ORIGINAL ARTICLE

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

Iranian Researchers' Contribution to Otorhinolaryngology: A Bibliometric Survey (2011-2020)

Ali Asghar Peyvandi[1], Zahra Shamloo[1], Mahdi Khajavi[1], Farhad Mokhtarinejad[1], Mohammad Karim Saberi[2]*, Davoud Haseli[3], Heidar Mokhtari[4], Ali Ouchi[5]

1. Hearing Disorders Research Center, Loghman Hakim Hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran.
2. Department of Nursing, Shirvan Faculty of Nursing, North Khorasan University of Medical Sciences, Bojnurd, Iran.
3. Department of Knowledge and Information Science, Faculty of Psychology and Education, Kharazmi University, Tehran, Iran.
4. Department of Library and Information Science, Payame Noor University, Tehran, Iran.
5. Student Research Committee, School of Health Management and Information Sciences Branch, Iran University of Medical Sciences, Tehran, Iran.

Article Info

Article Note:
Received: November 2023
Accepted: December 2023
Publish Online: December 2023

Corresponding Authors:
Dr. Mohammad Karim Saberi

Email:
m.saberi@umsha.ac.ir

Keywords:
Bibliometrics;
Iran;
Otorhinolaryngology;
Scientometrics.

Abstract

Background: Iranian researchers' scientific output in otorhinolaryngology needs to be evaluated from a bibliometric perspective.

Aim: This survey aimed at studying Iranian researchers' global contribution to the field during the recent decade (2011-2020).

Methods: Data were extracted by conducting a formulated search strategy in Scopus and analyzed by applying some bibliometric approaches and depicting scientific visualizing maps in VOSviewer software package.

Results: Iranian researchers published 2488 documents on otorhinolaryngology during 2011-2020. The mean h-index of the documents was 42, with mean citations per document=6.60. The majority of documents were original research (87.78%) and in English (.96.70%). The annual growth of Iranian researchers' documents on otorhinolaryngology was increasing in the studied years (R^2=0.91), especially in 2019 and 2020. Nader Saki from Ahvaz Jundishapur University of Medical Sciences with 65 documents (citations per document=18.42 and h-index=11) ranked first among top authors. Iranian Journal of Otorhinolaryngology was the first-ranked journal with publishing 327 documents. Among research institutes, Tehran University of Medical Sciences ranked first with 631 documents. The first-ranked collaborating country was the USA collaborating with Iran in authoring 125 documents. Broad-ranged keywords covering almost all aspects of the field were used in the published documents that were included in four topic clusters.

Conclusions: The global research on otorhinolaryngology made by Iranians has found its way. This study recognized important authors, journals, institutions, and countries as well as highly frequent co-occurred keywords and main subject clusters included in otorhinolaryngology documents published by Iranian researchers in the field.

Conflicts of Interest: The Authors declare no conflicts of interest.
Please cite this article as: Peyvandi AA, Shamloo Z, Khajavi M, Mokhtarinejad F, Saberi MK, Haseli D, Mokhtari H, Ouchi A. Iranian Researchers' Contribution to Otorhinolaryngology: A Bibliometric Survey (2011-2020). J Otorhinolaryngol Facial Plast Surg 2023;9(1):1-13. https://doi.org/10.22037/orlfps.v9i1.44309

Introduction

As one of the main professions in the medical field, otorhinolaryngology has been considerably developed in recent decades and benefited from new developments in microsurgery, cytotoxic drugs, flap reconstruction and microchip technology (1). Scientific research in the field has been inspired due to these innovations and developments. Systematic reviews as ones conducted in bibliometrics help researchers identify

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

scientific trends and facilitate research policy-making (2). Using mathematical and statistical approaches, bibliometrics quantitatively analyses all scientific agents and carries (3) and explores bibliometric features and research developments in published documents (4, 5). Bibliometric data can demonstrate the development of scientific information in different fields and subfields (6), including changes made in research and written communication (7).

Nowadays, due to a vast development in designing software packages in bibliometrics, different analyses other than traditional ones can be done for analyzing big data and making easy data interpretation as well as exploring and visualizing new patterns (8). Bibliomeric evaluation and scientific visualization are used for monitoring a research line or study topic and evaluating research frameworks in scientific fields (9). Using bibliometric techniques in medical fields and subfields is common. Otorhinolaryngology is not an exception. It has a great contribution to the medical field and related subfields (10). Few bibliometric researches have been conducted in otorhinolaryngology and related subfields, including among others, study on top producing countries during a 5-year time span (2009-2013) (11), top highly cited journals during 1985-2014 (12) and citation-analysis of publishing journals (13). As a main influencing medical subfield, it needs to be evaluated from the perspective of research output made by researches from a certain country. Some bibliometric studies have been conducted for evaluating Iranian researchers' contribution to some medical fields, including family theraphy (14), thyroid disease (15), pharmacology and pharmacy (16), parasitology (17), stem cells (18), endocrinology and metabolism (19) and microbiota (20).

Despite that otolaryngologists and academicians in Iran do research in the field and publish in national and international journals, the contribution of Iranian reseaerchers in the field of otorhinolaryngology is unknown. This bibliometric survey aimed at studying Iranian researchers' contribution in the field during recent decade (2011-2020).

Methods

Database used

The number of documents indexed in main indexing and abstracting databases is one of main criteria for measuring a certain country's scientific output and influence (21). Therefore, bibliometricians use some known databases for their analyses, including Google Scholar, Scopus, Web of Science (WoS) and PubMed. We extracted data from Scopus. Produced by Elsevier, the database is conceived as the greatest indexing / abstracting database with rich citation data of peer-reviewed literature. It produces annual bibliometric indicators that are used by many research policy-makers worldwide (22, 23).

Search strategy

By entering the search query into the advanced search box of Scopus, the needed data were extracted on 8 January 2022 and 2488 documents were retrieved. The search formula was as follows:

Otorhinolaryngology AND (LIMIT-TO (AFFILCOUNTRY, “Iran”)) AND (LIMIT-TO (PUBYEAR, 2020) OR LIMIT-TO (PUBYEAR, 2019) OR LIMIT-TO (PUBYEAR, 2018) OR LIMIT-TO (PUBYEAR, 2017) OR LIMIT-TO (PUBYEAR, 2016) OR LIMIT-TO (PUBYEAR, 2015) OR LIMIT-TO (PUBYEAR, 2014) OR LIMIT-TO (PUBYEAR, 2013) OR LIMIT-TO (PUBYEAR, 2012) OR LIMIT-TO (PUBYEAR, 2011))

Information on publication year, document type and language, top authors, journals, affiliated institutes and countries as well as highly frequent keywords and main subjects were all extracted from Scopus.

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

The full bibliographic data and citation rates and cited sources were downloaded as CSV format.

Bibliometric indicators and visualization techniques

Some bibliometric indicators were identified, including document type and language, top authors, journals, research institutes and countries.

H-indices and mean rates of citations per document (CPD) were used for evaluating the quality of publications. For studying the social structure (24), co-authorship networks of contributing authors, institutes and countries were depicted and word co-occurrence analysis was designed for exploring the conceptual structure (25).

Statistical analysis

Data visualization was done by applying VOSviewer and GunnMap. The former is used for mapping the network of citations, co-authorship, word co-occurrences, bibliographic couplings and subject clustering (26-28).

The latter (http://gunnmap.herokuapp.com) was used for mapping the density distribution of documents published by collaborating countries. H-indexes and the mean rates of citations per document (CPD) were obtained via the extracted CSV file.

Results

General findings

For 2488 otorhinolaryngology documents of Iranian researchers indexed in Scopus during 2011-2020, the mean h-index was 42. The citation counts ranged from 0 to 366, with 1930 documents receiving at least 1 citation. The total citations amounted to 16415 with 6.60 citations per document.

Types of documents and languages

The majority of documents were original research papers (2184; 87.78%), followed by reviews (218; 8.78%), letters to the editor (37; 1.49%), book chapters (13; 0.52%) and notes (10; 0.40%). In addition, 26 (1.05%) documents were grouped as others. The majority of documents were in English (2406; 96.70%), followed by Persian (122; 4.90%), Portuguese (17; 0.68%), Arabic (8; 0.32%), Spanish (6; 0.24%), French (4; 0.16%) and Italian (1; 0.04%), respectively.

Annual growth of publications

As Figure 1 shows, the annual growth of Iranian researchers' documents on otorhinolaryngology was increasing in the studied years (R2=0.91) as line of the best fit on the scatter diagram depicts the trend. While they published 150 documents in 2011, the number of their documents equaled 395 in 2020. The trend sped especially in 2019 and 2020.

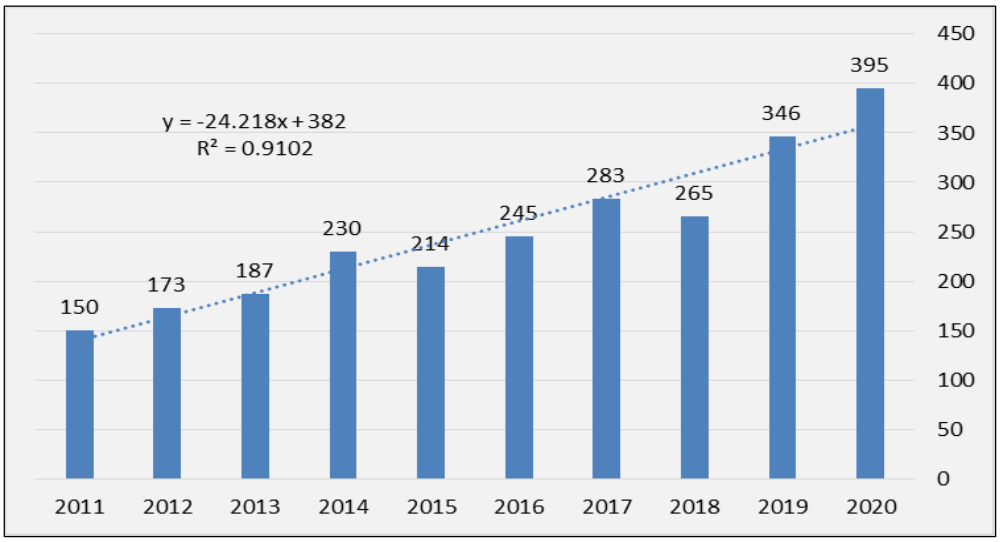

Figure 1. The annual growth of Iranian researchers' documents on otorhinolaryngology (2010-2020)

Most active authors

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

Table 1 shows some bibliometric indicators of top 20 active authors. As can be seen, Nader Saki from Ahvaz Jundishapur UMS with 65 documents, 18.42 citations per document and h-index=11 ranked first, followed by Mohammad Farhadi from Tehran UMS with 60 documents and Mehdi Bakhshaee with 54 documents from Mashhad UMS, respectively. Of them, 5, 3 and 3 authors were from Tehran UMS, Ahwaz UMS and Mashhad UMS, respectively.

Table 1. Top 20 Iranian authors publishing on otorhinolaryngology (2011–2020)

SCR[a]	Author	Affiliation	Doc.	Cit.[b]	Cit./ Doc.[b]	h-index[b]
1	Saki, N.	Ahvaz Jundishapur UMS	65	1197	18.42	11
2	Farhadi, M.	Tehran UMS	60	451	7.52	11
3	Bakhshaee, M.	Mashhad UMS	54	284	5.26	9
4	Nikakhlagh, S.	Ahvaz Jundishapur UMS	48	187	3.90	7
5	Yazdani, N.	Tehran UMS	42	254	6.05	10
6	Amali, A.	Tehran UMS	38	253	6.66	8
7	Tabatabaiefar, M.A.	Isfahan UMS	31	344	11.10	12
	Khademi, B.	Shiraz UMS	31	164	5.29	7
	Bayat, A.	Ahvaz Jundishapur UMS	31	164	5.29	7
8	Rajati, M.	Mashhad UMS	28	155	5.54	7
	Nemati, S.	Guilan UMS	28	150	5.36	8
	Jalaie, S.	Tehran UMS	28	108	3.86	6
9	Daneshi, A.	Iran UMS	27	240	8.89	8
	Rahpeyma, A.	Mashhad UMS	27	154	5.70	8
10	Jafari, Z.	Tehran UMS	25	203	8.12	7
11	Daneshi A.	Iran UMS	26	168	6.46	7
	Salehi M.	Iran UMS	26	162	6.23	7
12	Ahmadi A.	Iran UMS	25	219	8.76	5
13	Hashemzadeh-Chaleshtori M.	Shahrekord UMS	22	227	10.32	10
	Hashemi S.B.	Shiraz UMS	22	85	3.86	5

SCR: standard competition ranking, UMS: university of medical sciences

[a] Equal authors have the same ranking number and then a gap is left in the ranking numbers

Most productive journals

Table 2 shows the number of documents, h-indices and CPDs of top 20 publishing journals. Iranian Journal of Otorhinolaryngology ranked first with publishing 327 documents, followed by International Journal of Pediatric Otorhinolaryngology with 144 documents and European Archives of Oto-Rhino-Laryngology with 49 documents, respectively. These three journals have h-index>10.

Top collaborating countries

Table 3 shows the number of documents and citations, h-indices and CPDs of top 20 collaborating countries. The first rank belonged to the USA collaborating with Iran in authoring 125 documents. Germany, UK, Canada and Italy ranked second to fifth, respectively.

The CPD indicator of these 20 countries collaborating with Iran was more than that of all documents.

Most active institutions

Table 4 shows the number of documents and citations, h-indices and CPDs of top 20 productive Iranian research institutes. The first to third ranks in producing documents belonged to Tehran UMS (631), Mashhad UMS (317) and Iran UMS (306), respectively. The top h-indices belonged to Tehran UMS (28) and Mashhad UMS (20), respectively. However,

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

the top CPDs belonged to Shiraz UMS (8.53) and Mazandaran UMS (7.94), respectively.

Table 2. Top 20 productive journals publishing Iranian researchers' documents on otorhinolaryngology (2011–2020)

SCR[a]	Journal	Doc.	Cit.[b]	Cit./Doc.[b]	*h*-index
1	Iranian Journal of Otorhinolaryngology	327	1455	4.45	14
2	International Journal of Pediatric Otorhinolaryngology	144	1084	7.53	17
3	European Archives of Oto-Rhino-Laryngology	49	457	9.33	12
4	Iranian Red Crescent Medical Journal	38	305	8.03	10
	Acta Medica Iranica	38	216	5.68	9
6	Indian Journal of Otolaryngology and Head and Neck Surgery	31	98	3.16	6
7	Journal of Research in Medical Sciences	30	215	7.17	8
	Journal of Craniofacial Surgery	30	136	4.53	6
8	Journal of Isfahan Medical School	28	20	0.71	2
9	Iranian Journal of Pediatrics	27	197	7.30	8
	Iranian Rehabilitation Journal	27	37	1.37	3
10	Journal of Mazandaran University of Medical Sciences	26	13	0.50	2
11	Brazilian Journal of Otorhinolaryngology	25	100	4.00	6
12	International Journal of Pediatrics	24	99	4.13	6
13	Journal of Voice	22	116	5.27	8
	Journal of Babol University of Medical Sciences	22	32	1.45	3
	Koomesh	22	28	1.27	3
14	American Journal of Otolaryngology - Head and Neck Medicine and Surgery	21	170	8.10	3
	Archives of Iranian Medicine	21	160	7.62	7
15	Asian Pacific Journal of Cancer Prevention	20	234	11.70	10

SCR: standard competition ranking

[a]. Equal journals have the same ranking number and then a gap is left in the ranking numbers

[b]. These indicators reflect the measures for Iranian researchers only.

Table 3. Top 20 countries collaborating with Iran on otorhinolaryngology (2011–2020)

SCR[a]	Country	Doc.	Cit.[b]	Cit./Doc.[b]	*h*-index
1	United States	125	2535	20.28	24
2	Germany	44	522	11.86	9
3	United Kingdom	34	434	12.76	11
4	Canada	31	562	18.13	14
5	Italy	30	367	12.23	11
6	Australia	20	344	17.2	9
7	Malaysia	17	155	9.12	6
8	Sweden	16	326	20.38	10
9	India	15	249	16.6	6
	Netherlands	15	184	12.27	7
10	Turkey	13	139	10.69	5
11	Spain	12	306	25.5	6
	France	12	266	22.17	7
	China	12	196	16.33	6

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

12	Switzerland	9	207	23	7
	Belgium	9	154	17.11	5
13	Saudi Arabia	7	75	10.71	5
14	Norway	6	73	12.17	4
	Poland	6	173	28.83	3
	Pakistan	6	123	20.5	4

SCR: standard competition ranking,
[a.] Equal countries have the same ranking number and then a gap is left in the ranking numbers.
[b.] These indicators reflect the measures for Iranian researchers.

Table 4. Top 20 Iranian institutes publishing documents on otorhinolaryngology (2011–2020)

SCR[a]	Institution	Doc.	Cit.[a]	Cit./Doc.[a]	*h*-index
1	Tehran UMS	631	4387	6.95	28
2	Mashhad UMS	317	2023	6.40	20
3	Iran UMS	306	1721	5.62	18
4	Shahid Beheshti UMS	271	2052	7.57	18
5	Isfahan UMS	189	1200	6.35	18
6	Shiraz UMS	183	1562	8.53	18
7	Islamic Azad University	154	1173	7.62	18
8	Ahvaz Jundishapur UMS	135	589	4.36	13
9	Tabriz UMS	128	877	6.85	15
10	University of Social Welfare and Rehabilitation Sciences	115	681	5.92	14
11	Baqiyatallah UMS	86	471	5.48	12
12	Guilan UMS	76	413	5.43	10
13	Shahrekord UMS	74	580	7.84	14
14	Shahid Sadoughi UMS	71	404	5.69	10
15	Hamadan UMS	69	495	7.17	12
16	Babol UMS	65	356	5.48	9
17	Mazandaran UMS	58	461	7.94	11
18	Kerman UMS	53	208	3.92	10
19	Zahedan UMS	43	220	5.11	9
20	Kermanshah UMS	42	198	4.71	8

SCR: standard competition ranking, UMS: university of medical sciences
[a.] Equal institutes have the same ranking number and then a gap is left in the ranking numbers
[b.] These indicators reflect the measures for Iranian research institutes.

Co-authorship network

Figure 2 depicts the co-authorship network of 48 Iranian authors with at least 15 published documents on otorhinolaryngology during 2011-2020. The rates denoting total link strength are included in parentheses after author names. The network has 6 clusters. The first cluster (in red) includes 10 authors, including among others, Rajati, M. (42), Bakhshaee, M. (41), Salehi, M. (29 documents) and Hashemi, S.B. (24). Second cluster (in green) with 10 authors includes among others, Farhadi, M. (88), Daneshi, A. (71), Mohseni, M. (57), and Asghari, A. (52). With 9 authors, the third cluster (in blue) included among others, Amali, A (25), Mahmoudian, S. (25) and Pourbakht, A. (23). The fourth cluster (in yellow) has 7 authors, with Saki, N. (82), Nikakhlagh, S (61), and Bayat, A. (47) as main authors. The fifth cluster (in purple) had 6 authors, including Atighechi, S (38), Zand, V. (30) and Baradaranfar, M.H. (28) and Dadgarnia, M.H. (28). The sixth cluster (in turquoise) includes 6 authors, with Yazdani, N. (36), Kouhi, A. (22)

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

and Dabiri, S. (20) as top ones. Ones with more total strength link were Farhadi, M. (88) from the second cluster, Saki, N. (82) from the fourth cluster, Daneshi, A. (71) from the second cluster, Nikakhlagh, S. (61) from the fourth cluster (61) and Mohseni, M. from the second cluster (57), respectively. These authors are of important authors in consisting the scientific co-authorship network.

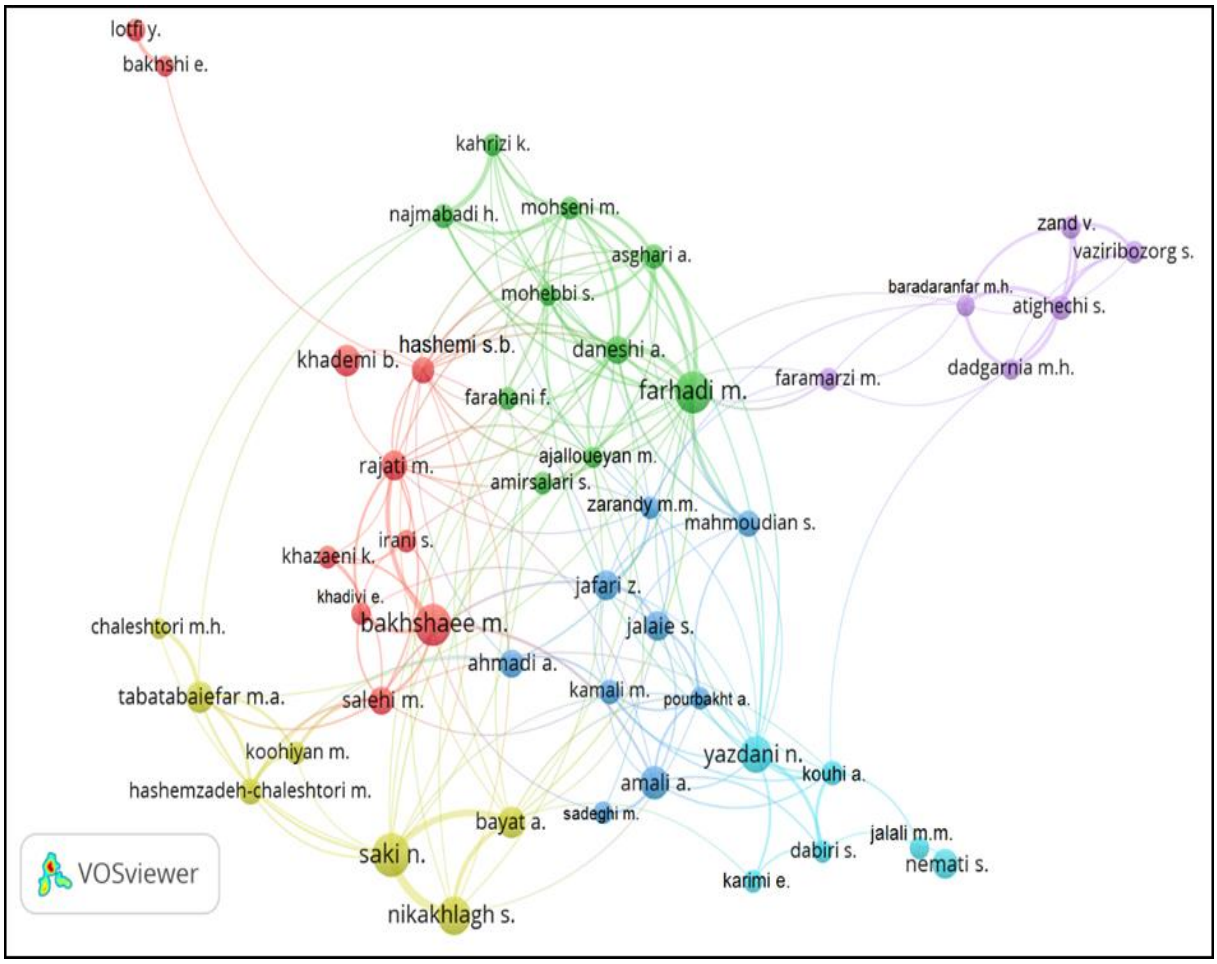

Figure 2. Network visualization map of Iranian authors' collaboration for authoring in otorhinolaryngology during 2011-2020 with a threshold of 15 documents. Note: Nodes (font sizes) show the frequencies of documents and line thickness between two nodes shows the strength of co-authorship between the two authors. The shorter the distance between the two nodes is, the more collaboration is made between them.

Country collaboration network

Authors from 78 countries worldwide collaborated with Iranian authors in publishing on otorhinolaryngology during 2011-2020. Figure 3 depicts the collaboration network of 20 countries with at least 6 co-authored documents. Here, the rates denoting total link strength are included in parentheses after country names.

Three clusters were formed. The first and main one (in red) shows 10 collaborating countries, including USA (100), UK (51), Italy (41), Canada (30), Australia (17), Switzerland (15), Sweden (13), Saudi Arabia (10), and Malaysia (9). The second cluster (in green) included 7 countries: India (37), Turkey (34), China (33), France (24), Spain (22), Belgium (17), and Poland (17). The third cluster (in blue) consists of 4 countries: Germany (44), Netherlands (20), Pakistan (20) and Norway (16).

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

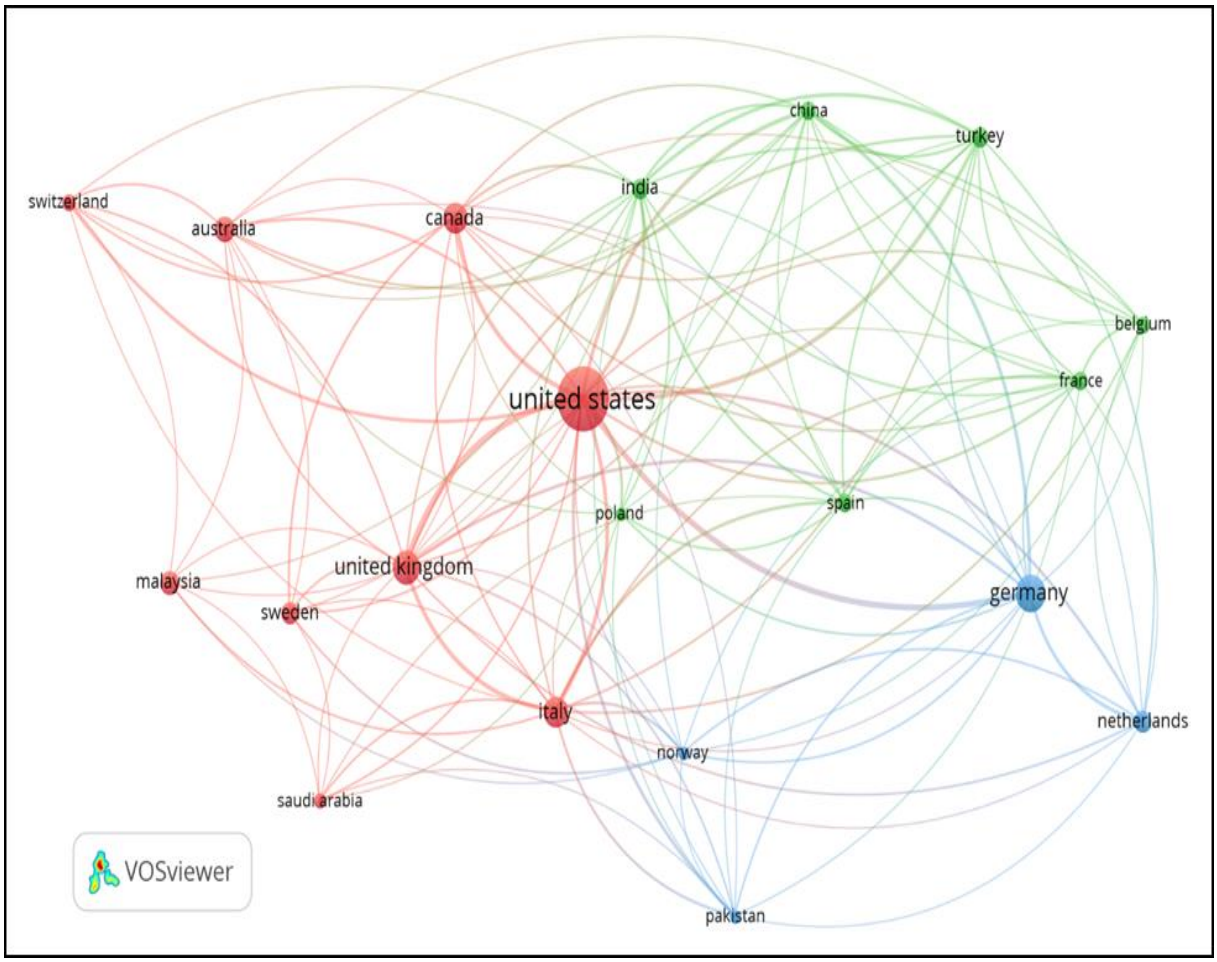

Figure 3. Network visualization map of worldwide country collaboration collaborating with Iran in authoring on otorhinolaryngology during 2011-2020 with a threshold of 6 documents. Note: Iran was deleted from the map. Nodes (font sizes) show the frequencies of documents and line thickness between two nodes shows the strength of collaboration between the two countries. The shorter the distance between the two nodes is, the more collaboration is made between them.

Research institutes' collaboration network

Figure 4 shows three clusters of 21 Iranian collaborating institutes with at least 40 documents.

The rates denoting total link strength are included in parentheses after institute names. The first cluster (in red) shows the collaboration of 9 universities: Iran UMS (272), Islamic Azad University (143), Isfahan UMS (143), Ahvaz Jundishapour UMS (100), University of Social Welfare and Rehabilitation (100), ShareKord UMS (73), Tehran University (52), Hamadan UMS (51) and Zahedan UMS (37). The second cluster (in green) includes 6 universities: Tehran UMS (422), Shahid Beheshti (204), Babol UMS (47), Mazandaran UMS (47), Guilan UMS (28) and Kermanshah UMS (23). The third cluster (in blue) consists of 6 universities, including Mashhad UMS (144), Shiraz UMS (95), Baqiyatallah UMS (84), Tabriz UMS (54), Shahid-Sadoughi UMS (34) and Kerman UMS (33). In forming the network, Tehran UMS, Iran UMS, Shahid Beheshti UMS, Mashhad UMS, Islamic Azad University and Isfahan UMS were the main ones.

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

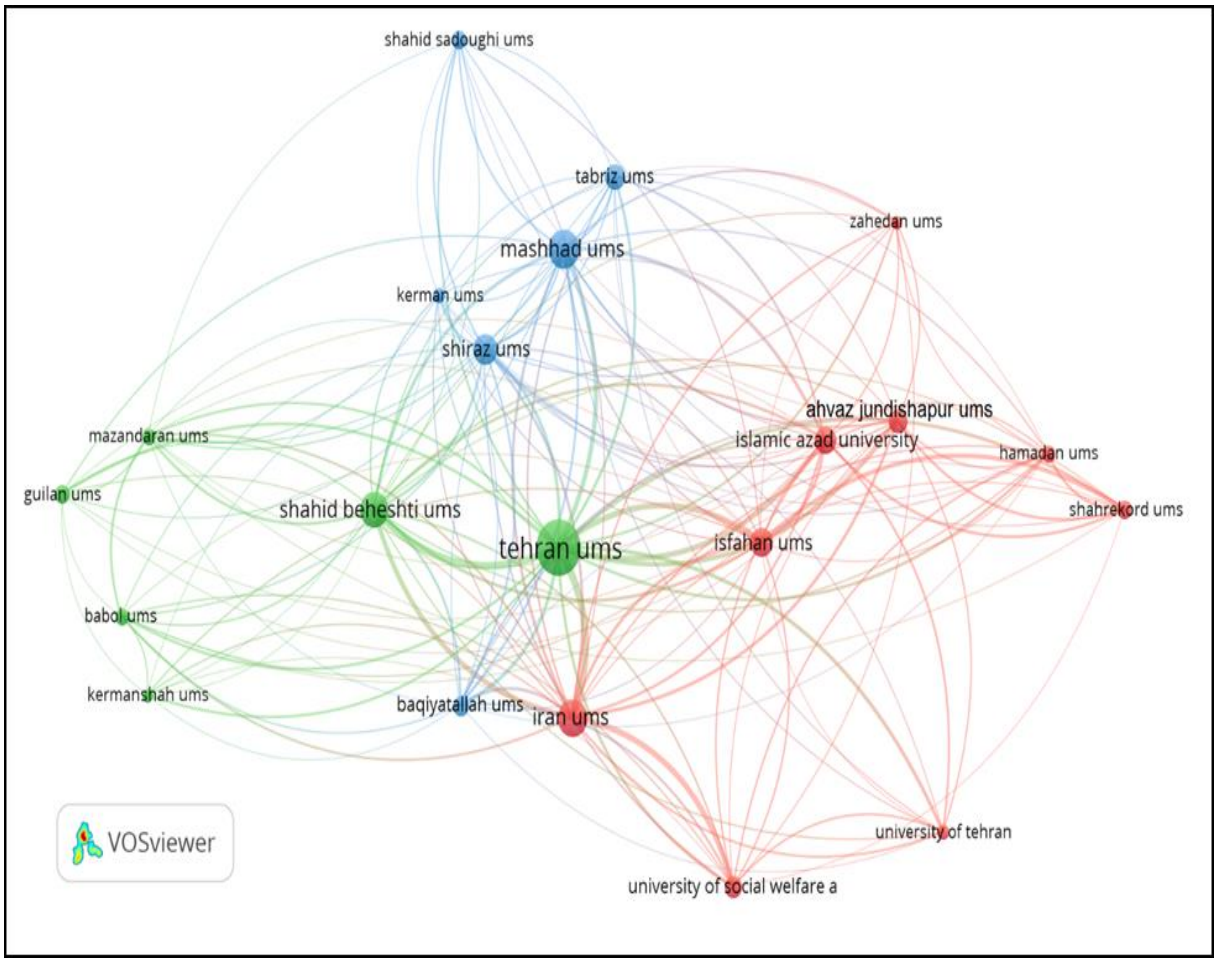

Figure 4. Network visualization map of Iranian research institutes' collaboration for authoring in otorhinolaryngology during 2011-2020 with a threshold of 40 documents. Note: Nodes (font sizes) show the frequencies of documents and line thickness between two nodes shows the strength of collaboration between the two institutes. The shorter the distance between the two nodes is, the more collaboration is made between them.

Word co-occurrence network

Figure 5 depicts the density map of 36 highly frequent co-occurred keywords with more than 100 frequencies in four clusters. Including 13 keywords (human, male, female, adult, adolescent, middle aged, aged, young adult, follow up, human tissue, computer assisted tomography, histopathology, and pathology), the first cluster (in red) relates to pathological aspects in different human groups. The second one (in green) consists of 10 keywords (Iran, hearing impairment, prevalence, hearing loss, perception deafness, genetics, disease association, risk factor, polymerase chain reaction, and nonhuman) and mainly explains otology.

The third cluster (in blue) with 8 keywords (treatment outcome, procedures, pathophysiology, disease severity, physiology, outcome assessment, hearing, and double blind procedure) demonstrates procedural aspects. The fourth cluster (in yellow) has 5 keywords (child, preschool child, school child, infant, and children) and can be named pediatric otorhinolaryngology. Of them, 5 keywords were top highly-cited ones: pathology (CPD= 10.61), risk factor (CPD= 10.44), non-human (CPD= 9.94), genetics (CPD= 9.41) and procedures (CPD= 8.52).

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

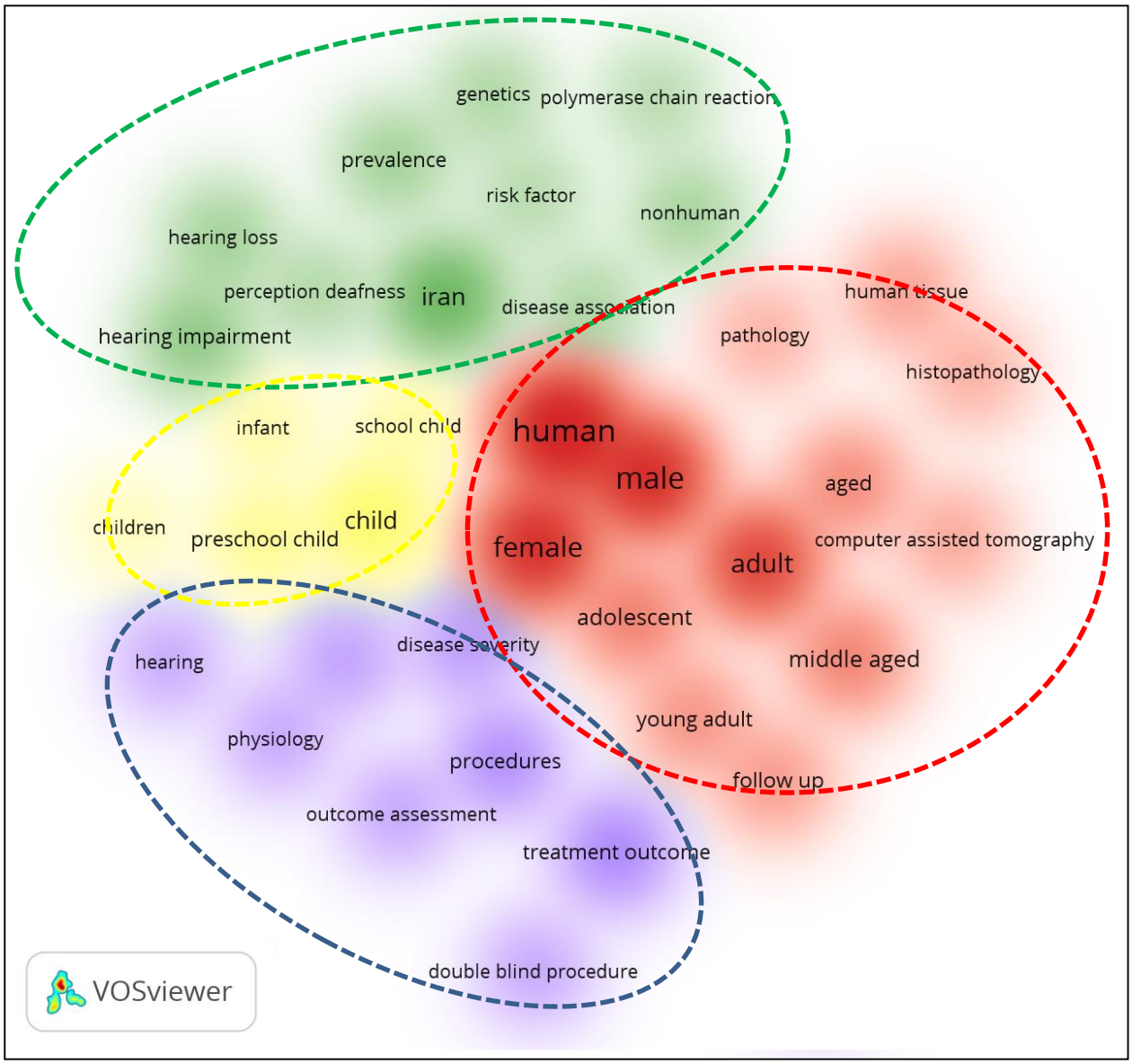

Figure 5. Word co-occurrence density map of keywords used in Iranian researchers' documents on otorhinolaryngology co-occurred more than 100 times during 2011-2020. Note: Some keywords may not clearly occur in the map due to overlap. The color density and font sizes show the co-occurrence frequencies. The shorter the distance between the two keywords, the more the frequencies of co-occurrence between them.

Discussion

Aiming at investigating the global contribution of Iranian researches on otorhinolaryngology during recent decade (years 2011-2020), we found that Iranians' contribution to research on the field is in increasing trend, especially in recent years. This development reflects research dynamics of the field and its accurate considerations made by Iranian researchers and policy-makers. One other reason is the quantitative and qualitative development in Iran medical education. Such a development in research and contribution to global scientific output by Iranians can be seen in other medical fields (14, 19). This is a sign of Iranian medical researchers' interest in involving in the global research on medical fields.

The contributed documents received rather good rate of citations during these years as their mean h-index and CPD rates show. These rates are greater than those found for other medical fields (2, 19, 20). However, the citation rates

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

can be increased by improving research quality by publishing documents in highly prestigious internationally scoped journals as well as collaborating with international authors and research institutes worldwide. These documents are mainly original research articles. Original articles are common in science as the innovative findings and creative procedures are reflected in them. In addition, as expected, the predominant language of the documents is English, as an internationally scoped language.

Considering more active researchers and highly-productive research institutes, it can be said that the majority of contributing institutes and affiliated authors are from big and wealthy cities, especially Tehran, as the capital city, indicating an inequality in the distribution of research grants and research funds for publishing international research throughout the country. Such a finding was reported in other medical fields (16, 19, 20). Policy-makers should pay more attention to other research institutes distributed countrywide and potentially may contribute to the field.

Highly productive journals that published Iranian researchers' papers on otorhinolaryngology are published in Iran and these journals are highly prestigious. The top journal is *Iranian Journal of Otorhinolaryngology*. As an official scientific bimonthly publication of Mashhad University of Medical Sciences, it has been published since 1985 and covers related topics of both local and international intents. It is indexed in main indexing and abstracting database (including among others Scopus and PubMed).

Considering country collaboration, it can be seen that the collaborating countries are with European origin. Some European countries have been found as more active countries in publishing on the field (11). As the top country in contributing to the global research on the field (11), USA is the first rank collaborating country in Iranian research on otorhinolaryngology and some other medical fields (19, 20). The contribution of Asian countries is low in this regard. It is needed that the researchers tend to contribute with their Asian colleagues for solving local problems and issues.

As keyword clustering shows, the majority of topics in the field have been studied reflecting that Iranian researchers have considered all needed aspects in the field. However, some ignored or less-considered and newly emerged topics can be detected to conduct further influential studies.

Conclusion

Our study is the first to give a relatively comprehensive bibliometric visualization of Iranians' research publication in otorhinolaryngology. This study made contribution to the literature in this field and recognized important authors, journals, institutions, countries, and areas as well as main considerable keywords and subject clusters. The global research on otorhinolaryngology by Iranians has found its way. However, Iran has more distance from other pioneering countries. We need to more consider the research and development in the field for producing more qualified research. Collaborating with researchers in an international level and co-authoring active institutes and activating researchers in other research institutes throughout the country can be beneficial.

Considering the differences between indexing databases in covering bibliographic data, it will be helpful to conduct other studies by extracting data from other databases. This exploratory study helps researchers find active agents in otorhinolaryngology and assists policy makers within the country in directing research grants and funds. In addition, it is a sample for conducting other bibliometric studies in similar medical fields.

Acknowledgments

Not declared.

Conflicts of Interest

The authors declare no conflicts of interest.

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

Financial Support
The authors declare there is no funding support for this study.

Ethics
IR.SBMU.RETECH.REC.1399.1090

Authors' ORCIDs
Ali Asghar Peyvandi
https://orcid.org/0000-0002-7509-1416
Zahra Shamloo
https://orcid.org/0000-0002-9760-5705
Mahdi Khajavi
https://orcid.org/0000-0001-5547-7429
Farhad Mokhtarinejad
https://orcid.org/0000-0001-6098-6455
Mohammad Karim Saberi
https://orcid.org/0000-0002-2471-0408
Ali Ouchi
https://orcid.org/0000-0003-3861-3761
Heidar Mokhtari
https://orcid.org/0000-0002-2396-8634

References
1. Weir N. Otorhinolaryngology. Postgrad Med J. 2000;76(892):65-9.

2. Chuang K-Y, Chuang Y-C, Ho M, Ho Y-S. Bibliometric analysis of public health research in Africa: The overall trend and regional comparisons. S Afr J Sci. 2011;107(5):1-6.

3. Merigo JM, Blanco-Mesa F, Gil-Lafuente AM, Yager RR. Thirty years of the International Journal of Intelligent Systems: A bibliometric review. Int. J. Intell. Syst. 2017;32(5):526-54.

4. Pritchard A. Statistical bibliography or bibliometrics. J Doc. 1969;25(4):348-9.

5. Thompson DF, Walker CK. A descriptive and historical review of bibliometrics with applications to medical sciences. PHPYDQ. 2015;35(6):551-9.

6. Şenel E, Demir E, Alkan RM. Bibliometric analysis on global Behçet disease publications during 1980–2014: is there a Silk Road in the literature? J. Eur. Acad. Dermatol. Venereol. 2017;31(3):518-22.

7. Wang C, Lim MK, Zhao L, Tseng M-L, Chien C-F, Lev B. The evolution of Omega-The International Journal of Management Science over the past 40 years: A bibliometric overview. Omega. 2020;93:102098.

8. Buckley AR. The application of spatial data analysis and visualization in the development of landscape indicators to assess stream conditions: Oregon State University; 1997.

9. Van Raan A. The use of bibliometric analysis in research performance assessment and monitoring of interdisciplinary scientific developments. TATuP-Zeitschrift für Technikfolgenabschätzung in Theorie und Praxis. 2003;12(1):20-9.

10. Wasserman JM, Wynn R, Bash TS, Rosenfeld RM. Levels of evidence in otolaryngology journals. J Otolaryngol-Head N. 2005;2(133):P90.

11. Saunders T, Rymer B, McNamara K. A global bibliometric analysis of otolaryngology: Head and neck surgery literature. Clin Otolaryngol. 2017;42(6):1338-42.

12. Lenzi R, Fortunato S, Muscatello L. Top-cited articles of the last 30 years (1985–2014) in otolaryngology–head and neck surgery. J Laryngol Otol. 2016;130(2):121-7.

13. Coelho D, Edelmayer L, Fenton J. Citation analysis of otorhinolaryngology journals: follow-up study. J Laryngol Otol. 2015;129(5):489-93.

14. Asnafi AR, Ommati E. Survey of scientific production of Iranian researchers in family therapy field. Casp. J. Appl. Sci. Res. 2017;3(2):7-15. (Persian)

15. Emami Z, Hariri N, Khamseh ME, Nooshinfard F. Mapping Scientific Output of Thyroid Disease Publications in Iran and the Middleast: A Scientometric Study. Iran. J. Endocrinol. Metab. 2016;18(1):1-9. (Persian)

16. Shekofteh M, Karimi M, Kazerani M, Zayeri F. Mapping the Structure of Iranian Scientific Pharmacology and Pharmacy Products in Science Citation Index during 2003-2012. JMIS. 2016;2(2):38-47.

17. Khasseh AA, Soosaraei M, Fakhar M. Cluster analysis and mapping of Iranian researchers in the field of parasitology: With an Emphasis on the co-authoreship indicators and h index. Iran J Microbiol. 2016;10(2):63-74.

18. Sedghi S, Mousakhani G, Talachi H. Citation analysis and scientific mapping of Iranian researchers' publications in stem cell indexed in science citation index up to 2015. J Health Adm (JHA). 2016;19(66).

19. Mohammadi F, Shekofteh M, Kazerani M. Irans Scientific Publications in the Field of Endocrinology and Metabolism in the Web of Science: A Scientometric Analysis. Iran. J. Endocrinol. Metab. 2020;22(2):127-36. (Persian)

20. Aazami H, DehghanBanadaki H, Ejtahed H-S, Fahimfar N, Razi F, Soroush A-R, et al. The landscape of microbiota research in Iran; a bibliometric and network analysis. J. Diabetes Metab. Disord. 2020;19(1):163-77.

21. Hall CM. Publish and perish? Bibliometric analysis, journal ranking and the assessment of

Journal of Otorhinolaryngology and Facial Plastic Surgery 2023;9(1):1-13.
https://doi.org/10.22037/orlfps.v9i1.44309

research quality in tourism. Tour. Manag. 2011;32(1):16-27.

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

23. Kulkarni AV, Aziz B, Shams I, Busse JW. Comparisons of citations in Web of Science, Scopus, and Google Scholar for articles published in general medical journals. Jama. 2009;302(10):1092-6.

24. Kumar S. Co-authorship networks: a review of the literature. Aslib J. Inf. Manag. 2015;67(1):55-73.

25. Cheng F-F, Huang Y-W, Yu H-C, Wu C-S. Mapping knowledge structure by keyword co-occurrence and social network analysis. Libr. Hi Tech. 2018;36(4):636-50.

26. Mongeon P, Paul-Hus A. The journal coverage of Web of Science and Scopus: a comparative analysis. Scientometrics. 2016;106(1):213-28.

27. Van Eck N, Waltman L. Software survey: VOSviewer, a computer program for bibliometric mapping. scientometrics. 2010;84(2):523-38.

28. Saberi MK, Mokhtari H, Farhadi A, Ouchi A, Shamloo Z, Haseli D. Exploring Global Trends in Otorhinolaryngology Research Output. J Otorhinolaryngol Facial Plast Surg 2022;8(1):1-11. https://doi.org/10.22037/orlfps.v8i1.38830