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Review

Global head and neck surgery research during the COVID pandemic: A bibliometric analysis

Olga Mbougo Djoutsop [a,*], Jolyvette Voufo Mbougo [a], Ulrick Sidney Kanmounye [b]

[a] Faculty of Medicine, Bel Campus University of Technology, Kinshasa, Congo
[b] Research Department, Association of Future African Neurosurgeons, Yaounde, Cameroon

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ABSTRACT

Background: Before the COVID-19 pandemic, access to otolaryngology and head-and-neck surgery was limited in low- and middle-income countries (LMICs). The pandemic has increased the burden on LMIC health systems by causing unanticipated expenses, delayed care, and changes in research activity. We aimed to assess the landscape of global ENT research during the pandemic.

Materials and methods: The authors developed a search strategy composed of the following keywords: "otolaryngology," "head and neck surgery," and "low- and middle-income countries." Then, they searched eleven citation databases via the Web of Science from January 01, 2020, to May 03, 2021. They imported the result as metadata into VosViewer and ran bibliometric analyses to identify the most influential institutions, countries, and themes.

Results: During the study period, 3077 articles were published. Two hundred eighty-nine articles (9%) mentioned COVID-19 explicitly. The second most common theme was pediatric ENT (223 articles, 7%). The United States had the most publications [1616 articles, 12,033 citations, and 2986 total link strength (TLS)], followed by China (336 articles, 10,981 citations, and 571 TLS). South Africa, the first African country, was fourth (302 articles, 699 citations, and 908 TLS), while Brazil, the first South American country, was seventh (158 articles, 582 citations, and 376 TLS). The most prolific institution was the National Institute of Allergy and Infectious Diseases (186 articles, 1110 citations, and 674 TLS).

Conclusion: COVID-19 was the most common research theme during the pandemic, surpassing pediatric ENT.

1. Introduction

The COVID-19 pandemic has impacted global health, economics, and social fabric adversely. At the time of submission, there have been 168 million cases, 3.5 million deaths, more than 4.9% loss in the gross domestic product of our nations, and exacerbation of inequities in our societies [1–3]. Low- and middle-income countries (LMICs) have been affected disproportionately by COVID-19 due primarily to insufficient vaccines and insufficient public health emergency preparedness [4–9]. In addition, the pandemic has diverted resources from infrastructure, education, and other health priorities. This double burden is concerning for LMICs, especially with regards to surgical care [10].

More than 5 billion people lack access to safe, timely, and affordable surgical care worldwide, and two-thirds of the unmet surgical need is in LMICs [11]. There has been significant progress towards reducing this unmet need; however, the COVID-19 pandemic has caused the cancellation or postponement of 28.4 million surgeries globally and increased patient mortality rates by almost 273% [12,13]. Otolaryngology - head, and neck surgery (OHNS) has been affected more than most surgical specialties due principally to higher occupational risks [14]. Furthermore, the COVID-19 pandemic has impacted OHNS research by diverting resources to COVID-19, reducing participation in interventional research due to social distancing and stay-at-home orders, and review and publication delays due to a surge in article submissions [15].

The authors sought to identify trends in OHNS research from LMIC researchers and institutions and about OHNS practice in LMICs during the COVID-19 pandemic. They did this using a scientometric analysis of all LMIC-related OHNS research during the said period.

* Corresponding author.
E-mail address: Olgadjoutsop@gmail.com (O.M. Djoutsop).

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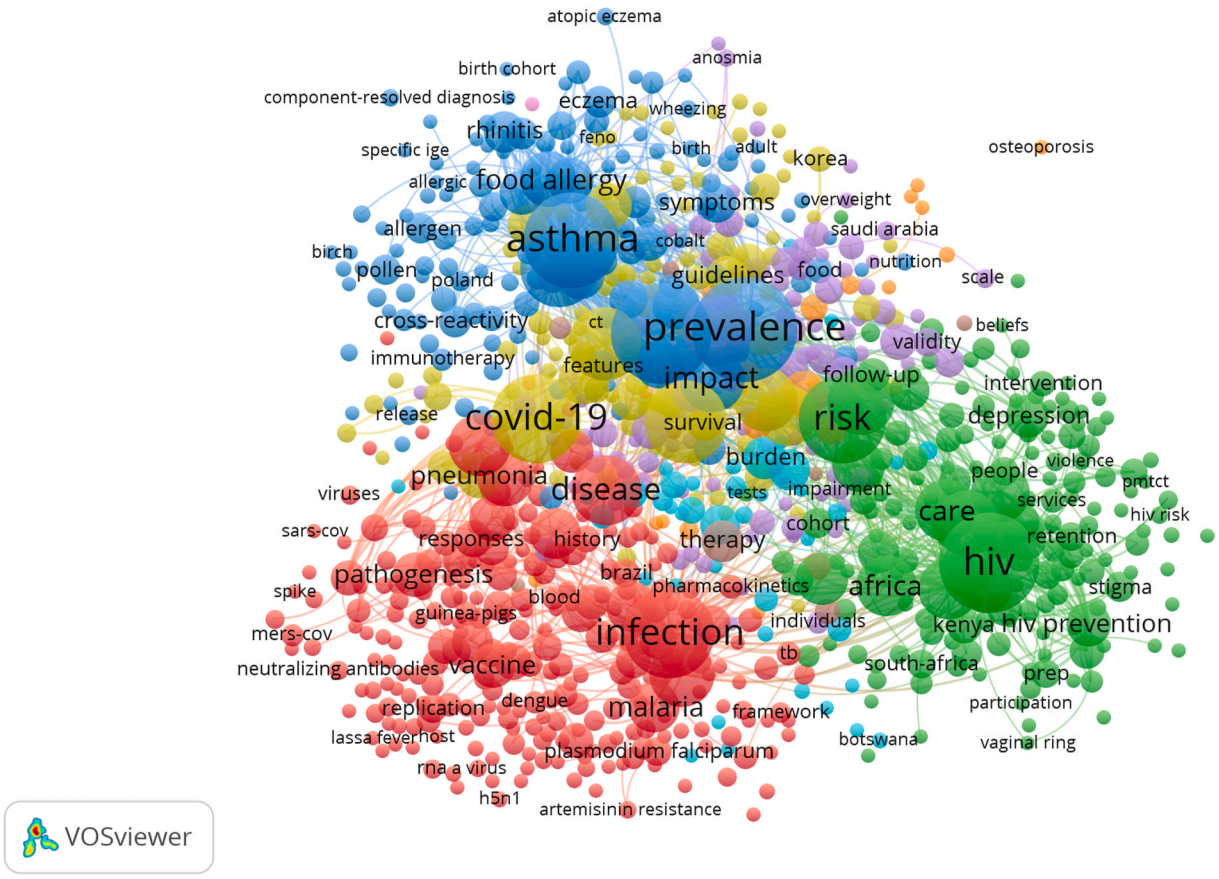

Fig. 1. Social network analysis of keywords extracted from otolaryngology, head, and neck surgery articles published during the COVID-19 pandemic. Nodes (circles) represent keywords, and links (lines) are connections between the nodes. The names in the circles are those of the most prominent keywords, and the circles' sizes are proportional to their total link strength. Related keywords have the same color (clusters), and clusters are grouped thematically. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

2. Material and methods

This manuscript reports findings in accordance with the 2020 Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statement [16].

2.1. Definition of terms

Scientometrics is a subfield within bibliometrics that measures and analyzes scholarly literature to identify the most influential articles, authors, academic institutions, and themes [17]. Scientometrics provides quantitative and qualitative insight into the key actors within a field and interactions between these key actors. The interactions between key actors are computed and visualized as network maps [18]. These network maps represent the actors as *nodes* (circles) and the interactions between actors as *links* (lines) [18]. Actors that share similar features are grouped into *clusters* (nodes of the same color), and the influence or centrality of a node is expressed as a *link strength* [19].

2.2. Data collection, curation, and analysis

The authors searched eleven citation databases via the Web of Science core collection from January 01, 2020, to May 03, 2021, for the terms "otolaryngology," "head and neck surgery," and "low- and middle-income countries" (**Appendix 1, search strategy**). They downloaded the article metadata in groups of 500 as text files. Next, the text files were imported into VOSViewer (Centre for Science and Technology Studies, Leiden University, The Netherlands), a scientometric freeware for the social network analysis. Network maps of the articles, their cited references, authors, author affiliations, and keywords were generated. Also, quantitative measures were computed, including the number of publications, number of citations, and total link strength.

The authors used SPSS v.26 for Windows (IBM, WA, USA) to calculate summary descriptive statistics to compare differences in the bibliometric data by region and income category. Regions and income categories were defined using the World Banks categorization by continent (East Asia and Pacific, Europe and Central Asia, Latin America & the Caribbean, Middle East and North Africa, North America, South Asia, and Sub-Saharan Africa) and by country income (Low-income economies, Lower-middle-income economies, Upper-middle-income economies, and High-income economies) [20]. These comparisons were made using the Kruskal-Wallis test and a threshold of significance of 0.05.

2.3. Ethics

This scientometric analysis was a secondary analysis of bibliometric data that did not have animal or human data. Hence, ethical approval was not necessary.

Table 1
Country of the author institutional affiliations for otolaryngology, head, and neck surgery articles published during the COVID-19 pandemic.

Country	Number of articles	Number of citations	Total link strength
United States of America	1616	12033	2986
China	336	10981	571
England	316	2528	1191
South Africa	302	699	908
India	242	366	385
South Korea	219	556	222
Brazil	158	582	376
Germany	156	2622	728
Australia	148	1341	676
Uganda	148	246	437
Kenya	132	203	349
France	111	498	574
Thailand	105	298	353
Iran	104	281	145
Turkey	104	170	158
Switzerland	97	2889	507
Canada	90	899	410
Netherlands	87	709	426
Japan	82	372	315
Spain	81	504	413
Italy	79	569	409
Poland	76	229	137
Sweden	67	324	258
Malawi	61	65	210
Mexico	61	128	174
Malaysia	56	229	222
Zambia	56	75	189
Belgium	55	186	287
Peru	51	58	154
Zimbabwe	50	60	173
Saudi Arabia	49	176	126
Singapore	47	1528	229
Portugal	46	258	248
Egypt	44	65	143
Russia	42	66	158
Taiwan	42	126	195
Tanzania	42	60	168
Indonesia	38	50	171
Nigeria	37	232	155
Vietnam	34	185	198
Greece	32	270	173
Scotland	32	146	165
Argentina	31	56	108
Colombia	31	79	92
Austria	30	81	187
Denmark	30	113	157
Cameroon	28	92	150
Ethiopia	27	144	97
Ghana	27	84	158
Bangladesh	25	116	80
Ecuador	25	17	65
Mali	25	44	94
Ukraine	24	27	70
Chile	23	52	73
Philippines	23	38	109
Finland	22	162	124
Botswana	21	71	84
Cambodia	20	13	117
Democratic Republic of Congo	20	123	104
Pakistan	20	141	59
Sri Lanka	19	113	27
Senegal	18	104	72
Nepal	17	36	91
New Zealand	17	43	84
Norway	17	36	112
Romania	16	152	105
Côte d'Ivoire	14	56	86
Hungary	14	34	51
Lebanon	14	12	54
Tunisia	14	21	29
The Gambia	13	50	128
Haiti	13	32	36
Jordan	13	28	13
Rwanda	13	50	45
Burkina Faso	12	38	108
Czech Republic	12	28	48
Ireland	12	242	70
Israel	12	61	75
Liberia	12	49	43
Mozambique	12	15	64
Sierra Leone	12	28	24
Croatia	11	135	66
United Arab Emirates	11	22	65
Eswatini	10	31	78
Lithuania	9	48	61
Slovenia	9	35	68
Cyprus	8	23	39
Honduras	8	14	34
Iraq	8	120	48
Nicaragua	8	59	10
Paraguay	8	13	34
Togo	8	21	59
Trinidad and Tobago	8	19	42
Venezuela	8	42	67
Belarus	7	10	26
Bulgaria	7	29	53
Morocco	7	20	57
Myanmar	7	3	33
Qatar	7	157	59
Serbia	7	18	46
Dominican Republic	6	23	19
Madagascar	6	8	27
Uruguay	6	8	40
Algeria	5	11	29
Costa Rica	5	21	30
Cuba	5	1	8
Lesotho	5	3	30
Slovakia	5	5	18
Benin	4	17	54
Bhutan	4	20	49
Guinea Bissau	4	33	36
Kuwait	4	14	11
Latvia	4	2	16
Mongolia	4	20	38
Wales	4	10	13
Angola	3	30	27
Armenia	3	0	1
Burundi	3	2	15
Estonia	3	5	10
Georgia	3	20	48
Laos	3	6	20
Luxembourg	3	21	26
Namibia	3	2	8
North Ireland	3	19	12
Oman	3	2	13
Panama	3	31	19
Cape Verde	2	2	3
Fiji	2	0	4
Gabon	2	10	27
Grenada	2	0	1
Guatemala	2	0	2
Iceland	2	3	8
Kazakhstan	2	1	2
Moldova	2	18	19
Palestine	2	3	1
Papua New Guinea	2	3	23
Republic of Congo	2	2	17
Samoa	2	0	2
St Kitts & Nevi	2	1	3
Sudan	2	1	18
Timor-Leste	2	17	38
Afghanistan	1	2	2
Albania	1	2	2
Azerbaijan	1	0	1
Bahrain	1	2	2
Bosnia & Herzegovina	1	0	1

(*continued on next page*)

Table 1 (*continued*)

Country	Number of articles	Number of citations	Total link strength
Comoros	1	12	24
El Salvador	1	0	3
French Guiana	1	11	4
Guyana	1	11	4
Jamaica	1	1	1
Kyrgyzstan	1	108	23
Libya	1	0	1
Malta	1	17	17
Mauritania	1	0	5
Mauritius	1	15	20
Niger	1	2	9
Seychelles	1	12	24
Somalia	1	1	0
Syria	1	6	0
Yemen	1	0	2

3. Results

The search strategy returned 3077 results. A handful of articles reported on COVID-19-related OHNS (n = 289 articles, 9%), and the second most common theme was pediatric OHNS (223 articles, 7%). The remaining articles reported allergic and atopic disorders and infectious diseases in OHNS patients (ex: HIV, malaria, and tuberculosis) (Fig. 1).

Authors affiliated with American institutions published the most [1616 articles, 12,033 citations, and 2986 total link strength (TLS)], followed by China (336 articles, 10,981 citations, and 571 TLS). South Africa, the first African country, was fourth (302 articles, 699 citations, and 908 TLS), while Brazil, the first South American country, was seventh (158 articles, 582 citations, and 376 TLS) (Table 1).

There were statistically significant differences between the regions in terms of the number of articles (P = 0.016), citations (P = 0.013), and total link strength (P = 0.001) (Fig. 2). Similarly, there were statistically significant differences between income categories regarding citations (Median: high-income = 81 vs. upper-middle-income = 19, vs. lower-middle-income = 28.5, vs. low-income = 30; P = 0.002) and total link strength (Median: high-income = 75 vs. upper-middle-income = 40, vs. lower-middle-income = 51.5, vs. low-income = 39.5; P = 0.013). However, there was no evidence to support the differences between income categories for the number of published articles (Median: high-income = 16 vs. upper-middle-income = 7, vs. lower-middle-income = 9, vs. low-income = 12; P = 0.098).

3.1. Academic institutions and authors

The most prolific institution was the National Institute of Allergy and Infectious Diseases (186 articles, 1110 citations, and 674 TLS). The first African institution was the University of Witwatersrand (99 articles, 148 citations, and 538 TLS) and the Hallym University (53 articles, 66 citations, and 281 TLS) was the first Southeast Asian university (Table 2). The social network map of academic institutions showed high connectivity resulting from academic collaborations (Fig. 3).

The most prolific authors were Kinuthia J (18 articles, 2 citations, and 11 TLS), Kamya MR (17 articles, 27 citations, and 59 TLS), Baeten JM (15 articles, 25 citations, and 13 TLS), Bekker LG (15 articles, 32 citations, and 9 TLS), Dorsey G (15 articles, 26 citations, and 34 TLS), Pettifor A (15 articles, 11 citations, and 22 TLS), and Reynolds SJ (15 articles, 14 citations, and 31 TLS).

4. Discussion

We analyzed LMIC-related OHNS research output during the COVID-19 pandemic. We found that a fraction of the LMIC-related OHNS research was focused on COVID-19, while the rest covered allergology and pediatric OHNS. Authors affiliated with high-income country (HIC) institutions published more articles than their colleagues affiliated with LMIC institutions. North American institutions had the highest median academic output, followed by East and South Asian institutions. Additionally, citations and TLS were correlated with country income and region - North American HIC institutions had the highest citations and TLS.

The study of clinical OHNS and its public health implications worldwide is called global OHNS or global ENT surgery. Global OHNS researches, educates, and advocates for universal access to OHNS care and improved health outcomes [21]. Global OHNS was born from the global surgery movement and has since emancipated to form a self-sufficient field. This expansion has been spearheaded by the Global OHNS initiative, an international collaborative that promotes research, education, policymaking, and advocacy in OHNS to increase access to safe, timely, and affordable OHNS care [22]. Research is a critical component of the global OHNS strategy. Its value resides in its ability to quantify the burden of OHNS globally, inform health policies, guide clinical practice in low-resource settings, and propose innovative solutions to common global OHNS problems [21]. Examples of relevant research include Patterson et al.'s [23] landmark study quantifying the global burden of OHNS cancers. The authors found that increasing the specialist OHNS workforce by 10% would reduce the OHNS cancer mortality-to-incidence ratio by 0.76% [23]. Another equally important article was Kligerman et al. [24] on challenges faced by LMIC OHNS specialists during the COVID-19 pandemic. In this commentary, the authors highlighted the nefarious impact of COVID-19 morbidity and mortality on the OHNS specialist workforce in LMICs. They proposed interventions to decrease occupational risks in this population, and they shared the experiences of OHNS specialists in LMICs who have successfully implemented these solutions [24].

The thematic analysis of LMIC-related OHNS articles published during the COVID-19 pandemic revealed that *global OHNS* and its synonyms are seldom used. This finding highlights the need for increased advocacy and education within global surgery, especially in regions where the burden of OHNS disorders is highest. Hence, advocacy efforts should target OHNS specialists, trainees, and medical students interested in OHNS living in LMICs especially, in Asia [23]. These targeted education and advocacy efforts can be facilitated by organized OHNS societies globally and globally. Global neurosurgery has done this successfully through the World Federation of Neurosurgical Societies (WFNS). The WFNS created an ad-hoc committee composed of global neurosurgery stakeholders. The committee and other global neurosurgery actors have created a global neurosurgery journal, organized sessions at major neurosurgery conferences, sponsor training in LMICs, and policymaking at the World Health Organization [25–27]. In addition, these efforts have led to an exponential increase in PubMed indexed global neurosurgery research [28].

The current academic global OHNS is skewed in favor of HICs. The global OHNS community should seek to involve LMICs institutions and researchers more often. The list of influential institutions and authors in this study can help HIC institutions and authors identify prolific LMIC colleagues to set up new research collaborations. Furthermore, the social network map of academic institutions (Fig. 3) shows the degrees of relationship between institutions. It can be used to identify intermediary acquaintances who can facilitate introductions between institutions that have not worked together in the past. Priority should be given to collaborations between institutions belonging to different clusters, especially between LMIC institutions. Similarly, the country list (Table 1) can identify priority countries for research capacity-building efforts.

4.1. Limitations

This scientometric analysis of global OHNS during the COVID-19 pandemic presented bibliometric data disaggregated regionally and economically. Publication and citation data are influenced by multiple factors, including the journal impact factor, open access, and language.

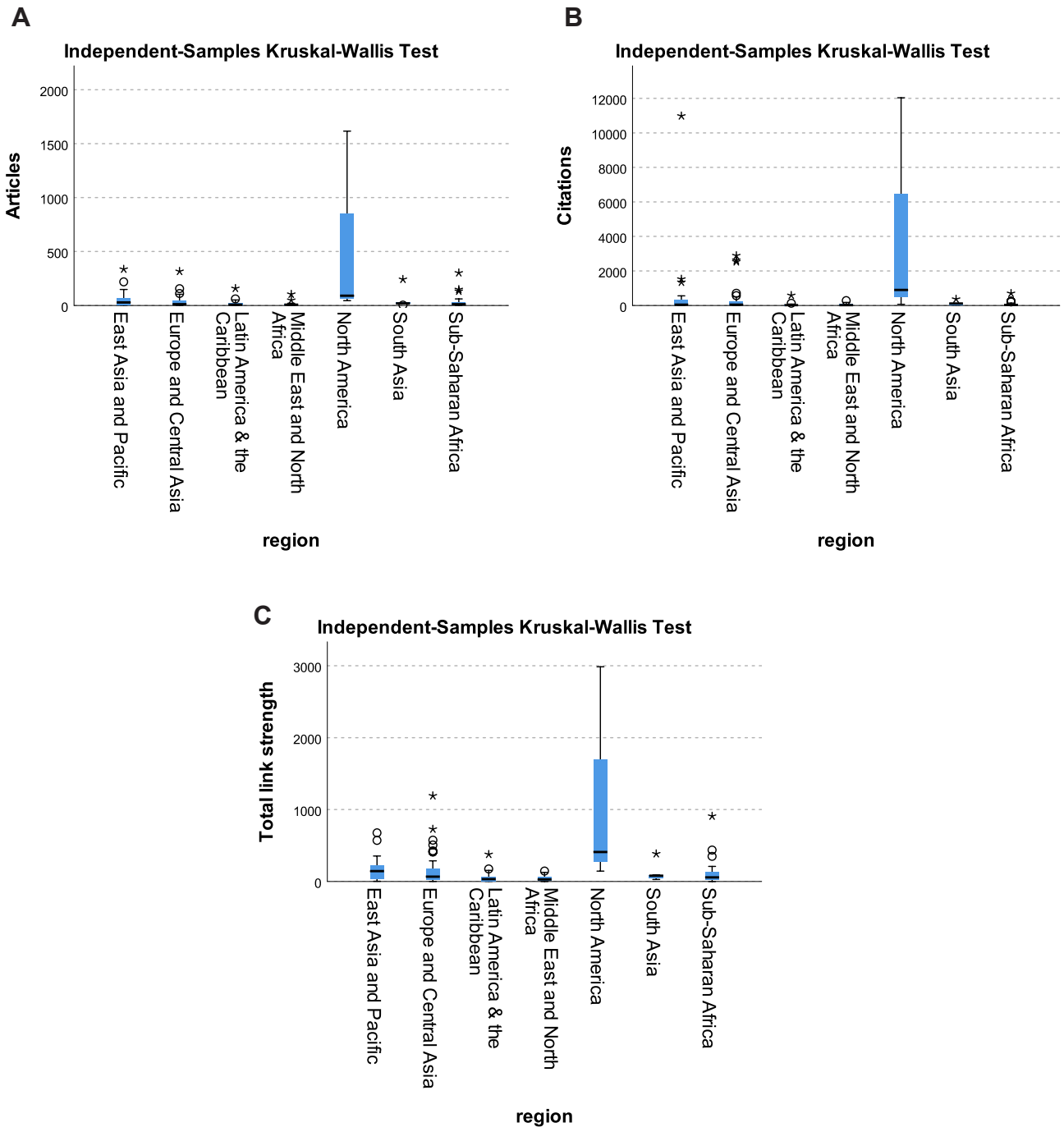

Fig. 2. Boxplot of articles, citations, and total link strength by region.

Our findings should be interpreted with caution because we limited our analysis to the COVID-19 pandemic. There is documented evidence that scholarly output and citations increased during the pandemic, so the metrics are probably higher than before the pandemic [15]. Notwithstanding, we expect the increase to be the same across regions and income categories. Hence, the differences between the regions and income groups should be the same pre-pandemic and during the pandemic.

5. Conclusion

We identified influential themes, prolific authors, and institutions within global OHNS using scientometrics. The COVID-19 global OHNS literature has diverse authors; however, HIC and North American institutions contribute much more to the scholarly output than LMIC institutions. This geographical disparity is a cause of concern. Fortunately, the diverse and highly connected social network of global OHNS contributors suggests this disparity can be solved easily.

Table 2
Fifty most prolific institutions for otolaryngology, head, and neck surgery articles published during the COVID-19 pandemic.

Institution	Number of articles	Number of citations	Total link strength
National Institute of Allergy and Infectious Diseases	186	1110	674
University of Washington	156	591	577
Johns Hopkins University	126	1473	495
University of California San Francisco	120	563	536
University of North Carolina	110	905	437
University of the Witwatersrand	99	148	538
University of Cape Town	96	175	405
Harvard Medical School	94	277	394
Johns Hopkins Bloomberg School of Public Health	87	1479	339
London School of Hygiene & Tropical Medicine	84	485	366
Makerere University	81	158	340
Harvard TH Chan School of Public Health	72	128	387
Columbia University	69	1526	325
Duke University	68	137	265
Emory University	61	173	240
Kenyan Medical Research Institute	55	72	202
Fred Hutchinson Cancer Research Center	54	165	314
Hallym University	53	66	281
University of KwaZulu-Natal	53	131	248
Seoul National University	52	58	283
Massachusetts General Hospital	48	72	227
Stanford University	46	302	194
Catholic University of Korea	45	53	210
Mahidol University	45	53	193
University of Pennsylvania	45	209	147
Stellenbosch University	44	156	230
University of Sao Paulo	42	401	132
Boston University	41	162	158
University of Ulsan	40	82	227
University of California, Los Angeles	39	74	168
University of California, San Diego	39	101	162
Yonsei University	39	38	196
Brown University	38	60	90
Centers for Disease Control and Prevention	37	230	144
Imperial College London	37	1043	163
University of Pittsburgh	37	596	187
Tehran University of Medical Sciences	37	79	87
South African Medical Research Council	36	38	209
University of California, Berkeley	36	118	171
University of Zimbabwe	35	43	204
University of Maryland	34	236	163
University of Michigan	34	281	125
University of Minnesota	33	68	103
Oxford University	33	118	140
National Cancer Institute	31	186	100
Sungkyunkwan University	31	32	142
University of California, Davis	31	1604	122
University of Texas Medical Branch	31	302	73
Vanderbilt University	31	796	107
Fundacao Oswaldo Cruz	30	66	157
Hanyang University	30	34	176

Ethical Approval

Not applicable.

Funding sources

None.

Author contribution

OMD and JVM contributed to data collection, analysis and manuscript writing. USK conceptualized, administered and supervised the project, interpreted and validated the data, and wrote the manuscript.

Guarantor

Olga Djoutsop Mbougo.

Registration of research studies

1. Name of the registry:
2. Unique Identifying number or registration ID:
3. Hyperlink to your specific registration (must be publicly accessible and will be checked):

Provenance and peer review

Not commissioned, externally peer reviewed.

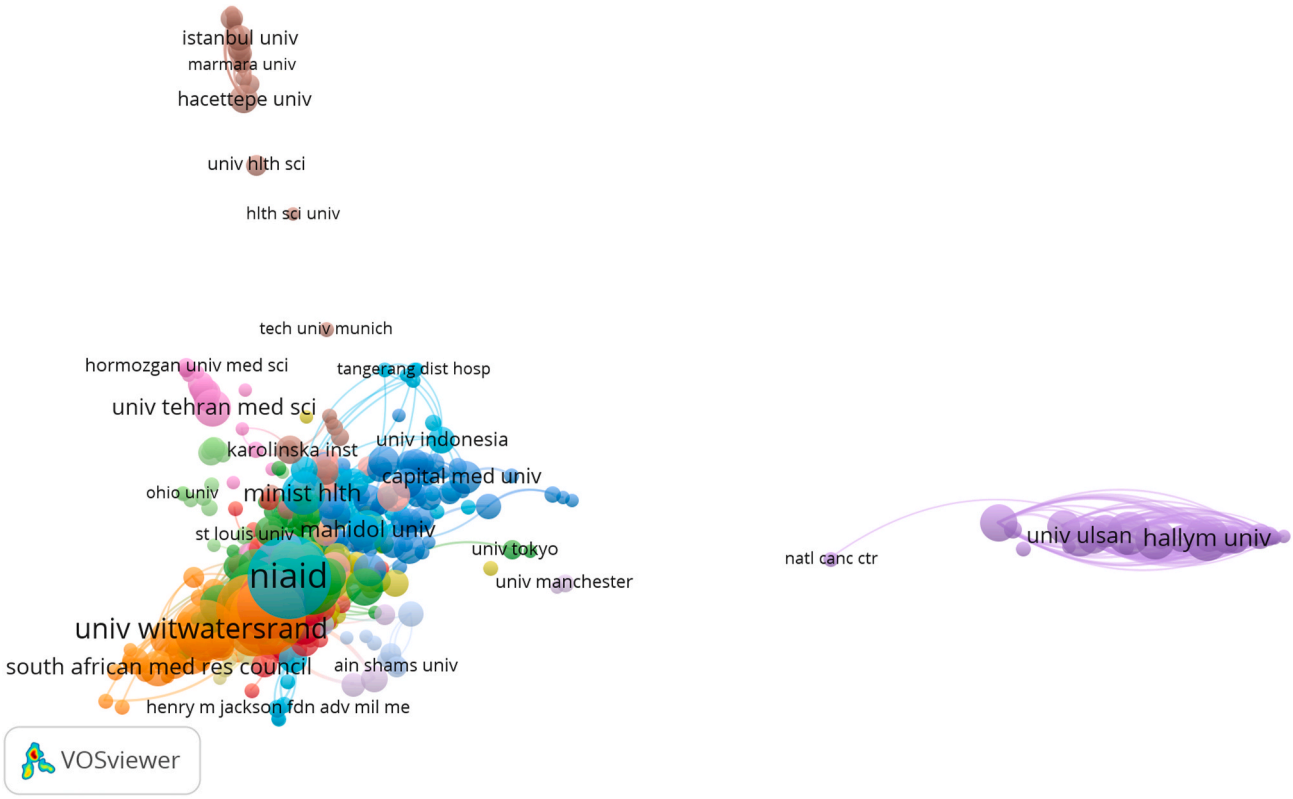

Fig. 3. Social network analysis of the otolaryngology, head, and neck surgery articles published during the COVID-19 pandemic. Nodes (circles) represent academic institutions and links (lines) are connections between the nodes. The names in the circles are those of the most influential institutions and the circles' sizes are proportional to their total link strength. Related institutions have the same color (clusters). (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

Declaration of competing interest

We declare no conflict of interest.

Acknowledgements

None.

Search Strategy

1. All=("Endocrine surgery" OR "facial surgery" OR "otology" OR "neuro-otology" OR "rhinology" OR "Allergy" OR "Allergology" OR "otolaryngology" OR "head and neck surgery" OR "head-and-neck surgery" OR "ENT surgery" OR "head surgery" OR "neck surgery")
2. TS=("developing countries" OR Africa OR Asia OR Caribbean OR "West Indies" OR "South America" OR "Latin America" OR "Central America")
3. TS=(Afghanistan OR Albania OR Algeria OR Angola OR Antigua OR Barbuda OR Argentina OR Armenia OR Armenian OR Aruba OR Azerbaijan OR Bahrain OR Bangladesh OR Barbados OR Benin OR Byelarus OR Byelorussian OR Belarus OR Belorussian OR Belorussia OR Belize OR Bhutan OR Bolivia OR Bosnia OR Herzegovina OR Hercegovina OR Botswana OR Brasil OR Brazil OR Bulgaria OR BurkinaFaso OR "Burkina Fasso" OR "Upper Volta" OR Burundi OR Urundi OR Cambodia OR "Khmer Republic" OR Kampuchea OR Cameroon OR Cameroons OR CapeVerde OR "Central African Republic" OR Chad OR Chile OR China OR Colombia OR Comoros OR "Comoro Islands" OR Comores OR Mayotte OR Congo OR Zaire OR "Costa Rica" OR "Cote d'Ivoire" OR "Ivory Coast" OR Croatia OR Cuba OR Cyprus OR Czechoslovakia OR "Czech Republic" OR Slovakia OR "Slovak Republic" OR Djibouti OR "French Somaliland" OR Dominica OR "Dominican Republic" OR "East Tim OR ″ OR "East Timur" OR "Timor Leste" OR Ecuador OR Egypt OR "United Arab Republic" OR "El Salvador" OR Eritrea OR Estonia OR Ethiopia OR Fiji OR Gabon OR "Gabonese Republic" OR Gambia OR Gaza OR "Georgia Republic" OR "Georgian Republic" OR Ghana OR "Gold Coast" OR Greece OR Grenada OR Guatemala OR Guinea OR Guam OR Guiana OR Guyana OR Haiti OR Honduras OR Hungary OR India OR Maldives OR Indonesia OR Iran OR Iraq OR "Isle of Man" OR Jamaica OR Jordan OR Kazakhstan OR Kazakh OR Kenya OR Kiribati OR K OR ea OR Kosovo OR Kyrgyzstan OR Kirghizia OR "Kyrgyz Republic" OR Kirghiz OR Kirgizstan OR "Lao PDR" OR Laos OR Latvia OR Lebanon OR Lesotho OR Basutoland OR Liberia OR Libya OR Lithuania OR Macedonia OR Madagascar OR "Malagasy Republic" OR Malaysia OR Malaya OR Malay OR Sabah OR Sarawak OR Malawi OR Nyasaland OR Mali OR Malta OR "Marshall Islands" OR Mauritania OR Mauritius OR "Agalega Islands" OR Mexico OR Micronesia OR "Middle East" OR Moldova OR Moldovia OR Moldovian OR Mongolia OR Montenegro OR Morocco OR Ifni OR Mozambique OR Myanmar OR Myanma OR Burma OR Namibia OR Nepal OR "Netherlands Antilles" OR "New Caledonia" OR Nicaragua OR Niger OR Nigeria OR "Northern Mariana Islands" OR Oman OR Muscat OR Pakistan OR Palau OR Palestine OR Panama OR Paraguay OR Peru OR Philippines OR Philipines OR Phillipines OR Phillippines OR Poland OR Portugal OR "Puerto Rico" OR Romania OR Rumania OR Roumania OR Russia OR Russian OR Rwanda OR Ruanda OR "Saint Kitts" OR "St Kitts" OR Nevis OR "SaintLucia" OR "StLucia" OR "Saint Vincent" OR "St Vincent" OR Grenadines OR Samoa OR Samoan Islands OR "Navigator Island" OR "Navigator Islands" OR "Sao Tome" OR "Saudi Arabia" OR Senegal OR Serbia OR Montenegro OR Seychelles OR "Sierra Leone" OR Slovenia OR "Sri Lanka" OR Ceylon OR "Solomon Islands" OR Somalia OR "South

Africa" OR Sudan OR Suriname OR Surinam OR Swaziland OR Syria OR Tajikistan OR Tadzhikistan OR Tadjikistan OR Tadzhik OR Tanzania OR Thailand OR Togo OR "Togolese Republic" OR Tonga OR Trinidad OR Tobago OR Tunisia OR Turkey OR Turkmenistan OR Turkmen OR Uganda OR Ukraine OR Uruguay OR USSR OR "Soviet Union" OR "Union of Soviet Socialist Republics" OR Uzbekistan OR Uzbek OR Vanuatu OR "New Hebrides" OR Venezuela OR Vietnam OR "Viet Nam" OR "West Bank" OR Yemen OR Yugoslavia OR Zambia OR Zimbabwe OR Rhodesia)

4. TS=(lmic OR lmics OR "third world" OR "lami countr*")
5. #2 OR #3 OR #4
6. #1 AND #5

Results: 41,524; May 3, 2021.

7. PY=(2020 OR 2021)
8. #6 AND #7

Results: 3077; May 3, 2021.

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