play an important role in the development of the quality of life of the population; therefore, growth in production of medical sciences can effect the progress of the country. Dentistry is one of the medical sciences in which development has great effects on the improvement of the health system.

Searching the literatures has shown that there are some studies evaluating dental research in Iran in the national and international database using the bibliometric method [7-10]. The results of them indicate the great growth in the number of dentistry articles published in national and international journals. Bibliometric study has been performed in two branches of dental sciences in Iran; endodontic [11,12] and periodontic [13]. To ascertain the position of Iran and its growth trend in science, scientometric analysis of relevant databases was conducted. This study was carried out to evaluate the researches that are electronically available in the field of orthodontics in Iran and to determine the time and trend of it.

MATERIALS AND METHODS

The research was conducted in June-July 2013. Keyword-searching method was used to collect Iranian orthodontic papers published between 1997 and 2012.

IranMedex (IRANIAN MEDLINE, available at http://www.iranmedex.com) and SID (Scientific Information Database, available at http://www.SID.ir) were used to find domestic articles and Pubmed search was carried out to determine international papers. IranMedex and SID are local bibliographic databases that cover all electronic publications of Iranian dental journals that are registered and indexed in the 'Iranian Ministry of Health'. These databases have many overlaps, but to find a maximum number of local orthodontic articles both of them were searched and the duplicated data were omitted. Abstracts of all articles were reviewed and unrelated papers were deleted. The name of the journal, year of publication, number of authors, name and gender and affiliation of the first author, main language of the article, type of article (original, letter, review, report) and design of the study (descriptive, analytical, in vitro, clinical trial, animal study) were extracted from each publication. The H-Index of the author was also recorded from Scopus and the data were transferred to Microsoft Excel.

RESULTS

The data indicate that from 1997 to 2012, a total of 733 orthodontic articles electronically available inside Iran, were publications by Iranian researchers as the first author. Five hundred (68.2%) published in domestic journals, and 233 (31.8%) in PubMed indexed international journals.

Figure 1 shows the year-wise distribution of publications from 1997 to 2012. An increasing trend in the number of publications is detected in this period, the total number of articles showing a 6.7-fold rise, more noticeable in international publications.

Fifty-seven percent of all the articles had been published within the last 5 years (from the beginning of 2008 to the end of 2012). There has been a decrease in the number of local articles since 2009, but the number of articles published by journals indexed in PubMed increased dramatically since 2009.

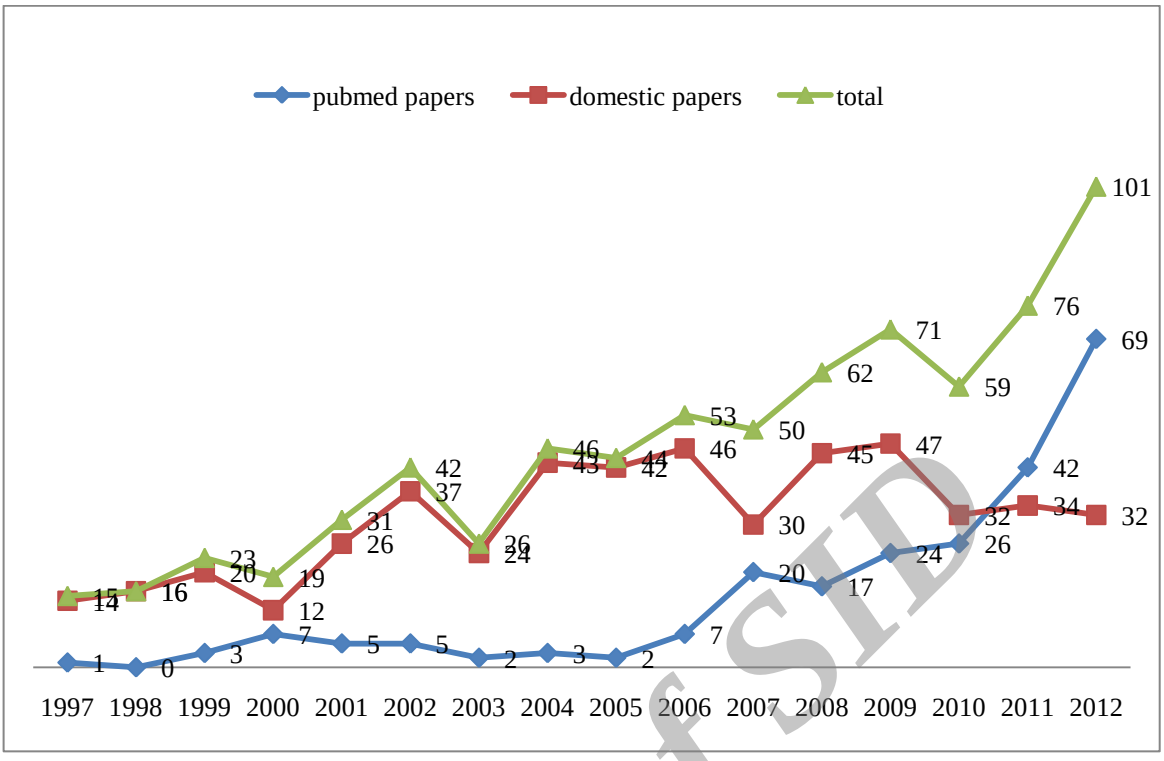

Fig 1. Trend in the number of Iranian dental publications per year indexed in PubMed and domestic journals

They have shown an approximate 69-fold increase over the past 15 years (Figure 1).

Table 1 demonstrates the top ten Universities of Medical Sciences by number of published orthodontic articles in Iran.

Overall, most of the papers (according to the first authors) originated from the capital city of Tehran (49.1%); particularly from dental schools of Shahid Beheshti University (22.9%) and Tehran University (19.9%) of

Table 1. Top Ten Institutions with the Highest Number of Orthodontic Articles in Iran

University of Medical Sciences	Domestic Published Papers		Pubmed Published Papers		Total Published Papers	
	n	%	n	%	n	%
Shahid Beheshti	124	24.8	44	18.88	168	22.91
Tehran	87	17.4	59	25.32	146	19.91
Mashhad	65	13	41	17.59	106	14.46
Shiraz	77	15.4	28	12.01	105	14.32
Islamic Azad Tehran	17	3.4	29	12.44	46	6.27
Esfahan	27	5.4	11	4.72	38	5.18
Shahid Sadoghi Yazd	11	2.2	9	3.86	20	2.72
Tabriz	4	0.8	13	5.57	17	2.31
Hamadan	12	2.4	3	1.28	15	2.04
Qazvin	14	2.8	0	0	14	1.90

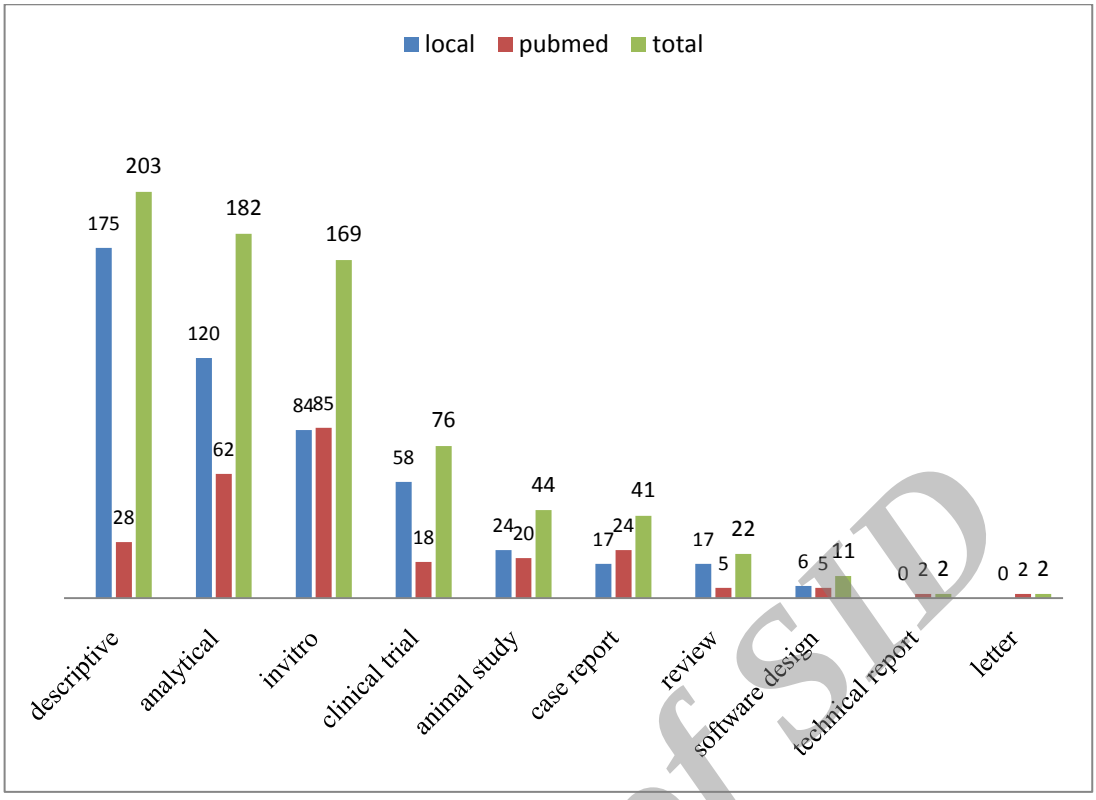

Fig 2. Study design of Iranian orthodontic articles

Medical Sciences. Our results revealed that of the 500 domestic orthodontic papers, 139 (27.8%) were published in the Journal of Dental School, Shahid Beheshti University of Medical Sciences, 62 (12.4%) in the Journal of Dentistry Shiraz University of Medical Sciences and 60 (12%) in the Journal of Islamic Dental Association of Iran (Table 2).

Most domestic articles were published in Farsi (n=468; 93.6%), others were published in English. Most international papers were published in the Australian Orthodontic Journal (n=23), then in the Journal of Dentistry of Tehran University of Medical Sciences (20 international and 26 domestic papers were published in the mentioned journal).

Table 2. Top Ten Journals with the Highest Published Iranian Orthodontic Papers

Journal Name	Number	Percent
Shahid Beheshti Medical Sciences University Journal of the Dental School	139	18.96
Journal of Dentistry of Shiraz University	62	8.45
The Journal of Islamic Dental Association of Iran	60	8.18
Journal of Dental Medicine Tehran University	58	7.91
Journal of Mashhad Dental School	46	6.27
Journal of Dentistry of Tehran University of Medical Sciences	46	6.27
Journal of Isfahan Dental School	25	3.41
Australian Orthodontic Journal	23	3.13
Journal of Dental Research, Dental Clinics, Dental Prospects Tabriz	20	2.72
The Journal of Qazvin University of Medical Sciences & Health Services	18	2.45

In total, 16506 articles related to the field of orthodontics were recovered during 1997-2012 from the PubMed database, 233 (1.41%) of which were written by first authors with an Iranian affiliation.

In terms of study design, 52.5% of the mentioned researches were observational (descriptive + analytical) and 39.4% were interventional (in vitro studies+ animal studies + clinical trials). Figure 2 shows more details. The mean number of authors per article was 3.05±1.27 (1 to 7).

Among all Iranian researchers in the field of orthodontics, the top ten authors indexed in PubMed- and domestic journals are presented in Table 3.

DISCUSSION

In the recent years, Iran has gained one of the fastest growth rates in scientific production in the whole world [14,15]. The results of the present study certify this and show the goals of the 20-year Iranian vision plan will be achieved in the field of orthodontics. Based on this target Iran will be the first rank in the region in the field of science and technology by 2025. Bibliometric studies have many creative possibilities and can help in evidence-based clinical decision making.

Table 3. Top Ten (First) Authors with the Highest Number of Orthodontic Articles in Iran

Author Name (first)	Articles (n)	Scopus (H-Index)
Seifi M	29	4
Hosseinzade-nik T	23	3
Eslamian L	21	3
Ahmad Akhondi MS	20	3
Hedayati Z	20	3
Shokatbakhsh R	19	3
Heravi F	18	3
Momeni Danae SH	17	1
Ramazanzadeh BA	17	2
Gerami A	15	6

To our knowledge, this is the first study that has evaluated Iran's research productivity, electronically available inside Iran, in the field of orthodontics from 1997 to 2012.

To find international articles, PubMed search system, an inclusive database covering scientific articles and dental journals, was used. The domestic articles that were published non-electronically were not included because of lack of comprehensive record keeping.

The results of this study illustrated that the number of Iranian orthodontic articles had an appreciable increase in the number of scientific publications during the past 15 years showing a 6.7-fold increase. This improvement is more prominent in international articles than domestic publications. Dental research in Iran too has showed such a progress [8,10,11,16], higher than that of Middle Eastern countries [10,17].

The increase in the number of dental faculties and research centers and consequently the increase of orthodontists, students and dissertations are surely positive factors that influence the rise in the number of articles in this field.

In 2006, six dental journals published their articles online [7] that increased to fourteen dental journals published electronically in 2012 and this progress led to an increase in electronically available domestic orthodontic articles as dental articles. There are four Iranian dental journals indexed in PubMed that have consequently increased the international published articles in the recent years.

When comparing dental schools, the results indicated that the dental school of Shahid Beheshti University of Medical Sciences published the highest number of domestic papers and the dental school of Tehran University of Medical Sciences published the highest number of orthodontic papers indexed in PubMed. These dental schools have the oldest orthodontic departments and also many research centers and a large number of scientists, researchers and residents in the orthodontic department compared to other dental schools in Iran.

Eighty-two of the 233 international articles were published in eleven orthodontic English PubMed indexed journals and the others were published in 35 dental and 13 medical journals. It is normal that most of the orthodontic articles have been published in non-orthodontic journals [4]. One of the reasons is that the impact factors of orthodontic journals are not high and their published articles are too professional.

The journal of the Dental School, Shahid Beheshti University of Medical Sciences published more than a quarter of the domestic papers (27.8%). Orthodontists manage the mentioned journal and the researchers in this branch prefer to submit their Persian manuscripts in this journal that may be one of the reasons.

Although 63.8% (n=468) of all scientific documents in the field of orthodontics were in Persian, nearly all the domestic papers have an English abstract that can be used by international researchers.

Most of the study designs were descriptive (27.7%) subsequently followed by analytical and in vitro studies. Whereas clinical trials were ranked fourth (10.7%). The distribution of papers published in national and international journals was different in this field. In national papers, descriptive studies and in international papers, in vitro studies had the first rank. Evidence-based dentistry reflects the power of research in the related fields. Meta-analysis, systematic review and randomized controlled trials (RCT) were ranked as first quality articles. Therefore, most of the Iranian orthodontic articles involve studies with a low potential to yield scientific evidence. This finding was similar to the results of the articles that assessed the number of dental articles [7,10].

Research output measures such as publication and citation rates differ between various fields of science, universities and nations. The quantity of articles indexed by sound databases is important for a country's contribution to science and its status in international academic rankings, but the quality of publications is important. Policy makers, clinicians and researchers need to implement knowledge into practice. The main subject of orthodontic interest has always been treatment evaluation, because of the increasing emphasis on evidence-based clinical decisions [4] and descriptive studies are not applicable enough in decision-making and practice

Analysis of articles published in domestic journals show an increase in the number of papers until 2009 and then a decrease from 2009 to 2012. Figure 1 reveals that at the same time, the number of orthodontic articles indexed in PubMed increased. This finding shows an increased interest in submitting manuscripts to international scientific journals by Iranian orthodontic researchers in the recent years. It is obvious that international scientific journals have more readers, and their articles have a higher impact in the scientific field.

The Hirsch index (h-index) is an index that attempts to measure both research productivity and the impact of the published work of a scientist or scholar. The number of published articles was considered as an index of research productivity, whereas the total number of citations was considered as a quality indicator. A scholar with an index of h has published h papers each of which has been cited in other papers at least h times. Thus, the h-index reflects both the number of publications and the number of citations per publication [18].

The mean h-index of the top ten authors in this study was three, which it is not considerable. Although non-English articles published in local journals are infrequently cited in the international literature, but this result shows Iranian orthodontic researchers should try to improve the quality of their researches.

There are limitations in our study; a great number of scientific articles by Iranian authors are published in non PubMed or Iranmedex

indexed national/international journals in Persian or English languages that were not accounted. Besides, the medical subject heading (MeSH) terms have not yet been thoroughly developed for orthodontics.

CONCLUSION

In conclusion, it is clear that orthodontic research production in Iran has made significant strides in the recent years, but orthodontic research policy-makers should find solutions to improve the quality of the science system to advance this growth. In addition, focus should be placed on the quality of research and its influence on improving orthodontology.

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