

Dermatology publications from Iran in MEDLINE: A comparison between 2004 and 2014

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Background: Iran has achieved rapid scientific growth in the past two decades. Considerable growth in scientific publications by Iranian dermatologists matches the pace of Iran's scientific publications in the previous decade. In this study, we aim to identify the current trends in Iranian dermatology publications and authorship over the past decade.

Methods: We compared papers indexed in the MEDLINE database at two time points, 2004 and 2014, using the PubMed Search engine.

Results: We found 145 dermatology papers from Iran in 2014 compared to 31 papers in 2004, with an annual growth rate of 36.8%. There was a highly significant increase in the mean number of authors per article from 3.1 to 5.02 ($P<0.001$), with a significant decrease in the number of single-author papers. A significant decrease existed in the number of male first authors (83.9% to 63.4%; $P=0.03$). The number of papers published in specialized dermatology journals significantly decreased in 2014 from 80.6% to 42.1% ($P<0.001$), with 41.4% of the total papers published in Iranian journals. The mean impact factor (IF) per paper dropped from 2.01 to 1.75.

Conclusion: The number of international publications by the Iranian dermatologist has proliferated during the past decade. Encouragement of international collaborations, production of high-quality and novel research, improvements to the standards and visibility of national journals, and higher adherence to authorship and publication ethics are essential perquisites for a more productive future for dermatology research in Iran.

Keywords: publications, dermatology, research

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INTRODUCTION

Skin diseases have historically been the subject of scientific investigation in Iran. The 3000-year-old religious book of Avesta included clinical descriptions of cutaneous diseases such as leprosy and vitiligo. During the Islamic era, a scientist named Rhazes described cutaneous presentations of various diseases. Avicenna discussed treatments for a variety of skin conditions, including skin

cancers. The establishment of modern medicine in Iran was marked by the opening of Tehran University in 1934, followed by the foundation of the university's first Dermatology Department in 1939¹. Currently, all Iranian medical schools offer a 4-week dermatology rotation. Dermatology residency training programs have been established in 11 universities and there are 10 dermatology related research centers.

Iran has achieved a rapid scientific growth in the

past two decades. Iran's scientific output increased 18-fold between 1996 and 2008, from 736 published papers to 13238². Scientific output has grown 11 times faster in Iran than the world average - a higher growth rate compared to other countries³. The science and technology publications' yearly growth rate of 25% show that Iran is doubling its total output every three years. There has been considerable growth in the number of publications by Iranian dermatologists which match the fast pace of Iran's publications in the previous decade⁴.

We previously reported on the contribution of Iran to dermatology literature in a review of MEDLINE-indexed articles from January 1964 to December 2004⁵. In order to evaluate the trend of dermatology publications and authorship from Iran in the past decade, we have compared papers indexed in the MEDLINE database at two time points: 2004 and 2014. The results of this search will help identify the current trends of Iranian dermatology publications in terms of quality and quantity over the past decade, yield insight into major areas of strength and weakness, and provide guidance on strategies to improve scientific visibility and impact.

MATERIALS AND METHODS

We electronically searched the MEDLINE database using the PubMed search engine for articles published from January 2004 to December 2004 as well as from January 2014 to December 2014. We used "Iran OR the names of all of the Universities of Medical Sciences in Iran" as keywords or affiliations, and the MeSH terms of "skin and connective tissue diseases" or "integumentary system". All retrieved articles were individually reviewed. This study included articles authored by at least one individual affiliated with a dermatology department and/or research center in Iran. We recorded the publication type and subject, number and affiliations of authors, journal impact factor (IF), and the first and corresponding authors' gender and institutional affiliations. The data were statistically analyzed by IBM SPSS Statistics (IBM Corp., Armonk, NY, USA) version 20. Chi-square and independent sample t-tests were used when applicable. $P<0.05$ was considered statistically significant.

RESULTS

We located 145 dermatology papers from Iran in 2014 compared to 31 papers in 2004, which reflected an annual growth rate of 36.8% in dermatology publications. There was a highly significant increase in the mean number of authors per article from 3.1 to 5.02 (Table 1). We observed a significant decrease in the number of single-author papers from 29% to 3.4%. The number of publication with multiple authors (>6) and the number of institutional affiliations per article also showed significant increases. There was a significant decrease in the number of male first authors, with a marginally significant increase in the proportion of female first authors (from 16.1% to 34.5%). Although we observed the same trend for corresponding authors, this finding was not statistically significant. The proportion of papers with international collaborating authors did not show a significant change in 2014 (9.7% versus 10.3%). While the most frequent type of publications were case reports (32.2%) and original research papers (32.2%) in 2004, the proportion of original research papers clearly increased in 2014, comprising 72.4% of all publications. There was a trend towards an increase in the proportion of clinical trials from 12.9% to 25.5%, with a considerable increase in randomized clinical trials (15.9%). However, the former did not reach a level of statistical significance. The proportion of review articles showed a significant decrease from 19.3% to 4.1%. The most common paper topics in 2014 were leishmaniasis (11.7%), blistering diseases (7.6%), and psoriasis (6.9%) compared to leishmaniasis (19.3%) and therapeutics (12.9%) in 2004.

The most frequent publishing journals in 2004 were the International Journal of Dermatology with 10 (32.2%) and BMC Dermatology with 4 (12.9%) papers. The highest number of papers in 2014 were published by Advanced Biomedical Research with 14 (9.6%), Acta Medica Iranica with 13 (9%), and Indian journal of Dermatology with 10 (6.9%) papers (Table 2). The number of papers published in specialized dermatology journals significantly decreased in 2014, from 80.6% to 42.1%. The proportion of articles published in high-impact international journals ($IF \geq 3$) changed from 4 (12.9%) to 12 (8.27%) papers. The mean IF per paper also declined from 2.01 to 1.75. No

Table 1. Characteristics and comparison of dermatology publications from Iran in 2004 and 2014 on authors' number and gender, article type, and subject.

	2004 (%)	2014 (%)	P
Number of publications	31	145	
Number of authors			
1	9 (29)	5 (3.4)	<0.001
1-5	19 (61.3)	92 (63.4)	0.83
≥6	3 (9.7)	48 (33.1)	0.008
Mean	3.1	5.02	<0.001
Number of affiliations			
1	20 (64.5)	32 (22)	<0.001
1-3	9 (29)	71 (49)	0.04
≥4	2 (6.45)	42 (29)	0.006
Number of international authors	3 (9.7)	15 (10.3)	1
First author gender			
Male	26 (83.9)	92 (63.4)	0.03
Female	5 (16.1)	50 (34.5)	0.05
Unknown	-	3 (2.1)	
Corresponding author gender			
Male	23 (64.2)	86 (59.3)	0.15
Female	7 (22.6)	60 (41.4)	0.07
Unknown	1 (3.2)	3 (2.1)	
Type of article			
Case series*	1 (3.2)	0	0.2
Case report	10 (32.2)	32 (22.1)	0.008
Review	6 (19.3)	6 (4.1)	
Letter	0	2 (1.4)	<0.001
Original research**	10 (32.2)	105 (72.4)	0.16
Clinical Trials	4 (12.9)	37 (25.5)	
Type of clinical trials*			
Uncontrolled trial	1 (3.2)	4 (2.7)	1.0
Controlled Clinical trials	3 (9.7)	10 (6.9)	0.591
Randomized controlled trial	0	23 (15.9)	0.015
Papers Topics			
Miscellaneous	6 (19.3)	31 (21.4)	
Leishmaniasis	6 (19.3)	17 (11.7)	
Blistering diseases	-	11 (7.6)	
Treatment	4 (12.9)	-	
Psoriasis	3 (9.7)	10 (6.9)	
Cancer	-	8 (5.51)	
Vitiligo	2 (6.4)	7 (4.8)	
Lichen planus	2 (6.4)	-	
Drug Reaction	2 (6.4)	-	
Laser	2 (6.4)	-	

*The number of patients less than 10 was considered as case-series and over 10 was considered as uncontrolled clinical trial. **Original research defined as all peer-reviewed scientific publication types excluding case reports, case series, letter to editors, short/brief reports, and narrative reviews.

Iranian journals were indexed in Medline in 2004, however in 2014, 41.4% of all publications were published in national journals.

The most frequent affiliations in 2004 publications included the Department of Dermatology, Shiraz University of Medical Sciences (11 papers) followed by the Department of Dermatology, Tehran University of Medical Sciences (4 papers); Center

for Research and Training in Skin Diseases and Leprosy, Tehran University of Medical Sciences (3 papers); and the Department of Dermatology, Isfahan University of Medical Sciences (3 papers). However in 2014, the most frequent affiliations included the Department of Dermatology, Tehran University of Medical Sciences with 22 publications followed by Skin Diseases and Leishmaniasis

Table 2. Characteristics and comparison of the publishing journals in 2004 and 2014.

Publishing Journal	2004 (%)	2014 (%)	Indexing database and Impact factor (2013)
International Journal of Dermatology	10 (32.2)	-	1.227
BMC Dermatology	4 (12.9)	-	Open Access, PubMed, Scopus
Dermatologic Surgery	2 (6.4)	-	2.467
Dermatology Online Journal	2 (6.4)	-	Open Access, PubMed, Scopus
Autoimmunity	2 (6.4)	-	2.754
International Immunopharmacology	2 (6.4)	-	2.711
Advanced Biomedical Research	-	14 (9.6)	Open Access, PubMed
Acta Medica Iranica	-	13 (9)	Open Access, PubMed
Indian Journal of Dermatology	-	10 (6.9)	PubMed
Indian Journal of Dermatology, Venereology and Leprology	-	5 (3.4)	1.325
Iranian Red Crescent Medical Journal	-	5 (3.4)	0.333
Journal of Dermatological Treatment	-	5 (3.4)	1.764
Papers published in specialized dermatology journals	25 (80.6)	61 (42.1)*	
Papers published in journals with an impact factor (IF)≥3	4 (12.9)	12 (8.27)**	
Mean impact factor	2.009	1.75	
Papers published in Iranian journals	0	60 (41.4)	

*P<0.0001, ** P=0.48.

Research Center, Isfahan University of Medical Sciences (20 papers); Skin Research Center, Shahid Beheshti University of Medical Sciences (19 papers); Center for Research and Training in Skin Diseases and Leprosy, Tehran University of Medical Sciences (18 papers); and Skin and Stem Cell Research Center, Tehran University of Medical Sciences (16 papers). Based on first and corresponding author affiliations only, the most common affiliation institutions were the Department of Dermatology, Shiraz University of Medical Sciences in 2004 (10 and 11 affiliations, respectively). In 2014, the most common first authors' institutional affiliation was the Department of Dermatology, Tehran University of Medical Sciences (8 affiliations) and the most frequent corresponding authors' institutional affiliations were the Department of Dermatology, Jahrom University of Medical Sciences (5 affiliations); Skin Research Center, Shahid Beheshti University of Medical Sciences (5 affiliations); and Molecular Dermatology Research Center, Shiraz University of Medical Sciences (5 affiliations).

DISCUSSION

In this study, we assessed and compared the characteristics of the Iranian dermatology publications indexed in MEDLINE at two time points one decade apart in an attempt to establish the current trends in publishing journals and

authorships. Our results suggested a substantial increase in dermatology publications from Iran at a growth rate higher than the general Iranian science and technology productivity rate. The increased numbers of specialized dermatology research centers, academic graduates, and residents-in-training in the past decade contributed to this growth in the quantity of papers. Notably, in recent years a more strict publication requirement has been implemented for academic promotion. On a bigger scale, the country's policy makers' efforts to facilitate researchers' access to the world's top academic resources and higher budget allocation for research and development also contributed to the rapid advancement⁴⁻⁷.

We observed specific trends in authorships patterns; there was a significant decrease of single-author articles and an increase in papers with multiple authors. This agreed with the global proliferation of multi-authorships in numerous medical and surgical research areas^{8,9}. The need for multicenter studies, overlapping areas of dermatology with many other specialties, and complexity of the research subjects have been main reasons for this tendency. However, international surveys show that along with the recent increase in the number of authors, the possibility for false, undeserved, gift, and ghost authorship may emerge, which potentially dilutes the accountability of the scientists and damages

the publication enterprise^{10,11}. Strict adherence to authorship requirement consensus and ethics is required among academicians, researchers, journal editors, and reviewers to assure a standard of true and honest authorship in the field of dermatology.

There was a significant increase in the proportion of female first authors. There was no data on the number of male and female dermatologists who graduated in 2004-2014; therefore, the increase in female dermatologists might be responsible for this finding. Gender inequality in scientific research and scholarly publications has remained a worldwide challenge for policy-makers and the scientific community at large. Despite the increased number of female scientists and those in major academic positions, women continue to be under-represented in scientific literature¹². The current prevalence of women in the Iranian dermatology workforce and subsequent possession of leading academic and research positions can potentially result in the closure of the gender gap in Iran. A dilution in gender inequality in dermatology authorship has been internationally observed as well¹³.

Despite the exceptional increase in the quantity of the published papers from Iran, the trends observed in the quality and impact of the publications was not encouraging. A lower number of high-impact international publications and the decline in mean IF per paper indicated lower overall publication quality. Major reasons have included a decrease in the number of international contributions, higher number of papers in general medical journals compared to specific dermatology journals, and increase in papers published in national and local journals. It is generally known that international collaboration influences publication success and leads to production of novel and high-quality research¹⁴. It can be inferred that the Iranian Dermatology Society underperformed in its vast potential to scientifically interact with the global community in this area. We have observed a decline in the proportion of review articles in 2014. The current policy of the Ministry of Health and Education states that it only gives academic and promotion credits to author(s) of review articles when at least three previously published papers by the author(s) are cited in the review paper. The merit of this strategy is that it provides exclusive advantage to the highly acclaimed scholars with substantial research contribution in the field to

author a review article. However, in the long run, it leads to a decreased number of these publications as younger authors with novel findings and publications in a specific area of science may not be motivated to present their findings as review papers.

Advanced Biomedical Research and Acta Medica Iranica were the leading publishing journals in 2014 - both Iranian, PubMed-indexed, open access journals in general medicine. The former's editorial office is based at Isfahan University of Medical Sciences and has published 14 papers from the Department of Dermatology of this university (out of 14 overall dermatology papers). The latter is the official journal of the Faculty of Medicine, Tehran University of Medical Sciences. This journal published 5 out of 13 dermatology papers from the Department of Dermatology of the same university. The increase in Iranian medical journals and their warm reception by scholar dermatologists is a positive development; however, it should not compromise or replace the production and publication of high-quality research papers in prestigious, leading international dermatology journals. Iranian scientific and technology publications continue to globally underperform in citation, impact, and visibility⁴. Publishing in local journals with low placement could limit accessibility and readability of Iranian dermatologists' work and experience for the international community. The political and economic sanctions imposed on Iran have led to restrictions and embargo of scientific Iranian publications by a number of academic publishers, which subsequently directed the researchers to publish in national journals^{15,16}. The effect of the financial crisis over the past few years and its inevitable influence on research budget allocation and financial support of projects should not be underestimated. We have not assessed the number of paper citations. Although citation number is a better indicator of scientific impact, it is a lagging indicator. Therefore, more long-term studies are required to correctly identify such items.

In conclusion, the number of international publications by Iranian dermatologists has proliferated during the past decade with a specific trend towards multi-institutional and multi-authored publications, and higher influence by women scholars. Encouraging international collaborations, production of high-quality and

novel research, improving the standards and visibility of national journals, and higher adherence to authorship and publication ethics are essential perquisites to a more productive future for dermatology research in Iran.

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