ORİJİNAL ARAŞTIRMA ORIGINAL RESEARCH

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Bibliometric Analysis of the Articles Published in the Ophthalmic Epidemiology Journal Between 2002 and 2019

2002-2019 Yılları Arası Oftalmik Epidemiyoloji Dergisi'nde Yayınlanan Makalelerin Bibliyometrik Analizi

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ABSTRACT Objective: The purpose of this study is to present a holistic analysis of published items in Ophthalmic Epidemiology Journal (OEJ). **Material and Methods:** The data used in this study were obtained from the Web of Science (WoS) Core Collection. WoS enabled the extensive details of documents published in OEJ between 2002-2019 including countries, institutions, authors, citations and keywords. Scientometric network maps of keywords and country and institution co-authorships were created. Country contributions to the OEJ were shown on a graphic. **Results:** The search query revealed a total of 991 documents. Most of the documents were original articles (90.11%). The peak year when the maximum number of the documents (86) and total number of citations (1687) occurred was 2018. The h-index of the literature published in OEJ was 49. The average citations per item was 13.9. USA was the leading country by producing 40.42% of all documents followed by UK, Australia, India and China. The London University was the most contributing institution (5.25%) followed by London School of Hygiene Tropical Medicine and Johns Hopkins University. The most used keywords were 'Acuity', 'Survey' and 'Child'. **Conclusion:** Beneficial information about dynamic and trending search topics in ophthalmic epidemiology field may be obtained by this study.

Keywords: Bibliometrics; medical informatics; ophthalmology

ÖZET Amaç: Bu çalışmanın amacı Oftalmik Epidemiyoloji Dergisi'nde (OED) yayınlanan makalelerin bütüncül bir analizini sunmaktır. **Gereç ve Yöntemler:** Bu çalışmada kullanılan veriler Web of Science (WoS) veri tabanından elde edilmiştir. WoS kullanarak 2002-2019 yılları arasında OED'de yayınlanan belgelerin ülkeler, kurumlar, yazarlar, alıntılar ve anahtar kelimeler dahil olmak üzere kapsamlı ayrıntıları elde edilmiştir. Anahtar kelimelerin, ülke ve kurumlar ile ortak yazarlıklarının bilimsel ağ haritaları oluşturuldu. OED'ye ülke katkıları bir grafikte gösterildi.**Bulgular:** Arama sorgusunda toplam 991 belge bulundu. Belgelerin çoğu orijinal makalelerdi (%90.11). Maksimum belge sayısı (86) ile toplam atıf sayısının (1687) gerçekleştiği yıl 2018 idi. OED'de yayınlanan literatürün h-endeksi 49'du. Makale başına ortalama alıntı 13.9'du. Tüm makalelerin %40.42'sini Amerika Birleşik Devletleri kaynaklı iken, onu sırayla İngiltere, Avustralya, Hindistan ve Çin takip etmişti. Londra Üniversitesi en çok katkıda bulunan kurum olurken (%5.25) onu Londra Hijyen Tropikal (Hygiene Tropical) Tıp Okulu ve Johns Hopkins Üniversitesi izledi. En çok kullanılan anahtar kelimeler "Keskinlik", "Anket" ve "Çocuk" idi. **Sonuç:** Bu çalışma ile oftalmik epidemiyoloji alanındaki dinamik ve yükselen değerdeki arama konuları hakkında faydalı bilgiler elde edilebilir.

Anahtar Kelimeler: Bibliyometri; tıbbi bilgi; oftalmoloji

Bibliometrics analyses publications generated in a specific discipline of academic literature and elucidates publication patterns and trends. Scientometrics also known as 'science of science' is a recent and popular statistical discipline explores all features of scientific literature.[1,2] Scientometric studies evaluate characteristics and features of the authors, organizations and countries of the documents in the literature.[1] Scientometric and bibliometric applications are interdisciplinary research fields target almost all scientific disciplines. The output of these applications are widely used in library and information field and also in publication sector to provide the impact factor of journals, most cited papers, h-index, collaborations, etc.[3] It also presents an opinion to design a well-defined goal for doing excellent studies to discover

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which institutions or journals have superior impact within the specific discipline of knowledge.[3]

Ophthalmic Epidemiology is a new branch of ophthalmology practice which is interested in eye and vision health in regard to epidemiology, public health and the prevention of blindness.[4] Although ophthalmic epidemiology studies have been increasing lately, there has been no recent scientometric analysis of publications published in Ophthalmic Epidemiology Journal. This study aims to present a bibliometric and scientometric analysis of the documents published in the Ophthalmic Epidemiology Journal, which is the only journal in ophthalmic epidemiology field. To the best of our knowledge, this is the first report in this field.

MATERIAL AND METHODS

The data of this study were obtained from Web of Science Core Collection (WoS; Thomson Reuters, New York, NY, USA) databases and carried out on 23 December 2019. As the study was a bibliometric study, the ethical approval was not obtained. The study adhered to the Declaration of Helsinki for clinical research. A search question 'ophthalmic epidemiology' as a keyword in 'publication name' field was performed between 1975 and 2019. All documents from the WoS database from 2002 were collected and included to the analysis as the journal was founded in 2002. Data were exported from WoS in "Full record and cited references" and "Tab-delimited for Mac" formats. A free web source titled GunnMap 2 application -a free web site-was used to create a world map informing publication production densities of world countries.[5] Scientometric network analysis was achieved by using VOS viewer freeware (Leiden University, Leiden, Netherlands).[6] Citation counts reflect all the documents obtained on 23 December 2019 when the time of this study was conducted. Institutions were determined using the "Organizations-Enhanced" field. Documents from England, Wales, Scotland and Northern Ireland were combined under the United Kingdom (UK).

RESULTS

GENERAL CHARACTERİSTİCS OF THE DOCUMENTS

A total of 991 published documents were retrieved during the period 2002–2019, 90.11% of which were original articles (Table 1).

TABLE 1: Document types published in the Ophthalmic Epidemiology Journal between 2002 and 2019.

Document Types	Record count	Percentage (%)
Article	893	90.111
Editorial Material	56	5.651
Proceedings Paper	27	2.725
Early Access	26	2.624
Review	22	2.220
Letter	11	1.110
Correction	9	0.908
Total	991	100

A consistent increase was observed in the number of published documents since the journals' foundation year-2002. The maximum number of publications and also maximum citations were occurred in 2018 with 86 published items and 1687 total citations (Figure 1).

The h-index of the literature published in Ophthalmic Epidemiology Journal was 49 in this period and the total number of citations was 13767 (12715 without self-citations). The average citations per item was 13.9. The leading countries in productivity of documents were USA (40.42%) and UK (18.85%) followed by Australia, India and China (18.04%, 9.17% and 8.36%, respectively) The global contributions of the countries in regard to publication density in the Ophthalmic Epidemiology Journal was demonstrated in Figure 2.

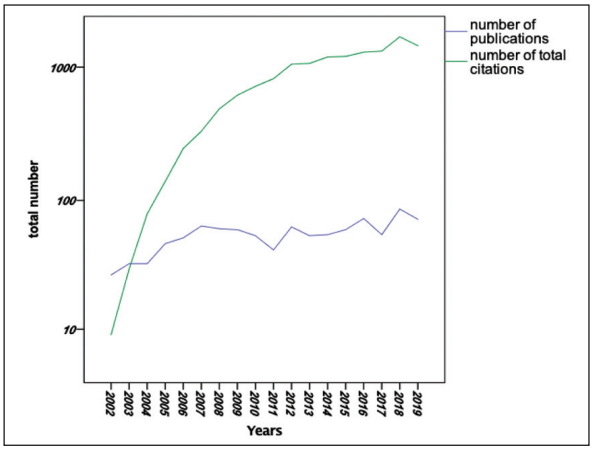

FIGURE 1: Number of publications total citations according to years.

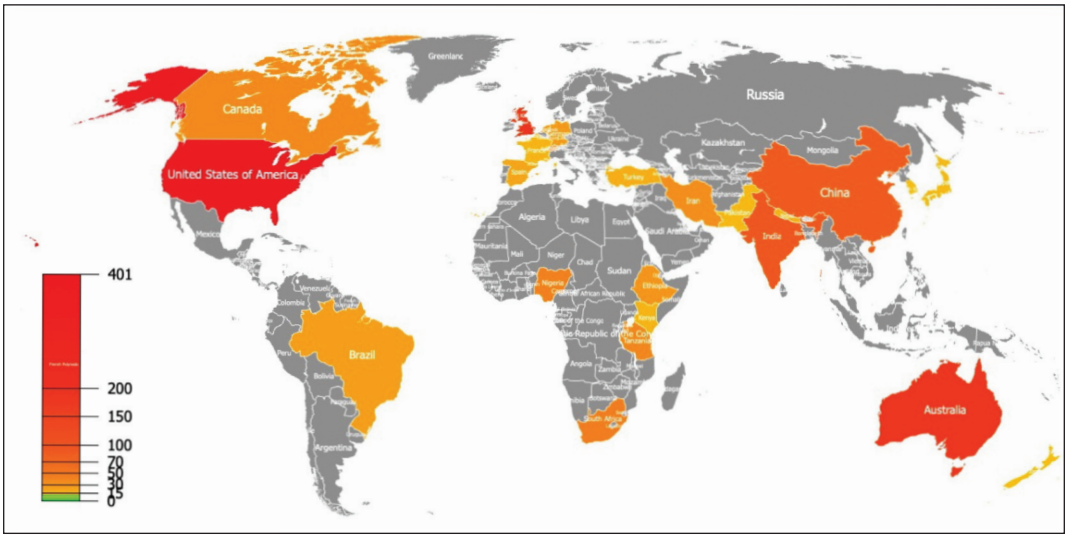

FIGURE 2: The distribution of the density of published documents.

THE MOST CONTRIBUTING COUNTRIES, INSTITUTIONS AND AUTHORS

A co-authorship network for countries was achieved in VOS viewer software. The contribution levels of countries and co-authorship connections were represented by different sphere diameters with different colours in this network. The USA had the highest sphere diameter indicating the highest number of publications and also a connection with India and South Korea between USA was detected by having the same colour (Figure 3).

A publication relationship network was evident among 44 countries limited to minimum number of 5 joint publications. Most of the examined countries (42 of 44) had also citation relations (Figure 4).

The London University was the most contributing institution with 146 documents (14.73%) followed by London School of Hygiene Tropical Medicine, Johns Hopkins University and University of Melbourne (12.31, 9.08 and 8.47%, respectively; Table 2).

One hundred seventeen institutions met the criteria of authorship relations with the limitation of minimum 5 joint publications among 1301 institutions (Figure 5).

The most prolific authors were Solomon AW, Courtright P and Willis R (n:51, 45 and 43 records, respectively; Table 3).

Foong, Athena W. P, Klein, B.E.K and Pascolini, D. were the most cited authors (n: 306, 301 and 275 citations, respectively; Table 4). The most cited document was an original article written by Foong AW. et al titled '*Rationale and methodology for a population-based study of eye diseases in Malay people: The Singapore Malay eye study (SiMES)'* published in 2007 (Table 4).

KEYWORD ANALYSIS

WoS databases retrieved a total of 16765 keywords used in Ophthalmic Epidemiology Journal during this period. A bibliometric analysis with the limitation of minimum number of 10 occurrences of a term revealed 528 keywords. A network map was created with the most relevant 317 keywords (Figure 6).

'Acuity', 'Survey', 'Child', 'Association' and 'Impairment' were the most repeated keywords (n: 219, 194, 163, 157 and 157, respectively; Table 5).

DISCUSSION

In this report, a holistic analysis of the published documents in Ophthalmic Epidemiology Journal - the first and the only journal in this field- was performed. Since its foundation-in 2002- a total of 991 documents were published in Ophthalmic Epidemiology Journal. The most contributing countries

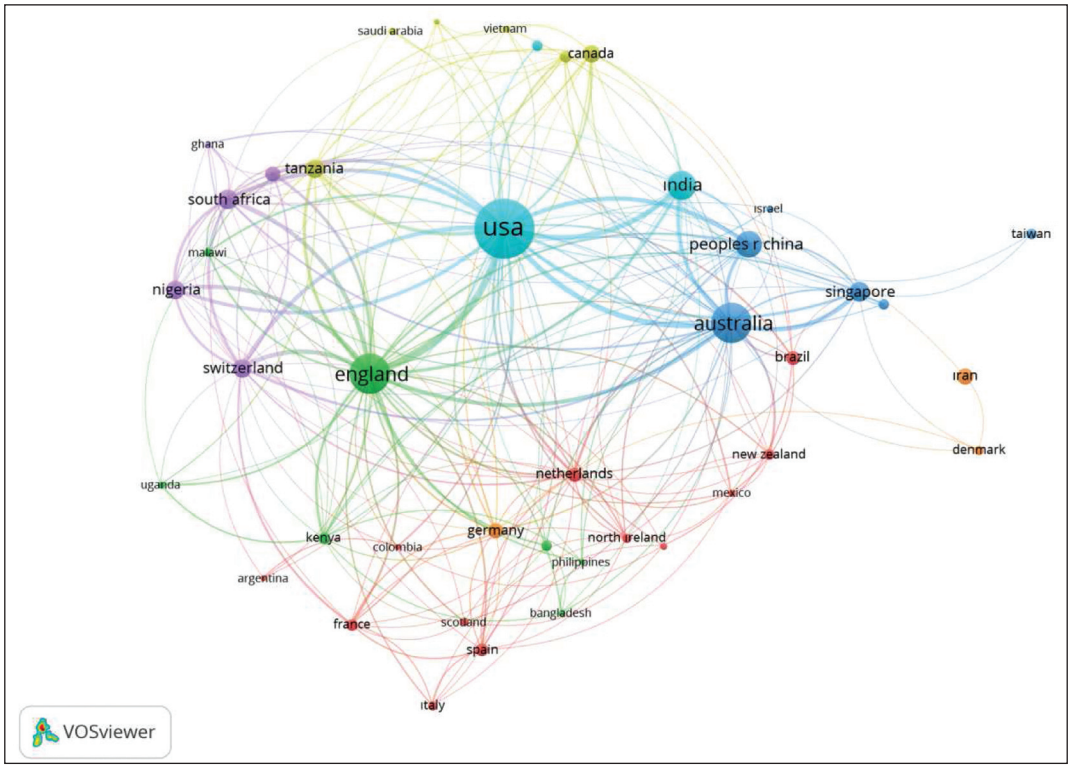

FIGURE 3: The publication relationship network of the most productive countries.

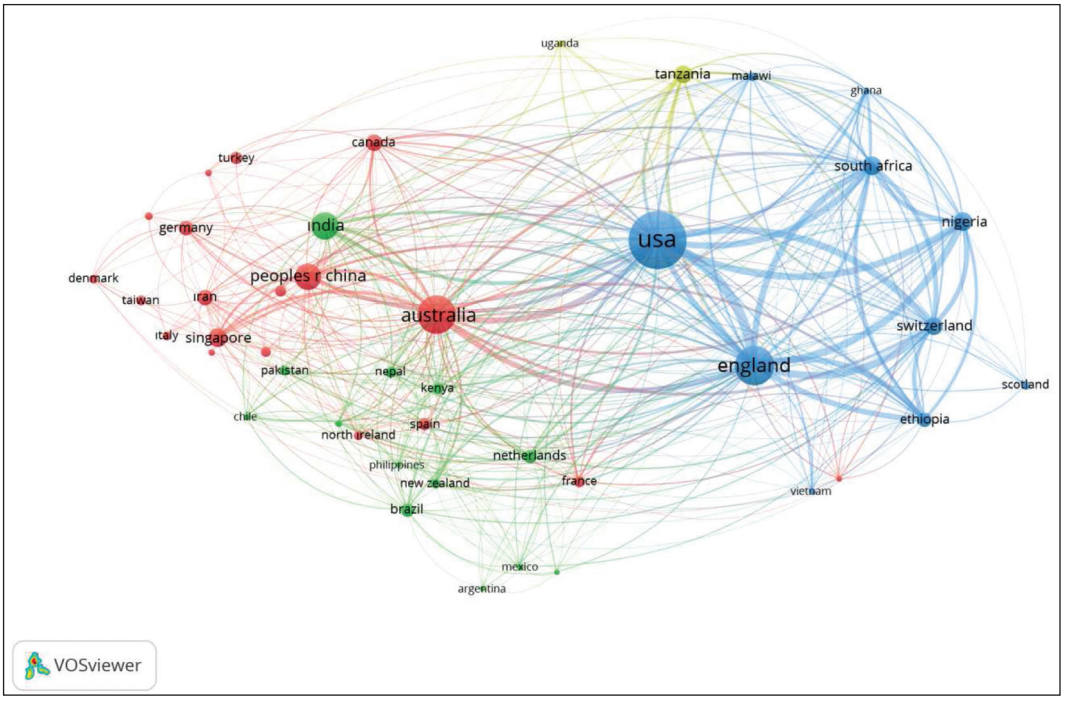

FIGURE 4: Citation network of the most productive countries.

are USA and UK. Publication and citation network relationships were evident among more than 40 countries with more than 100 institutions.

In an article entitled 'Epidemiology in Ophthalmology' published nearly four decades ago, the author firstly emphasized the potential significance of

TABLE 2: The 20 most productive institutions in Ophthalmic Epidemiology Journal between 2002 and 2019.

Organizations	Country	Records	Percentage (%)
University of London	UK	146	14.733
London School of Hygiene Tropical Medicine	UK	122	12.311
Johns Hopkins University	USA	90	9.082
University of Melbourne	AUS	84	8.476
Centre for Eye Research Australia	AUS	75	7.568
Johns Hopkins Medicine	USA	56	5.651
University of Sydney	AUS	54	5.449
University of California System	USA	44	4.440
Ministry of Health	UK	41	4.137
Task Force Global Health	USA	41	4.137
National University of Singapore	SGP	38	3.835
University College London	UK	38	3.835
World Health Organization	CHE	37	3.734
Singapore National Eye Centre	SGP	35	3.532
Harvard University	USA	34	3.431
Sightsavers	USA	34	3.431
Johns Hopkins Bloomberg School of Public Health	USA	32	3.229
University of Cape Town	ZAF	32	3.229
University of California San Francisco	USA	31	3.128
National Institutes of Health	USA	30	3.027

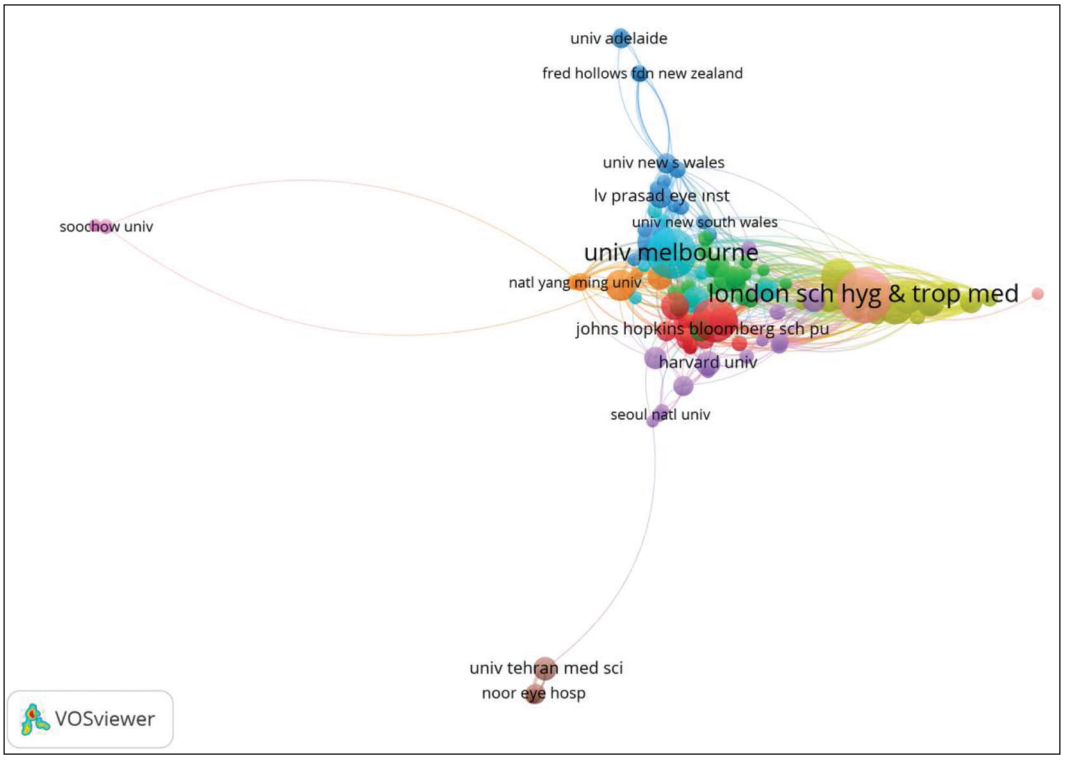

FIGURE 5: Authorship network of the most productive institutions.

epidemiological approach of ophthalmic diseases and their treatments.[7] Nearly two decades after this article, Wilson postulated that the increasing number of publications were epidemiological in nature and ophthalmology textbooks and major ophthalmology journals were assigned to have separate epide-

TABLE 3: The 20 most prolific authors of Ophthalmic Epidemiology Journal between 2002 and 2019.

Authors	Record count	Percentage (%)
Solomon AW	51	5.146
Courtright P	45	4.541
Willis R	43	4.339
West SK	38	3.835
Lewallen S	36	3.633
Wang JJ	36	3.633
Mitchell P	34	3.431
Flueckiger RM	33	3.330
Lietman TM	33	3.330
Foster A	32	3.229
Mpyet C	32	3.229
Munoz B	32	3.229
Chu BK	31	3.128
Dejene M	30	3.027
Wong TY	30	3.027
Alemayehu W	28	2.825
Macleod C	27	2.725
Resnikoff S	26	2.624
Klein R	25	2.523
Emerson PM	23	2.321

miology sections.[8] Wilson also speculated that ophthalmic epidemiology had matured over the passing years and 'it is no longer in its infancy'.[8] A logarithmic growth pattern was observed in the total number of citations when compared to the steady growth pattern in the number of published documents within years (Figure 1). This finding indicates the increasing impact factor of the Ophthalmic Epidemiology Journal.

Scientometric studies display publication trends and creativity of the countries, authors and organisations in a certain area.[1] Scientometrics enables the qualitative and quantitative assessment of academic literature and also provides the details of the most popular, active and trending fields.[9] In contrary to scientometrics' growing popularity, there have been scarce articles investigating ophthalmology field.

Liu et al. recently reported a bibliometric research analysing top 100 cited articles in ophthalmic epidemiology between 2003 and 2016.[10] Most of the articles (36%) were originated from USA and mostly

TABLE 4: Most cited articles in Ophthalmic Epidemiology Journal between 2002 and 2019.

Article	Author(s)	Year	Total citations	Average citations per year
Rationale and methodology for a population-based study of eye diseases in Malay people: The Singapore Malay Eye Study (SiMES)	Foong, Athena WP.; Saw, Seang-Mei; Loo, Jing-Liang et al.	2007	306	23.54
Overview of epidemiologic studies of diabetic retinopathy	Klein, Barbara Eden Kobrin	2007	301	23.15
2002 global update of available data on visual impairment: a compilation of population-based prevalence studies	Pascolini D, Mariotti SP, Pokharel, GP et al	2004	275	17.19
Methodology of the Singapore Indian Chinese Cohort (SICC) Eye Study: Quantifying ethnic variations in the epidemiology of eye diseases in Asians	Lavanya, Raghavan, Jeganathan V, Swetha E et al	2009	194	17.64
Open-angle glaucoma - An epidemiologic overview	Leske, M. Cristina	2007	144	11.08
Methods for a population-based study of myopia and other eye conditions in school children: The Sydney Myopia Study	Ojaimi E, Rose KA, Smith W. et al.	2005	141	9.4
Microbial keratitis in South India: Influence of risk factors, climate, and geographical variation	Bharathi M, Jayahar, Ramakrishnan R; Meenakshi, R. et al.	2007	132	10.15
The Roche European American Cataract Trial (REACT): A randomized clinical trial to investigate the efficacy of an oral antioxidant micronutrient mixture to slow progression of age-related cataract	Chylack LT, Brown NP, Bron A. et al	2002	119	6.61
Overview of progress in the epidemiology of age-related macular degeneration	Klein, Ronald	2007	95	7.31
A simplified cataract grading system	Thylefors B, Chylack LT, Konyama K. et al	2002	95	5.28

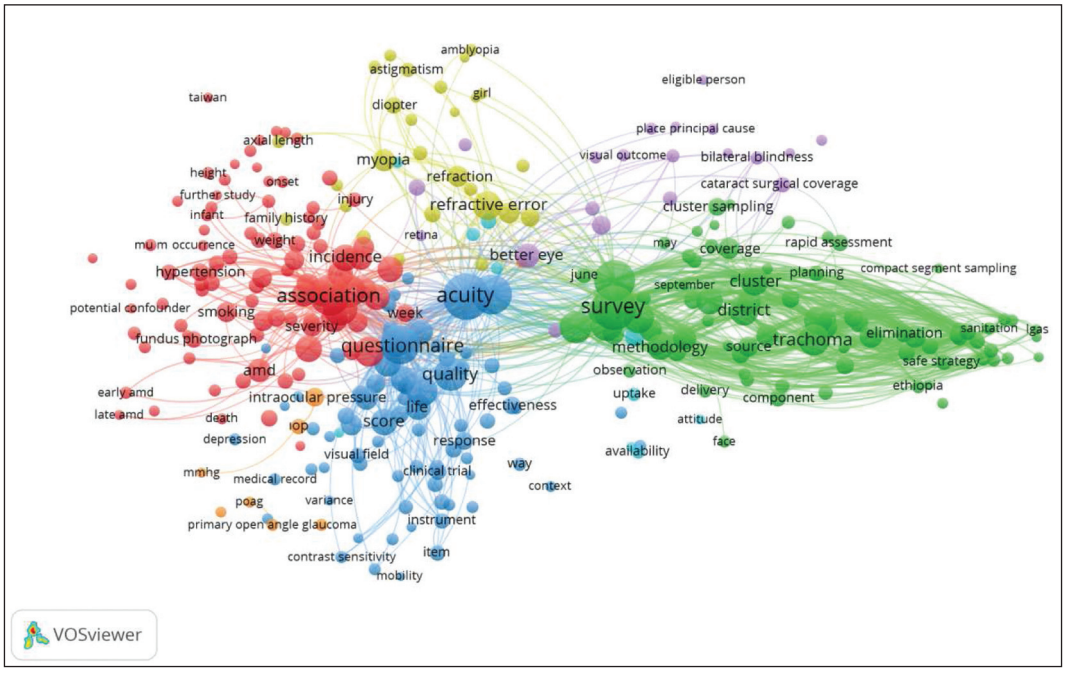

FIGURE 6: Bibliometric network of the most used keywords.

TABLE 5: The most used keywords in Ophthalmic Epidemiology Journal between 2002 and 2019.

Keywords	Records
Acuity	219
Survey	194
Child	163
Association	157
Impairment	157
Questionnaire	152
Risk	117
Quality	111
Odd's ratio	108
Intervention	107
Adult	106
Test	98
Community	97
Trachoma	96
Measure	95
Refractive error	87
Effect	87
Household	78
District	78
Cluster	78
Score	72
Relationship	72
Macular degeneration	71
Incidence	70
Self	70

were published in the *Ophthalmology* journal as stated in their report.[10] The authors found that the three major topics in most cited ophthalmic epidemiology articles were age-related macular degeneration, glaucoma and visual impairment.[10] In contrast to this current study, only original articles were included in that study and also co-authorship, keyword and citation network mapping were lacking.[10]

Fan et al. reported the citation analysis of the most influential authors and ophthalmology journals in the field of cataract and corneal refractive surgery between 2000-2004.[11] They used only Science Citation Index Expanded (SCI) to explore the citations of the authors and ophthalmology journals.[11] The network analysis between authors, keywords, countries and institutions were lacking in their report. In a bibliometric analysis on dry eye disease, the authors reported that 5522 documents were published about dry eye disease and they found that the most productive country was USA with 34.53% of the overall articles studied.[12] Different from this current study, only the journal articles and reviews were included in that mentioned report.[12]

Though USA, UK and Australia dominated the published documents in Ophthalmic Epidemiology Journal, the distribution of the world countries ac-

cording to global productivity was relatively balanced compared with developed countries. The countries in Africa also contributed to the published documents in this journal. This finding was concordant with the journals' scope as expected.

Self-citation of a specific journal shows the continued interest in a particular research topic. In spite of the fact that self-citation is legitimate, this process might be violated to increase journals' impact factor. The self-citation rates of the journals range between 10% to 25%.[13] The self-citation of the Ophthalmic Epidemiology Journal was 7.6%, which was lower than the previous reports.

The most leading journals in ophthalmology field are usually general ophthalmology journals which include research papers from all subspecialties of ophthalmology.[14] However, Ophthalmic Epidemiology Journal has an increasing citation and productivity trend although it is a subspecialty journal. This could be attributed to the journal's closely related research fields with the other fields in medicine such as paediatrics, public health and internal medicine. Furthermore, supporting this argument in a recent report both the number of published reports and h-index scores were found highest in uveitis and neuro-ophthalmology field in all ophthalmology subspecialties which are closely related to rheumatology and neurology fields, respectively.[15] Collaboration with other practitioners might have led to more research opportunities.

Population-based epidemiological studies including ethnicity comparisons with sufficient sample sizes might give valuable normative data for future studies. Recently, both the retinal nerve fibre symmetry, systemic medications and cortical cataract relation, and ganglion-cell inner layer thickness profiles were reported in 'The Singapore Epidemiology of Eye Diseases Study' separately.[16-18]

This study has two main limitations. First, though WoS reflects more reliable data than other databases, only WoS database was used for analysis in this study.[4] A comparison with other studies could not be achieved due to the lack of a previous related bibliometric or scientometric study of a specific ophthalmology journal. Therefore, the results of this study were only compared with the published scientometric reports of ophthalmology. However, this is the first report focusing on the output of a specific ophthalmology journal-Ophthalmic Epidemiology- by scientometric and bibliometric analysis.

CONCLUSION

The scientometric and bibliometric results of the one most significant leading journal in this field may assist health professionals to better figure out ophthalmic epidemiology research worldwide. Additionally, beneficial information about dynamic and trending search topics in ophthalmic epidemiology field may be obtained by this study.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Deniz Kılıç, Soner Güven;* ***Design:*** *Soner Güven;* ***Control/Supervision:*** *Deniz Kılıç, Soner Güven;* ***Data Collection and/or Processing:*** *Soner Güven;* ***Analysis and/or Interpretation:*** *Deniz Kılıç, Soner Güven;****Literature Review:*** *Soner Güven;* ***Writing the Article:*** *Soner Güven;* ***Critical Review:*** *Deniz Kılıç,* ***References and Fundings:*** *Deniz Kılıç, Soner Güven.*

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