An Analysis of Otology-Neurotology Articles from Turkey Published in Science Citation Indexed Otolaryngology Journals from 2012 through 2016

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Original Investigation

Abstract

Objective: The objective of this study was to review the articles on otology-neurotology submitted from Turkey and published in Science Citation Indexed (SCI) and Science Citation Index-Expanded (SCI-E) journals in the period from 2012 through 2016 in terms of characteristics and quantity, and to analyze the variances in these parameters over the defined time period to profile the national scientific endeavor in the field.

Methods: We searched the papers on otology-neurotology and related subjects that were submitted from Turkey and published in the period from 2012 through 2016 in the relevant journals listed in SCI and SCI-E. We noted the impact factors and quartile rankings of the publishing journals, and reviewed, counted and classified the titles, subjects, types and characteristics of the articles that met our criteria.

Results: A total of 546 papers from Turkey were published in 25 SCI and SCI-E listed journals (145 and 401, respectively) in the defined period. The impact factors of these 25 journals ranged from 0.392 to 2.951. Of these papers, 393 (71.97%) were experimental or observational clinical studies, case reports, or surveys; 137 (25.10%) were non-clinical, laboratory or animal experiments; and the remaining 16 (2.93%) were reviews or letters to the editor.

Conclusion: A substantial number of papers on otology-neurotology submitted from Turkey were published in many prestigious SCI-journals, however, we did not find any significant increase in this number in the given period. We also found concentration of articles in certain journals and inclination to a few subjects and would like to underline that the number of basic science and ecological-epidemiological studies within the confines of our review were relatively few.

Keywords: Otology-neurotology, bibliometrics, Turkey, Science Citation Index

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Introduction

Review of scientific publications through periodical literature search based on the publishing journals, authors, a scientific discipline, citations, a region or a country and their subjects has been defined to measure indicators of academic performances (1). These bibliometric studies allow to follow the publications and the developments in a given area of science within a certain time period (2). The impact factor (IF) is one of the conventional parameters used in evaluating the scientometric value of a scientific journal. IF is calculated annually with a formula dividing the number of citations a journal has received in the preceding two years by the number of citable items published in that journal in the same two years (3). World-leading journals are listed in three major indexes accessible via the Web of Science (WoS), namely, The Science Citation Index (SCI), The Social Sciences Citation Index (SSCI), and The Art and Humanities Citation Index (AHCI) (4). SCI lists over 8500 journals that have been published since 1900 in about 150 scientific disciplines, and these can be accessed via the WoS web page (5). Quartile ranking is another method of categorizing scientific journals; again, according to their IF ranking in a given year. Here, the journals in the top 25% of the IF distribution are placed in Q1 and those in the bottom 25% in Q4 (3).

The aim of this study was to review the articles that were submitted from Turkey in the field of

otology-neurotology or in related subjects such as audio-vestibular science, acoustics, language and speech, and published in journals listed in the SCI and SCI-E in the period from 2012 through 2016, in terms of quantity and characteristics, and to analyze the trends these parameters have shown over these years.

Methods

In the scope of this study, the periodical literature of otology-neurotology and related disciplines (audio-vestibular science, acoustics, language and speech) in the WoS web page as indexed by SCI and SCI-E within the years of 2012-2016 was scanned. The articles from Turkey that were published in this period and reporting clinical or experimental studies, case reports, letters to the editor, reviews and meta-analyses in the indicated fields were included.

Journals, which exclusively publish papers in other sub-branches of otorhinolaryngology and head and neck surgery (ORL-HNS) such as HNS, rhinology, swallowing disorders, phonology, and those which publish only review articles, i.e., Otolaryngologic Clinics of North America, and acoustics journals that deal with the more physical side of this science were excluded. The IFs of the remaining journals and their placement in quartiles (Q1 to Q4) by the years were noted. Articles submitted from non-Turkish institutions and including Turkish authors, as well as articles remotely related to otology-neurotology and/or papers with main authors from fields other than otolaryngology, audiology or from related disciplines were also excluded.

The articles included in this review were sorted under the headings of clinical studies, non-clinical (experimental) studies, reviews/meta-analyses, case reports, and letters to the editor. Clinical studies were further classified as observational (prospective-retrospective) and experimental. Genetics and molecular biology and cell-tissue studies were listed in a separate column regardless of the scope of the study. The results were noted in terms of quantity and characteristics according to the above criteria and statistically analyzed by years.

Results

In our search we found a total of 42 ORL-HNS journals indexed in SCI and SCI-E (16 and 26, respectively). The number of audio-vestibular science, speech-language and acoustics journals were five in SCI and 25 in SCI-E. However, some journals were listed both under ORL-HNS and the related subjects, and when these journals were eliminated, the number of audio-vestibular science, speech-language and acoustics journal decreased to two in SCI and 13 in SCI-E. Some ORL-HNS journals were excluded as they do not publish otology-neurotology papers, thus, the number of journals we reviewed dropped to 34 (SCI: 12, SCI-E: 22) in ORL-HNS, and 15 (SCI: 2, SCI-E: 13) in ORL-HNS-related sciences, summing to 49 in total.

Two of the journals listed in SCI and SCI-E published all articles bilingually (Italian-English or Portuguese-English), while two were published in German with abstracts in English.

Eventually, we identified that 25 SCI (9) and SCI-E (16) ORL-HNS and related subjects journals published otology-neurotology papers from Turkey in this period (2012-2016) (Table 1). The IFs of these journals ranged from 0.392 to 2.951 (accord-

Table 1. Number of SCI and SCI-E indexed otology-neurotology articles from Turkey by publishing journals (2012-2016)

	IF	2012	2013	2014	2015	2016	Total
JAMA Otolaryngol HNS	2.951					1	1
Int J Audiol	1.733	1			3		4
Euro Arch ORL	1.660	8	23	18	20	22	91
Acta Otolaryngol Ital	1.530	1	1		1	1	4
J Otolaryngol HNS	1.495	1	1				2
Int J Pediatr Otorhinolaryngol	1.159	7	12	15	16	14	64
Clin Exp. Otolaryngol	1.149	2	1	2	5	2	12
AurisNasus Larynx	1.128	4	3	3	2	5	17
ORL-J ORL&HNS	1.055		1				1
Am J Otolaryngol	1.033	4	7	8	7	8	34
B-ENT	0.578	4	7		6	2	19
ENT J	0.919	2	2	1	3	4	12
J Vest Res Equilib Orient	0.90		3				3
J laryngol Otol	0.844	9	8	12	14	9	52
Braz J ORL	0.822	1	1	1	2	7	12
Int J Adv Otology	0.392	32	26	23	25	29	135
Total		76	96	83	104	104	463

IF: Impact factor; SCI: Science Citation Index; SCI-E: Science Citation Index Expanded

ing to WoS 2016 figures) (6) and ranked in Q1 to Q4 as listed in journal citation reports (Table 2). Eleven of these journals showed steady, 2 showed ascending, 6 showed descending and 6 showed fluctuating trends in quartile ranking in the course of the 5 years and a majority followed a fairly stable trend (6) (Table 2).

The total number of articles was 546 (SCI journals: 145, and SCI-E journals: 401). The distribution of these papers by years was: 93 in 2012, 106 in 2013, 100 in 2014, 121 in 2015, and 126 in 2016 (Figure 1).

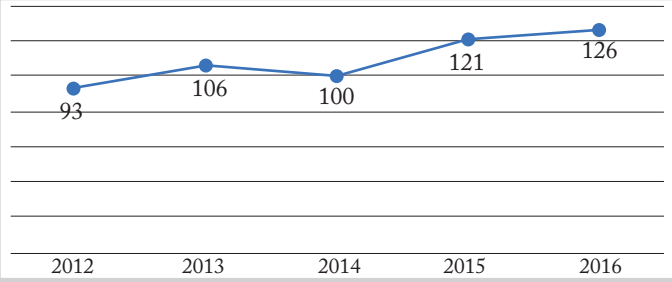

Figure 1. Distribution of SCI and SCI-E indexed otology-neurotology articles from Turkey by years (2012-2016)

Of the 546 articles, 393 (71.97%) were experimental and observational clinical studies (retrospective: 136, prospective: 196,

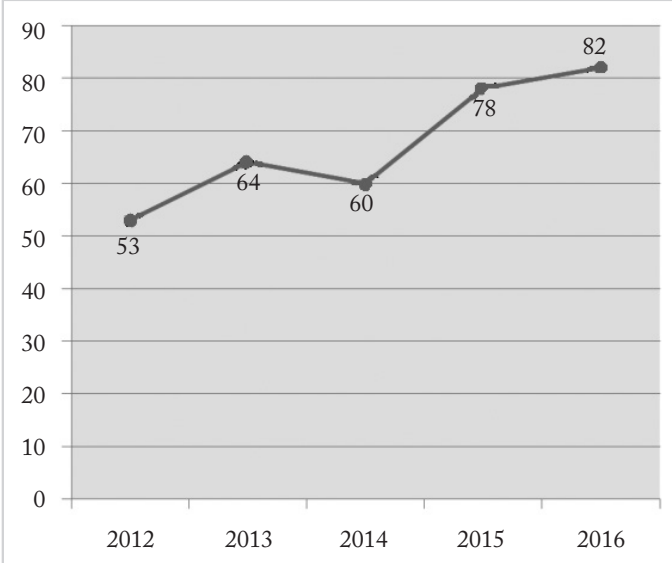

Figure 2. Distribution of clinical otology-neurotology trials from Turkey published in SCI and SCI-E indexed journals by years (2012-2016)

Table 2. The IF of SCI and SCI-E indexed ORL-HNS in 2016 and related subjects journals and their quartiles

	IF	2012	2013	2014	2015	2016
JAMA Otolaryngol HNS	2.951	-	Q4	Q2	Q1	Q1
Ear and Hearing	2.842	Q1	Q1	Q1	Q1	Q1
Laryngoscope	2.471	Q1	Q1	Q1	Q1	Q1
Otolaryngology-Head And Neck Surgery	2.276	Q2	Q2	Q2	Q2	Q1
Otology & Neurotology	2.024	Q1	Q2	Q2	Q2	Q2
Audiology And Neuro-Otology	1.791	Q1	Q1	Q2	Q2	Q2
Int J Audiol	1.733	Q2	Q2	Q2	Q2	Q2
Euro Arch ORL	1.660	Q2	Q2	Q2	Q2	Q2
Journal of The Acoustical Society of America	1.547	Q2	Q2	Q2	Q2	Q3
Acta Otolaryngol Ital	1.530	Q4	Q2	Q2	Q2	Q2
J Otolaryngol HNS	1.495	Q3	Q4	Q3	Q2	Q2
Annals of Otology Rhinology And Laryngology	1.384	Q2	Q3	Q3	Q3	Q2
Int J Pediatr Otorhinolaryngol	1.159	Q2	Q2	Q3	Q3	Q3
Clin Exp Otolaryngol	1.149	Q3	Q3	Q4	Q4	Q3
Auris Nasus Larynx	1.128	Q3	Q3	Q3	Q3	Q3
Acta Oto-Laryngologica	1.116	Q3	Q3	Q3	Q3	Q3
ORL-J ORL & HNS	1.055	Q3	Q4	Q4	Q3	Q3
Am J Otolaryngol	1.033	Q2	Q3	Q3	Q4	Q4
ENT J	0.919	Q3	Q3	Q3	Q4	Q4
J Vest Res Equilib Orient	0.900	Q3	Q2	Q3	Q3	Q4
Clinical Linguistics & Phonetics	0.893	Q1	Q1	Q1	Q1	Q1
J laryngol Otol	0.844	Q4	Q4	Q4	Q4	Q4
Braz J ORL	0.822	Q4	Q4	Q4	Q4	Q4
B-ENT	0.578	Q4	Q4	Q4	Q4	Q4
Int J Adv Otology	0.392	Q4	Q4	Q4	Q4	Q4

IF: Impact Factor; ORL-HNS: otorhinolaryngology and head and neck surgery; Q: Quartile, SCI: Science Citation Index; SCI-E: Science Citation Index Expanded

Table 3. Annual numbers of SCI and SCI-E indexed otology-neurotology articles from Turkey by categories (2012-2016)

	CLINICAL STUDY					NON-CLINICAL STUDY							
	EXPERIMENTAL (RCT)	OBSERVATIONAL			SURVEY (INCIDANCE / PREVALANCE	CASE/ CASE SERIES REPORT	ANIMAL MODELS	GENETIC/ MOLECULAR BIOLOGY	CELL AND TISSUE CULTURE	CADAVER STUDIES	REVIEW/ META-ANALYSIS	LETTER TO THE EDITOR	TOTAL
		PROSPECTIVE	RETROSPECTIVE	TOTAL									
2012	2	38	10	48	4	6	27	4		1	1		93
2013	4	43	21	64	3	7	19	3	1	1	2	2	106
2014	1	29	31	60	3	9	21	2		2		2	100
2015	2	41	37	78	2	4	29	1	1			4	121
2016	4	45	37	82		10	22	3			2	3	126
TOTAL	13	196	136	332	12	36	118	13	2	4	5	11	546

RCT: randomized controlled trial; SCI: Science Citation Index; SCI-E: Science Citation Index Expanded

experimental clinical trials: 13, case or case-series reports: 36, surveys: 12), 137 (25.10%) were non-clinical studies (laboratory, animal model), and 16 (2.93%) were reviews or letters to the editor (Table 3; Figure 2, 3). The majority of non-clinical studies were animal experiments.

Among the subjects of experimental studies, "ototoxicity" topped the list by a large margin with 84 papers, followed by "tympanosclerosis and prevention" with 18 papers, "facial nerve injury treatment" and "noise induced hearing loss prevention and management" with eight and seven papers, respectively. Among the clinical studies, "tympanoplasty techniques and results" was the most frequently chosen topic with 32 publications, followed by cochlear implantation techniques/outcomes, and laboratory investigations and treatment results of idiopathic sudden sensorineural hearing loss with 20 articles each. Laboratory investigations and managements for tinnitus and benign paroxysmal positional vertigo followed with 12 and 11 papers, respectively (Table 4).

Table 4. Most frequently studied subjects in otology-otoneurology articles from Turkey published in SCI and SCI-E indexed ORL-HNS journals

Experimental	Number of articles	Clinical	Number of articles
Ototoxicity	84	Tympanoplasty techniques and results	32
Tympanosclerosis and prevention	18	Cochlear implantation techniques and results	20
Facial nerve injury and treatment	8	Sudden sensorineural hearing loss	20
Noise induced hearing loss prevention and treatment	7	Tinnitus	12
		Benign paroxysmal positional vertigo	11

ORL-HNS: otorhinolaryngology and head and neck surgery; SCI: Science Citation Index; SCI-E: Science Citation Index Expanded

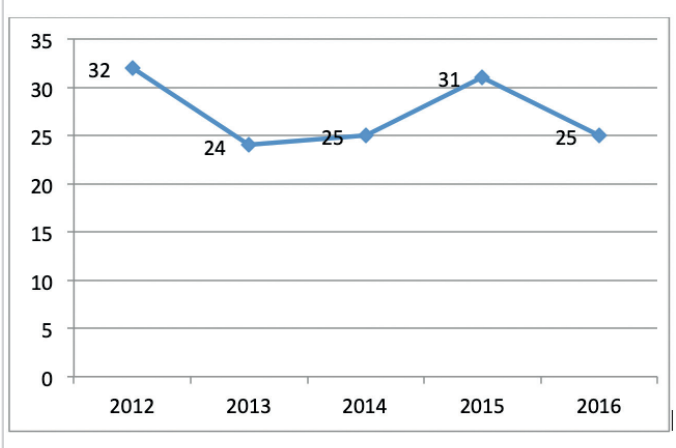

Figure 3. Distribution of non-clinical otology-neurotology trials from Turkey published in SCI and SCI-E indexed journals by years (2012-2016)

Discussion

There was a constant annual increase, except in 2014, in the number of otology-neurotology papers from Turkey in SCI and SCI-E journals in the studied period, with an average of 6.34% per year. When, however, the increase in the number of teaching institutions and research hospitals in Turkey, as well as the increase in the number of ORL-HNS articles listed in SCI and SCI-E, as pointed out by Edelmayer et al. (7), in this period were taken into account, the slight increment of the publications over these years did not look so striking. Ten out of the 23 private foundation universities' medical schools and their affiliated teaching hospitals, as well as the two medical schools and five research and training hospitals under the Turkish Ministry of Health became operational in this period or in the preceding two years (2010-2016). When we looked at the SCI and SCI-E indexed otology-neurotology and related subjects journals, the papers from Turkey reporting the results of clinical-observational and animal model experimental studies were found to be the top two categories quantitatively, with 332 and 118 publications, respectively. When, however, the number of randomized controlled trial reports, which are accepted as a category of highest scientific validity, are considered, this number was much lower than that of prospective observational studies (13 vs. 196). Among the animal experiments, "ototoxicity" stood out as the most studied subject, constituting more than 10% of the papers published in SCI and SCI-E indexed journals worldwide in the period (2012-2016). Nevertheless, it is hard to say that ototoxicity is one of the major clinical problems in otology-neurotology practice and the reason behind this preference calls for further discussion.

One aspect that we observed about the Turkish ORL-HNS papers was the noticeable scarcity in the number of case and case series reports in this period. The main reasons for this scarcity seem to be that these high-IF journals have been accepting less and less manuscripts in this category in the recent years. This assessment is in line with the results of a bibliometric study conducted by screening the top 10 otorhinolaryngology SCI journals published between 1945-2017. The study reported a marked decrease in the number of case reports despite the steady increase in the total number of articles. This rate (case reports to total articles) was found less than 1:10 in 2016 as opposed to about 15% in 2006 (7).

On the other hand, there were as few as 15 articles (2.74%) reporting studies that required high technology and multidisciplinary work, such as tissue and cell culture, molecular biology and genetics, and ultra-structural experiments. This is most likely to be due to the paucity of research centers under teaching otorhinolaryngology departments, hence scientists (i.e., biologists, geneticists, physicists) who focus on basic sciences of otology-neurotology. Furthermore, in this context, the number of incidence and prevalence studies, ecologic studies, and multi-center trials that do not necessarily require big budgets, but rather coordination and time, are also not satisfactory. We found only three Turkish ecologic-epidemiologic studies published in the SCI and SCI-E otology-neurotology journals in the 2012-2016 period.

Another point that came to our attention in this review is that SCI and SCI-E indexed otology-neurotology papers from Turkey were rather concentrated in certain journals. In the period of interest (2012-2016), 345 (63%) of these articles were published in four journals, and the remaining 201 (37%) were distributed among 21 journals. These journals, each of which have published more than 50 articles from Turkey, are, in the order of the number of papers according to their IF and quartile rankings as at 2016: *The Journal of International Advanced Otology (0.392)* 135 articles, *European Archives of Oto-Rhino-Laryngology* (0.1660) 94 articles, *International Journal of Pediatric Otorhinolaryngology (1.159)* 64 articles, *The Journal of Laryngology & Otology (0.844)* 52 articles.

A comparable bibliometric review of articles submitted from Turkey and published between 1990-2013 in 56 SCI and SCI-E indexed ophthalmology journals revealed that 30% of these papers were distributed among three journals (8). We are not able to further comment on this assessment, as, we do not have access to the rejection / acceptance rates of these journals in general and on country bases. The number of citations is a conventional "quality indicator" for an article (9). The quartile ranking of the journal in which the article is published is another bibliometric parameter that is also related to the number of citations. They do not, however, always reflect the magnitude of the contribution a certain paper makes to its scientific field. Some review articles or meta-analyses may be cited more than a report of a scientific discovery. Furthermore, some of the papers we screened in scope of this review were published relatively recently—an aspect limiting their citability in the covered period. Therefore, we took into account only the number of articles, their characteristics and scopes. It was established in reviews that the number of papers from Turkey published in SCI and SCI-E journals are on the rise in ophthalmology and in the sub-branches of ORL-HNS, namely in paediatric otolaryngology and rhinology in the last two decades (8-10). In fact, in The Scimago Journal and Country Rank list that covers the period from 1996 to 2017, the number of otorhinolaryngology papers from Turkey ranked 8th in the world with 7260 citable documents. The average number of citations per article, however, was not as impressive. In the "citations per document" listing the same papers were cited 8.21 times on the average, with a ranking somewhere between 50-100 in terms of citation per paper among the 168 countries listed, and 21st among the 28 countries with more than 1000 cited papers (11). One can expect that similar citation figures would be applicable to otology-neurotology articles as only less than 10% (53, 9.70%) of the total (546) publications reviewed in this study appeared in the top 10 journals with the highest citation figures according to the SCOPUS-based 2016 ranking report (11). This assessment also applies to the quartile ranking, as two of the four journals that published the highest number of articles from Turkey fall into Q4, as opposed to the few Q1 journals that published articles from Turkey in this period.

Bibliometric study reports are available in many scientific disciplines; however, are relatively rare in ORL-HNS and related sciences (12, 13). There are few published bibliometric reports in

the other sub-branches of ORL-HNS from Turkey (9-10). This review, to the best of our knowledge, is the first and only one in otology-neurotology, albeit, otology-neurotology is arguably the most fertile ORL-HNS subspecialty in terms of publication opportunities, since "related subjects journals," as the name defines, were also included in this group of publications with 15 SCI and SCI-E journals specializing in audiology.

The limitation of this study was that we screened only the ORL-HNS and related subjects SCI and SCI-E periodicals publishing papers on otology-neurotology and related sciences. In the period of interest, some of these articles might definitely have been published in general medicine or basic science journals, or in journals listed in indexes other than SCI. However, we reckon that there would not be as many as to change the results of the study.

Conclusion

In the five years from 2012 through 2016, researchers from Turkish institutions authored a good number of articles in the field of otology-neurotology that were published in SCI-indexed journals. The number of these papers do not seem to have significantly increased in accord with the increased number of research and teaching institutions in this period, especially in the fields of basic sciences and community-based epidemiologic studies. Other important assessments are consolidation of study topics usually in both clinical and experimental fields into a few subjects such as "ototoxicity" and" tympanoplasty results", and marked affinity to certain journals in terms of publication preferences

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