Original Article

Scientific Publications and Subject Clusters in the Field of Glaucoma: A Scientometric Analysis

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Abstract

Purpose: To analyze the glaucoma research in the Web of Science (WoS) and Scopus to determine the top features, trends, and subject clusters.

Methods: In this scientometric study, all glaucoma publications in Scopus and WoS were analyzed based on various characteristics such as authors, journals, and co-word analysis. Data analysis was conducted using both Excel and VOSviewer.

Results: A gradual increase in the publication rate was found for articles in the field of glaucoma in both Scopus and WoS databases. In this regard, most publications were conducted in the USA and the University of California System. The co-word network was constituted of five clusters, including glaucoma, intraocular pressure, open-angle glaucoma, visual acuity, and optic disc. It showed that the top 10 highly cited articles were more addressed by epidemiologic studies.

Conclusions: The findings of this study had a more precise vision of the previous research on the field of glaucoma. It also provided the possibility to discover hidden patterns and emerging events of a subject by explaining the most essential aspects of research and identifying the areas that need more research. The findings could be useful for authors and health policymakers in academia and countries.

Keywords: Glaucoma, Intraocular pressure, Scientific publications, Scientometrics, Scopus, Web of Science

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Introduction

Scientific outputs show the universal ranking of different countries in the case of scientific subjects all around the world resulting in the development of countries. There is a straight relationship between the extensity of the research, technology, and sustainable growth and development in each country.[1-5] Therefore, assessment of the scientific publications and the structure of the various aspects of science using the scientometric methods is considered by the health policymakers in different countries. Scientometric studies are specifically designed for the evaluation of scientific publications of countries, individuals, organizations, and journals. They are also advisable for scientific mapping and cluster analysis.[6-8]

Medical researchers are highly remarkable due to the linkage of this type of study with human health status, and the majority of countries commonly assign a lot of budgets for developing of medical research. The evaluation of medical scientific outputs could be influential regarding future studies, planning for

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the balanced development in various fields of medicine, and assignment of the budget, and eventually, it would be beneficial in improving the quality and quantity of the scientific outputs in the field of medicine.[9-13]

Visual and ocular diseases are reported as the most prominent dysfunctions that play a decisive role in the countries' budget as well as the individual's quality of life.[14,15] In this regard, glaucoma is reported as the most common irreversible cause of visual impairment, and it is classified as the second cause of blindness throughout the world.[16,17] In addition, there are a lot of publications in the field of glaucoma due to the high importance of this issue. Identification of the research structure in this field is considered a fundamental step that can be discoverable through scientometric research based on its quantitative and qualitative criteria. In the field of glaucoma, there are a few studies applying the Scientometric indicators which have been indexed either in the Web of Science (WoS) or PubMed databases.[18-23] It seems that Scopus can be a more comprehensive reference for assessment of the research publications in various fields because numerous numbers of journals have been indexed in this database.[24] However, no research has been studied on the scientific publications of glaucoma indexed in the Scopus.

The current research purposed to investigate the scientific publications in the field of glaucoma in the Scopus and WoS databases. In addition, we aimed to determine the trends of the scientific publications; the prolific countries, institutes, and journals; highly cited articles; and subject clusters of the scientific publication in the field of glaucoma.

Methods

In this scientometric study, first, a comprehensive search was performed based on the standardized Medical Subject Headings system to identify the most relevant keywords to "Glaucoma". The selected keywords were also confirmed by the experts in the field of glaucoma. Afterward, an unlimited search was done in both Scopus and WoS databases by the combination of the following keywords connecting with "OR" in "the article title", "abstract", and "keywords" fields in the Scopus and the "topic" field in the WoS: "Glaucoma", "Glaucomas", "Sclerostomy", "Trabeculectomy", "Filtering Surgery", and "Iridocorneal Endothelial Syndrome".

The literature search was conducted based on the articles published from 1858 to the end of 2019. No filtering was conducted based on the language.

The search results were analyzed using the descriptive statistics performed by both Excel and VOSviewer software (version 1.6.15/ Center for Science and Technology Studies, Leiden University, The Netherlands). Analysis was conducted based on the number of publications and reported separately according to the author, journal, country, and organization. Then, the top 10 highly cited articles in the field of glaucoma were presented. The compound annual growth rate (CAGR) was calculated using the following formula, in which t_0 and t_n show the initiation and ending years of the study as well as $V(t_0)$ and $V(t_n)$ represent the cumulative number of publications in the initiation and ending years, respectively.

$$CAGR\,(t_0, t_n) = \left(\frac{v(t_n)}{v(t)}\right)^{\frac{1}{t_n - t}} - 1$$

The co-word analysis method is a technique for identifying the scientific trends for each research subject using the frequency and co-occurrence of the applied keywords.[25] This technique is used to map the strength of association between keywords in textual data. It measures the co-occurrence of keywords in the title, abstract, and keywords of the articles. We used the co-word technique by VOSviewer software to indicate the most important keywords and clusters in the field of glaucoma. We extracted the retrieved data from the databases into the RIS format and loaded them in VOSviewer software. The co-occurrence of words was analyzed and depicted in the form of a network with different clusters. The keywords of each cluster were extracted from the software in Excel format. Finally, the experts carefully checked the keywords of each cluster and analyzed and specified the important topics and areas of each cluster.

Results

Based on our search results, we obtained 97,472 and 63,555 scientific outputs in the field of glaucoma in the Scopus and WoS databases, respectively. Although all documents had English abstracts, they were published in various languages. Most of the documents were published in the English language (95%, 90.49%) in WoS and Scopus, respectively. In addition, other articles with the languages of German (3.41%), French (1.59%) in WoS, and Chinese (4.02%) in Scopus were also identified. The article was identified as the most common document type with publication rates of 66.54% and 76.7% in the WoS and Scopus, respectively. The other document types were reviews, letters, and conference articles.

Figure 1 shows that the first article in the field of glaucoma was published in 1858 and during an increasing trend of the number of publications was received to 97,472 articles in 2019. The first article in the WoS database was published in 1919, and the number of published documents was 63,555 in 2019.

In addition, the annual output growth in the glaucoma field in the WoS and Scopus databases was calculated using the CAGR formula. The rate of growth in scientific publications per year was calculated to be 0.053 and 0.085 in the WoS and Scopus databases, respectively, with a significant higher growth in the Scopus compared to the WoS.

Figure 2 shows the distribution of scientific publications in the field of glaucoma in different countries; as shown, the USA with 42% and Great Britain with 10% of scientific publications had the first and the second ranks among 159 countries, while it was found that France and South Korea were assigned as the tenth countries in the WoS and Scopus databases, respectively.

Figure 3 also shows that Robert N Weinreb and Robert H Ritch were the most prolific authors in Scopus and WoS who had almost 1.5% and 1% of the publication rates in this field, respectively.

Regarding the rate of publication, it was found that the highest rank of publication in the WoS database was related to the University of London and the University of California, and the University of California and Johns Hopkins were known as the highest publications in the Scopus [Figure 4].

In addition, the *journals Investigative Ophthalmology & Visual Science* (IOVS) and the *American Journal of Ophthalmology* were obtained as the highest ranking for publication in the field of glaucoma that were visible in WoS and Scopus, respectively [Figure 5].

The co-word network and thematic clustering of glaucoma outputs were evaluated using the VOSviewer software. Both WoS and Scopus databases were separately analyzed, and our findings showed that the scientific maps of both databases were similar. In this study, the Scopus maps were presented due to the higher coverage of this database [Figure 6 and Table 1]. As shown in Figure 6, this network consisted of five thematic clusters that were discriminated by different colors. The most frequent keywords were shown by the greater circles and, also higher-sized alphabetical letters. It was found that "glaucoma", "intraocular pressure", "open-angle glaucoma", "visual acuity", and "optic disc" were the most frequent keywords, respectively.

These five clusters were evaluated by ophthalmologists and researchers who were experts in the field of glaucoma. It shows that the largest cluster contains 332 subject terms, in which ocular hypertension, diabetes mellitus, Alzheimer's disease, cardiovascular disease, obesity, complication, and headache were the most important subjects. The second cluster contains 192 subject terms with an understating of this issue that glaucoma, intraocular pressure, gonioscopy, diagnostic technique, optic disc lesion, ethnicity, urban population, and race were the most noteworthy words of this cluster. Among the 164 subject terms included in the third cluster, apoptosis, signal transmission, gene expression, cell death, and cell survival were the most frequent subject terms. In addition, the fourth and fifth clusters included 155 and 73 subject terms, respectively, with the most subject terms of vitrectomy, laser coagulation, steroid, retina macula edema, and dry eye in the fourth cluster. Furthermore, in the fifth cluster, dorzolamide, brimonidine, acetazolamide, ophthalmic solutions, drug therapy, and latanoprost were the most important term subjects [Table 1].

The top 10 highly cited articles in the field of glaucoma in the databases of WoS and Scopus are presented in Table 2. Seventy percent of these articles (seven out of 10) focused on epidemiologic subjects, and three out of 10 (30%) focused on clinical subjects which purposed to therapeutic and preventive approaches. In addition, 40% of the highly cited articles were published in the *Journal of Archives of Ophthalmology*, which has been renamed to *JAMA Ophthalmology* since 2013. The

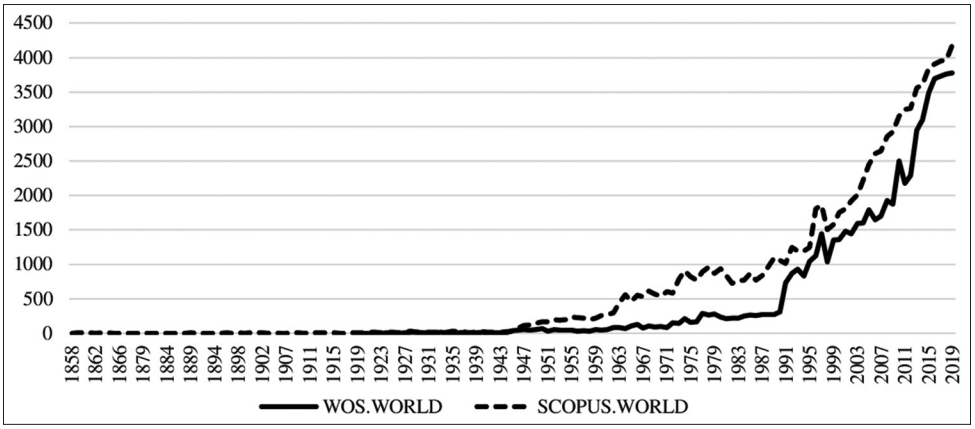

Figure 1: Glaucoma output rate in the world during 1858–2019. WoS: Web of Science

Table 1: The most important subjects of the clusters in the field of glaucoma

Cluster	Cluster color	Cluster label	Important subjects	Number of total terms
1	Red	Risk factor	Ocular hypertension, diabetes mellitus, Alzheimer's disease, cardiovascular disease, obesity, complications, and headache	332
2	Green	Epidemiology of glaucoma	Glaucoma, intraocular pressure, gonioscopy, diagnostic technique, optic disc lesion, ethnicity, urban population, race, and country	192
3	Blue	Pathology	Apoptosis, signal transmission, gene expression, cell death, and cell survival	164
4	Yellow	Therapy	Vitrectomy, laser coagulation, steroid, retina macula edema, and dry eye	155
5	Purple	Medication	Dorzolamide, brimonidine, acetazolamide, ophthalmic solutions, drug therapy, and latanoprost	73

highest citation score was 9163, which was assigned to the article published in Science in 1991 [Table 2].

Discussion

Glaucoma is a major problem in public health, and it is reported as one of the preventable causes of blindness all around the world. Early diagnosis and appropriate treatment can be crucial points in decreasing the prevalence of blindness and the economic burden of glaucoma in societies. Due to the importance of this issue, a significant proportion of publications in the field of ophthalmology focus on glaucoma.[16,26]

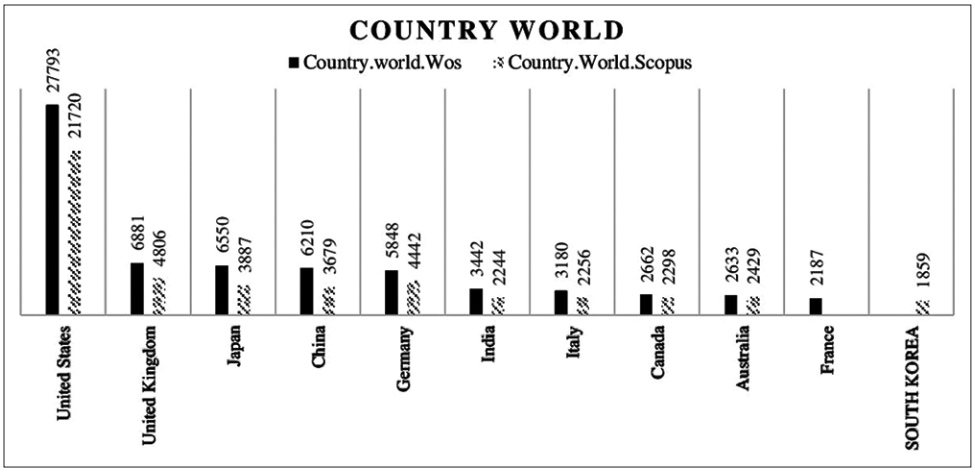

Figure 2: Distribution of the scientific publications in the field of glaucoma in different countries. WoS: Web of Science

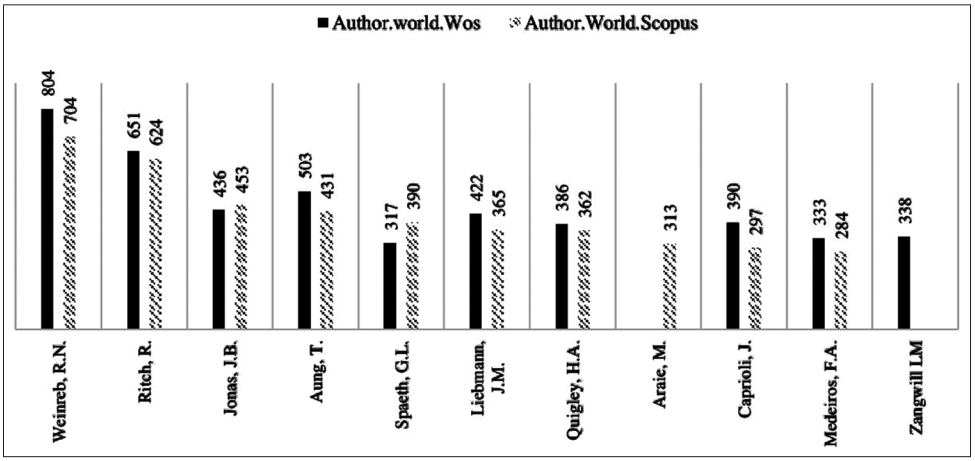

Figure 3: Authors with the highest rate of publications in glaucoma in the Web of Science and Scopus databases. WoS: Web of Science

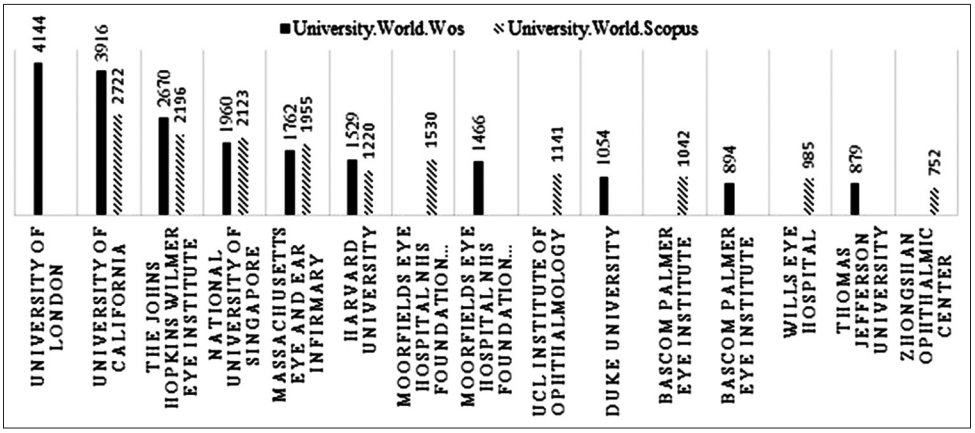

Figure 4: Universities or organizations with the highest scientific output contribution in glaucoma in the Web of Science and Scopus databases. WoS: Web of Science

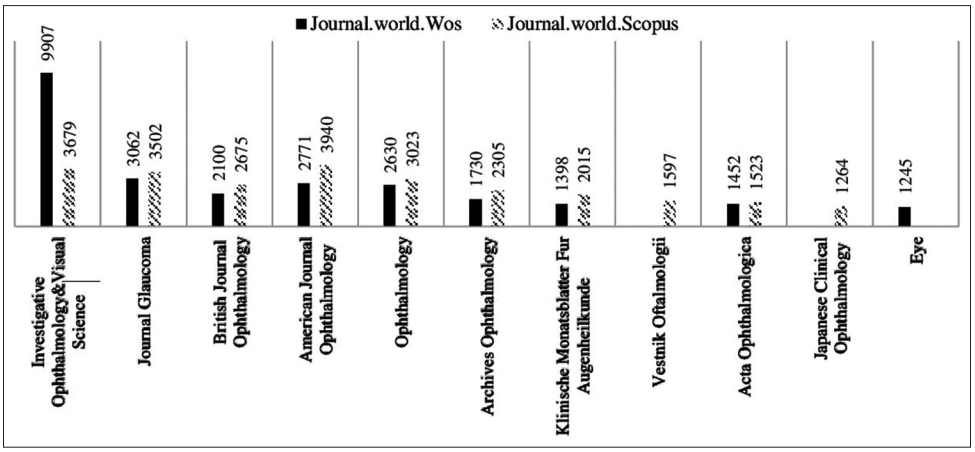

Figure 5: Journals with the most publications in the field of glaucoma all around the world. WoS: Web of Science

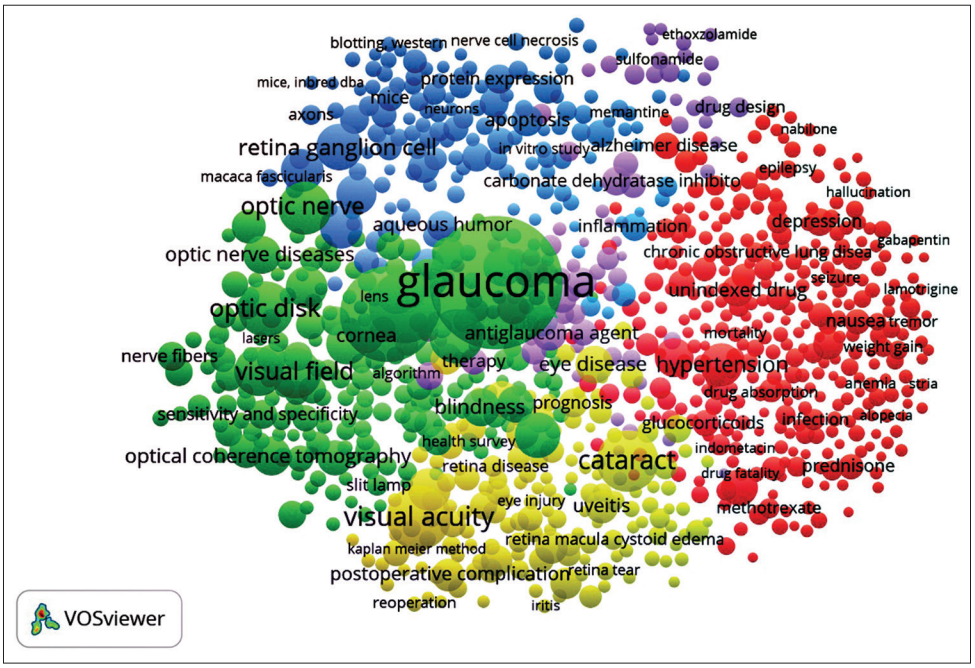

Figure 6: The co-word map in the field of glaucoma

Our findings showed that there was an increasing trend in the publication rate of scientific publications in the field of glaucoma in the WoS and Scopus databases from 1858 to 2019. From 1995 onward, an upward growth was identified in the number of published articles on glaucoma, which can be attributed to the revolution in diagnostic advances using optical coherence tomography devices and surgical and pharmaceutical advances.[27] Along with our findings, this increasing trend was also reported by Ramin *et al*. who studied the scientific publications in the field of glaucoma in WoS between 1993 and 2013, Gupta and Kaur who analyzed the global publication output in glaucoma during 2002–2011 in Scopus, and Sun *et al*. who studied glaucoma articles published in the Science Citation Index Expanded (SCIE) database during 2009–2018.[21,28,29]

Due to the higher coverage of indexed journals in Scopus compared with WoS, a greater number of articles can be accessible in this database. As the journals of the two databases showed, there are 123 and 35 journals in the field of ophthalmology indexed in the Scopus and WoS databases, respectively. Of these, there are five and six subspecialty journals in the Scopus and WoS databases, respectively, which are specifically focused on the field of glaucoma. Most of the publications are articles. The majority of publications (approximately 42%) in the field of glaucoma were conducted in the USA among 152 different countries which are in line with studies by Gupta and Kaur[28] and Huang *et al*.[19] They found that the USA is the most prolific country in the field of glaucoma regarding the publications indexed in the PubMed and Scopus databases during five (2007–2011) and ten (2002–2011) years, respectively. However, the current research covers a longer period and is more comprehensive than the previous studies.

Table 2: Top 10 highly cited articles in the field of glaucoma

Authors	Article name	Cluster	Number of citations Scopus	Number of citations WoS	Journals	Impact factor	Cite score	Year
Huang *et al*.	Optical coherence tomography	2	10,539	9163	*Science*	41.845	45.30	1991
Quigley *et al*.	The number of people with glaucoma worldwide in 2010 and 2020	2	4090	3651	*British Journal of Ophthalmology*	3.806	6.80	2006
Resnikoff *et al*.	Global data on visual impairment in 2002	2	2822	2439	*Bulletin of the World Health Organization*	6.818	8.40	2004
Kass *et al*.	The ocular hypertension treatment study – a randomized trial determines that topical ocular hypotensive medication delays or prevents the onset of primary open-angle glaucoma	1	2426	2195	*Archives of Ophthalmology*	6.198	9.00	2002
Heijl *et al*.	Reduction of intraocular pressure and glaucoma progression – results from the Early Manifest Glaucoma Trial	2	2033	1841	*Archives of Ophthalmology*	6.198	9.00	2002
AGIS investigative	The AGIS: 7. The relationship between control of intraocular pressure and visual field deterioration	4	1951	1753	*American of Ophthalmology*	4.483	7.70	2000
Congdon *et al*.	Causes and prevalence of visual impairment among adults in the United States	2	1856	1656	*Archives of Ophthalmology*	6.198	9.00	2004
Quigly *et al*.	Number of people with glaucoma worldwide	2	1829	1543	*British Journal of Ophthalmology*	3.806	6.80	1996
Gordon *et al*.	The Ocular Hypertension Treatment Study: baseline factors that predict the onset of primary open-angle glaucoma	1	1779	1628	*Archives of Ophthalmology*	6.198	9.00	2002
Tham *et al*.	Global prevalence of glaucoma and projections of glaucoma burden through 2040: A systematic review and meta-analysis	2	1538	1404	*Ophthalmology*	4.013	14.80	2014

AGIS: Advanced Glaucoma Intervention Study, WoS: Web of Science

In addition, we found that most articles in this field are assigned to Robert N. Weinreb with the affiliation of the University of California, San Diego in the USA. Furthermore, most of the articles are conducted by the University of California System and published in the *Journal of Investigative Ophthalmology and Visual Science*, which is in line with Sun *et al*.'s findings that reported the same author and journal as the most prolific in the world. They studied the glaucoma-related literature based on the SCIE database for 10 years from 2009 to 2018.[29] In the present study, the co-word analysis as one of the content analysis techniques was applied to identify the conceptual structure, interaction of different research subjects, and the research trend in the field of glaucoma. The first cluster was identified as the largest cluster, which was labeled with "ocular hypertension" as the most frequent subject term. This cluster is specifically focused on the signs and symptoms of glaucoma and concurrent systemic disease. The second cluster focuses on the epidemiologic aspects of glaucoma disease in different populations, glaucoma and ocular signs, and diagnostic instruments. Furthermore, cellular and molecular changes in glaucoma are the main focus of the third cluster. The ocular complications and therapeutic modalities are the principal subjects of the fourth cluster. Furthermore, ophthalmic medication is the main focus of the fifth cluster.

The top 10 highly cited articles were analyzed in the present study, which is valuable scientifically due to the high citation by other publications.[30] We also found that 40% of these 10 articles were published in the *Journal of Archives of Ophthalmology*, which shows the high quality of this journal in the field of glaucoma. Based on the findings of the present study, this journal is also classified as one of the 10 first journals with a greater number of publications in this field. Journal and country appear to be the factors most strongly associated with the frequency of citation. Surprisingly, it was found that none of these highly cited articles was published in the subspecialty journals in the field of glaucoma such as *Journal of Glaucoma*, *Journal of Neuro-ophthalmology*, *Journal of Neuro-ophthalmology Japan*, *Journal of Current Glaucoma Practice*, and *Neuro-ophthalmology Journal*. In addition, the main focus of the majority (70%) of these highly cited articles was on the epidemiologic aspects as classified in the second cluster in our study. There is a high citation rate in the epidemiological studies due to the fact that most of them are commonly purposed to investigate public health, requirements of the healthcare system, and the standard health criteria in different locations throughout the world.[31,32] Nevertheless, it seems that the impact of the types of articles on receiving citations needs further investigation. In this regard, Filion *et al*. studied the factors related to the

frequency of citations in epidemiological studies. They found that highly cited articles were more likely to be published in journals with medium and high impact factors, and there is an association between topics and citations in the child injury prevention articles.[33]

In the study by Ramin *et al*., the top 10 highly cited glaucoma articles in the WoS published during 1993–2013 were investigated. They found that the majority of these publications focus on the treatment and preventive approach, epidemiological aspects, pathogenesis factors, and the genetic causes of glaucoma.[21] Huang *et al*. also reported that the pathology of optic disc was the most common subject in the field of glaucoma, while epidemiological subjects were the low frequent subjects in this field.[19]

Based on the clusters and the extracted keywords from the VOSviewer, which were analyzed by ophthalmologists and other researchers who were experts in the field of glaucoma, it was found that fewer articles have been published on some topics, and it is recommended to be more investigated in the future studies. In this regard, it seems that it is needed to publish more studies for glaucoma screening performed by using the updated teleophthalmology approaches such as mobile health, artificial intelligence, and telemedicine. Furthermore, more investigations are recommended to be conducted in relation with some various subjects like interpretation of retinal images indices, normal-tension glaucoma, refractive changes in glaucoma, public awareness of glaucoma and its complications. Also, designing of a meta-analysis comparing the effectiveness of different ocular medications, investigation of the mitomycin C in the surgeries for glaucoma and conducting other studies focused on inheritance pattern and genetic factors in glaucoma progression were the other essential topics which are needed to be more investigated in the future studies.

In this study, we analyzed all glaucoma research in the WoS and Scopus. The co-word analysis was used to extract subject clusters. The study had a more precise vision than the previous research. We found an increasing publication rate in both databases. The USA, the University of California System, and the Journal of Investigative Ophthalmology and Visual Science were the most prolific country, institution, and journal, which were identified, respectively. The co-word network and thematic clustering of glaucoma outputs showed that this network consisted of the five thematic clusters. "glaucoma", "intraocular pressure", "open-angle glaucoma", "visual acuity", and "optic disc" were the most frequent keywords, respectively. This study discovered hidden patterns and emerging events of a subject by explaining the most important aspects of research and identifying the areas that need more research. It can be helpful for ophthalmologists and other eye care physicians, researchers, and health policymakers all around the world. Efficient research can be influential in the prevention of visual impairment due to glaucoma; therefore, policymaking in designing such research can be considered the crucial point in ocular health progression.

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Conflicts of interest

There are no conflicts of interest.

References

1. Bernabò N, Greco L, Mattioli M, Barboni B. A scientometric analysis of reproductive medicine. Scientometrics 2016;109:103-20.
2. Cavacini A. Recent trends in Middle Eastern scientific production. Scientometrics 2016;109:423-32.
3. Katz Y, Matter U. On the Biomedical Elite: Inequality and Stasis in Scientific Knowledge Production. Berkman Klein Center Research Publication; 2017.
4. Miguel S, Tannuri de Oliveira EF, Cabrini Grácio MC. Scientific production on open access: A worldwide bibliometric analysis in the academic and scientific context. Publications 2016;4:1.
5. Zerem E. The ranking of scientists based on scientific publications assessment. J Biomed Inform 2017;75:107-9.
6. Aistleitner M, Kapeller J, Steinerberger S. The power of scientometrics and the development of economics. J Econ Issues 2018;52:816-34.
7. Fortunato S, Bergstrom CT, Börner K, Evans JA, Helbing D, Milojević S, *et al.* Science of science. Science 2018;359:eaao0185.
8. Jibu M, Osabe Y. Scientometrics: BoD-Books on Demand. Norderstedt, Germany; 2018.
9. Basu T, Mallik A, Mandal N. Evolving importance of anticancer research using herbal medicine: A scientometric analysis. Scientometrics 2017;110:1375-96.
10. Ebadi A, Schiffauerova A. How to boost scientific production? A statistical analysis of research funding and other influencing factors. Scientometrics 2016;106:1093-116.
11. Liao H, Tang M, Luo L, Li C, Chiclana F, Zeng XJ. A bibliometric analysis and visualization of medical big data research. Sustainability 2018;10:166.
12. Masic I, Begic E, Zunic L. Scientometric analysis of the journals of the academy of medical sciences in Bosnia and Herzegovina. Acta Inform Med 2016;24:4-11.
13. Shekofteh M, Kazerani M. Scientometric Analysis of medical and non-medical highly cited papers of Iran in essential science indicator (ESI). Arch Adv Biosci 2017;8:6-15.
14. Hassell JB, Lamoureux EL, Keeffe JE. Impact of age related macular degeneration on quality of life. Br J Ophthalmol 2006;90:593-6.
15. Lamoureux EL, Pallant JF, Pesudovs K, Tennant A, Rees G, O'Connor PM, *et al.* Assessing participation in daily living and the effectiveness of rehabiliation in age related macular degeneration patients using the impact of vision impairment scale. Ophthalmic Epidemiol 2008;15:105-13.
16. American Academy of Ophthalmology. Christopher A, Girkin MD (Editors). 2019-2020 BCSC (Basic and Clinical Science Course), Section 10: Glaucoma. American Academy of Ophthalmology, San Francisco, CA, United States, 2020.
17. Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. Br J Ophthalmol 2006;90:262-7.
18. Boudry C, Baudouin C, Mouriaux F. International publication trends in dry eye disease research: A bibliometric analysis. Ocul Surf 2018;16:173-9.
19. Huang WB, Wang W, Zhou MW, Chen SD, Zhang XL. Bibliometric analysis of current glaucoma research based on Pubmed database. Zhonghua Yan Ke Za Zhi 2013;49:987-92.
20. Kumaragurupari T, Geetha V. Scientometric analysis of genetics research on Glaucoma. J Adv Libr Inf Sci 2017;6:01-6.
21. Ramin S, Pakravan M, Habibi G, Ghazavi R. Scientometric analysis

and mapping of 20 years of glaucoma research. Int J Ophthalmol 2016;9:1329-35.
22. Rezaei L, Mohammadi M. Scientometric analysis of Iranian scientific productions in the field of ophthalmology. J Clin Basic Res 2018;2:23-32.
23. Yu ZL, Hu XY, Wang YN, Ma Z. Scientometric analysis of published papers in global ophthalmology in the past ten years. Int J Ophthalmol 2017;10:1898-901.
24. Mongeon P, Paul-Hus A. The journal coverage of web of science and Scopus: A comparative analysis. Scientometrics 2016;106:213-28.
25. Bosanac S, Matešić M, Tolić N. Telling the Future of Information Sciences: Co-Word Analysis of Keywords in Scientific Literature Produced at the Department of Information Sciences in Zagreb; 2009.
26. Pakravan M, Yazdani S, Javadi MA, Amini H, Behroozi Z, Ziaei H, *et al*. A population-based survey of the prevalence and types of glaucoma in central Iran: The Yazd eye study. Ophthalmology 2013;120:1977-84.
27. Fallon M, Valero O, Pazos M, Antón A. Diagnostic accuracy of imaging devices in glaucoma: A meta-analysis. Surv Ophthalmol 2017;62:446-61.
28. Gupta B, Kaur H. World glaucoma research: A quantitative analysis of research output during 2002-11. Annals of Library and Information Studies 2013;60:98-106.
29. Sun YX, Liu YN, Han Y, Kong FQ, Zhang Y, Labisi SA, *et al.* Bibliometric analysis of glaucoma-related literature based on SCIE database: A 10-year literature analysis from 2009 to 2018. Int J Ophthalmol 2020;13:1998-2006.
30. Durieux V, Gevenois PA. Bibliometric indicators: Quality measurements of scientific publication. Radiology 2010;255:342-51.
31. Hatami H, Razavi S, Eftekhar A, Majlesi F, Sayed Nozadi M, Parizadeh S. Textbook of Public Health. Tehran: Arjmand; 2004. p. 212-4.
32. Sackett DL, Rosenberg WM, Gray JA, Haynes RB, Richardson WS. Evidence based medicine: What it is and what it isn't. BMJ 1996;312:71-2.
33. Filion KB, Pless IB. Factors related to the frequency of citation of epidemiologic publications. Epidemiol Perspect Innov 2008;5:3.