

Tear down the walls: Disseminating open access research for a global impact

Mohammed Saqr¹,
Abdulrahman Al-Mohaimed²,
Zafar Rasheed³

¹School of Computing, University of Eastern Finland, Joensuu Campus, Yliopistokatu, Joensuu, Finland, ²Department of Family Medicine, College of Medicine, Qassim University, Buraidah, Saudi Arabia, ³Department of Medical Biochemistry, College of Medicine, Qassim University, Buraidah, Saudi Arabia

Address for correspondence:

Dr. Mohammed Saqr, School of Computing, University of Eastern Finland, Joensuu Campus, Yliopistokatu 2, P.O. Box 111, FI-80100, Joensuu, Finland.
E-mail: mohammed.saqr@uef.fi

WEBSITE: ijhs.org.sa

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ABSTRACT

Objective: Publications are the cornerstone of the dissemination of scientific innovation and scholarly work, but published works are mostly behind paywalls. Therefore, many researchers and institutions are searching for alternative models for disseminating scholarly work that bypasses the current structure of paywalls. This study aimed to determine whether a self-published open access (OA) journal, the International Journal of Health Sciences (IJHS), has been able to reach a global audience in terms of authorship, readership, and impact using the OA model.

Methods: All IJHS articles were retrieved and analyzed using scientometric methods. Using the keywords from abstracts and titles, unsupervised clustering was performed to map research trends. Network analysis was used to chart the network of collaboration. The analysis of articles' metadata and the visualizations was performed using R programming language.

Results: Using Google Scholar as a source, the general statistics of IJHS from inception to 2019 showed that the average citation per article was 11.29, and the impact factor of the journal was 2.28. The results demonstrate the obvious local and global impact of a locally published journal that allows unrestricted OA and uses an open source publishing platform. The journal's success at attracting diverse topics, authors, and readers is a testament to the power of the OA model.

Conclusions: Open source is feasible and rewarding and enables a global reach for research from under-represented regions. Local journals can help the Global South disseminate their scholarly work, which is frequently ignored by commercial and established publications.

Keywords: Global impact, International Journal of Health Sciences, Open Access Journals, scientometric methods

Introduction

Science is built, refined, and advanced by sharing and distributing knowledge. In principle, science should be accessible to all, even the most remote researcher (or even layman), and such access to knowledge is essential for the public good. Most scholarly work is produced by universities and research institutions that fund researchers. Researchers also peer-review research manuscripts to ensure quality before publishing. Yet, publishers, who receive the research and the reviewers' services for free, assume ownership of the scholarly work and lock it behind paywalls that limit public access.^[1] In addition, research published using this traditional subscription publication model is restricted by copyright issues that prohibit reuse of the published content. Therefore, many researchers and institutions are searching for alternative models for disseminating scholarly work that bypasses the current structure of paywalls.

Researchers, who act as both the producers and main consumers of scientific documents, prefer to publish within an unrestricted open access (OA) framework.^[2] OA publications are defined as "digital, online information, free of charge, and free of most copyright and licensing restrictions, readily available to researchers and the general public once published."^[1] Full and immediate OA publishing is gaining trust in most developed countries despite some difficulties in the process of moving away from the traditional subscription publishing.^[3] OA has the potential to encourage innovation and speed up its adoption, which will be beneficial for education, collaboration, and innovation.^[4,5] OA articles appear to be downloaded more often and receive more citations than subscription articles, indicating a greater scientific impact.^[6-9] There is also evidence suggesting that OA articles have a broader societal impact based on data that measure the attention publications receive in the news and social media. Depending on their level of licensing restriction,

OA journals can facilitate public and commercial reuse of research results.^[9,10]

Publications are the cornerstone of the dissemination of scientific innovation and scholarly work. However, publication and dissemination do not always translate into impact. Research has shown that translation of research into practice is slow; one study has stated that it may take an average of 17 years for research evidence to reach 50% adoption in clinical practice, with the longest delays occurring after successful publication of clinical trial results.^[11,12] Such delay may be made worse by paywalls and restrictions on access. Over the past two decades, the publishing landscape has been significantly transformed due to digitization and the introduction of online communication tools.^[13] Advanced online editorial management and publishing platforms are now widely used to speed up editing and publishing. Social media are becoming yet another major player in scholarly publishing, highlighting the societal implications of scholarly output, and adding a new dimension to the impact of research. Research managers and publishers alike should accept that including OA with its established and emerging components, such as social networking platforms, may reach a wider audience in less time and even lead to a scientific breakthrough.^[13]

Aim of the study

Journals aspiring to have a global reach often opt for a commercial publisher to manage the process of publishing, and most importantly, to manage marketing. The question that the current study is trying to answer is, can a publication that is self-published as an OA journal capable of reaching a comparable global audience? Specifically, we examined the authorship, readership, and impact of an OA journal, the International Journal of Health Sciences (IJHS). This article begins by listing the main statistics about the journal's performance, analyzes its topics and main articles, and finally analyzes the citing articles and journal's impact.

About IJHS

IJHS has been published by Qassim University continuously since 2007 and includes articles relating to various medical fields. The first volume of the journal was published in January 2007. It originally published two issues annually, but due to increasing interest from authors, the editorial board decided to increase the number of issues several times: Four issues were released in 2014, 5 issues in 2015, and 6 issues annually since 2018. The journal is indexed in the Web of Science Core Collection Emerging Sources Citation Index, PUBMED, PUBMED Central, EBSCO HOST, Directory of OA Journals, Google Scholar, and Microsoft Academic and is listed on the Norwegian and Finnish lists as level 1.

While many journals would rely on commercial publishers to handle the publishing process, IJHS has relied on a self-hosted

version of the open source application Open Journal System to manage submissions, reviews, decisions, and electronic publishing.

Methods

The data for all articles published by IJHS from 2007 to 2019 were retrieved from PUBMED on February 15, 2020. Citation information was retrieved from Google Scholar since Web of Science only has data for the past 5 years, which does not cover the full duration of the journal's existence. The bibliometrix R package was used to analyze the data and calculate the metrics. Bibliometrix was used to extract keywords from published abstracts, construct networks of country collaboration, cluster topics into groups of topics, and create trend plots. The citing articles from the past 5 years (the only years available in the database) were retrieved from Web of Science using specific methodology of bibliometrix.^[14]

Results

Descriptive statistics

From 2007 to 2019, IJHS published 629 articles, of them 488 were original articles, 51 reviews, 72 case reports, and 18 editorial manuscripts. The average citation per article was 11.29, and the average citation per year per article was 1.619. The total number of authors was 1684, and authors' appearances were 2079, indicating a very small rate of repeated appearance for authors. The author collaboration index was 3.5, and there were 191 single-authored articles. For more details about collaboration, articles per author, authors per article, and coauthors per article, please refer to Table 1.

Research themes

Themes extracted from article titles

Clustering was performed to group the frequently used keywords from the titles of all IJHS published papers. The extracted title keywords showed five main clusters, which are depicted in Figure 1 (left): (1) A clinical cluster about treatment, cancer, diseases, and patients, (2) an epidemiological cluster representing studies about prevalence, health education, and children, (3) a hospital cluster representing studies about primary care centers and hospitals, (4) a medical education and medical students cluster representing studies about learning and teaching medicine, and (5) a local cluster representing studies about Saudi Arabia and Qassim Province. Worth noting is that the clinical and epidemiological clusters are the largest in number and breadth of clustered topics, which highlights the focus of the authors and the journal and their adherence to the scope.

Themes extracted from abstracts

While the topics extracted from the abstracts and titles were similar, there were more diversity and range of topics extracted from the abstracts. Four clusters can be distinguished: (1)

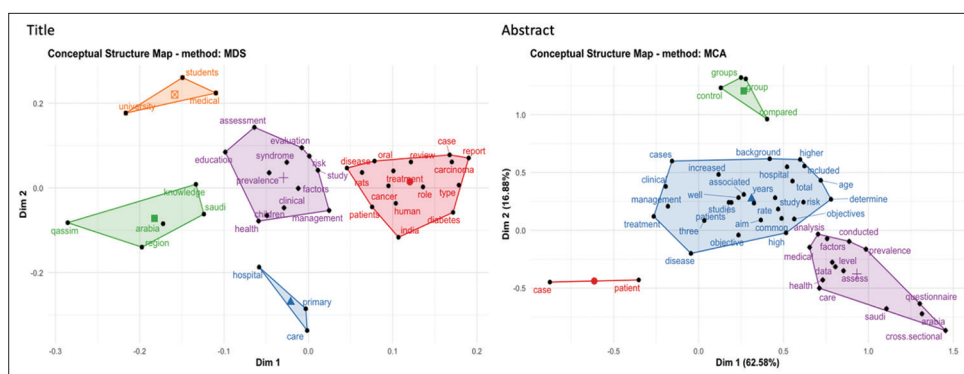


Figure 1: Research clusters extracted from titles (left) and research clusters extracted from abstracts (right)

Table 1: General statistics of IJHS

Parameters	Statistics
Time span	2007–2019
Articles published	629
Average citations per article	11.29
Average citations per year per article	1.619
Article types	
Case reports	72
Editorials	18
Original articles	488
Review articles	51
Authors	
Total number of authors	1684
Author appearances	2079
Authors of single-authored articles	150
Authors of multi-authored articles	1534
Author collaboration	
Single-authored articles	191
Articles per author	0.374
Authors per article	2.68
Coauthors per article	3.31
Collaboration index	3.5

IJHS: International Journal of Health Sciences

A clinical cluster reflecting clinical issues, hospitals, and management, (2) an epidemiological cluster covering issues of disease impact, knowledge, and prevalence, (3) a small case report cluster, and (4) a controlled trials cluster reporting on comparative trials.

Research trends

To understand the timeline of events and temporal dynamics of the published research, keywords were extracted from abstracts of all published IJHS articles, cleaned of stop words, and plotted for analysis. The abstract keyword trends in Figure 2 show the timeline of progression of the most frequently used words. There was a steady rise in the following keywords: Groups, associated, clinical, factors, treatment, and compared. These words indicate the journal's interest in clinically

oriented research and highlight the increasing relevance and need for studies that address clinical and human health issues. Epidemiological keywords ranked next in frequency of use, for example, risk, prevalence, rate, knowledge, women, children, and care. The rise of epidemiologically oriented research can be understood in the context of the increasing relevance of issues related to under-represented countries in research. In the same vein, the keyword Saudi (local studies) started to become prominent 5 years ago; however, a decline in the rate of Saudi-themed articles can be observed in the last couple of years.

The results of keyword clustering and trending topics show the dominance of clinical and epidemiological themes in the journal. Some of these papers reflect the local environment of the country of origin, covering nations, and regions not usually addressed by other international journals that focus on Western countries and the Global North. Since studies reporting on disease patterns, epidemiology, presentations, and how cultures of the Global South differ from Western countries are often under-represented, it is important that such research finds a venue for publication. There is an increasing recognition of the lack of research diversity in many commercial journals that often do not address non-Western contexts, and the citations and impact of articles from IJHS are a testament to this increasing interest.

Authorship

As displayed in Figure 3, the authorship of IJHS articles was diverse and spanned six continents. Most of the authors have come from the USA, Europe, South and East Asia, and the Middle East. A network of collaboration shows the countries of the authors who collaborated on published articles. Central to the network is the country of publishing, Saud Arabia. We used community detection to color the countries where the collaborating authors work from; there is a Western cluster (green), a Middle East and Canada cluster (pink) representing the common collaboration among these countries, and blue and orange clusters representing other common collaborations. The diversity of the authorship points to a global reach enabled by networks of collaboration among researchers that follow no obvious geographical theme.

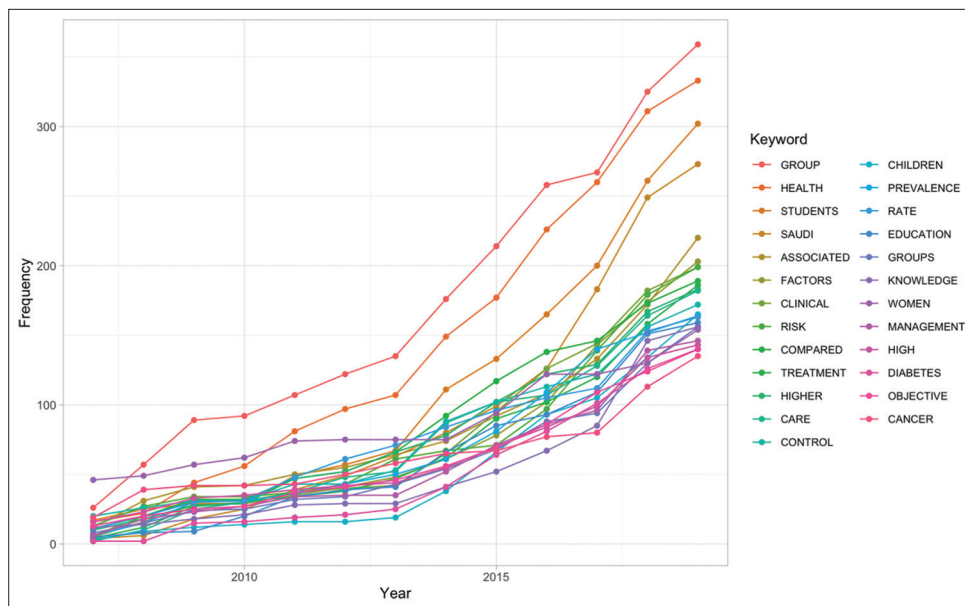


Figure 2: Growth and trends of topics

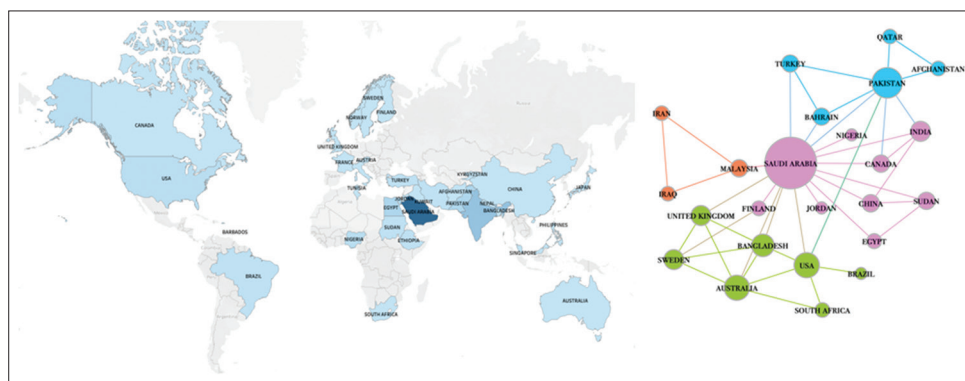


Figure 3: Global map of contributing authors (left) and the network of collaboration (right)

Impact and reach

The impact of research is commonly measured by number of citations. We used Google Scholar since it indexes all articles of the journal, in contrast to Web of Science, which indexes the past 5 years only. According to Google Scholar, the average citation per article in the journal was 11.29, with a very low self-citation rate (0.023). The Google Scholar H5-index was 25, and the H5-median was 32. Four of the top-cited articles were published in the past 5 years, and three articles with more than 100 citations were published in the past 3 years, indicating the immediate impact and reach of articles in the journal. Calculating impact factor based on Google citations could give a hint about the expected journal impact; at the moment of writing, the Google Scholar-based impact factor was 2.28.

Web of Science citations are another metric that is commonly used to measure journal impact. The average citation per IJHS document was 2.45 (covering only articles published in the past 5 years). The citation graph shown in Figure 4 shows a rising trend of citations by journals with impact factors,

emphasizing the increasing impact and interest in the content of the journal.

A breakdown of citing countries and institutions in the past 5 years from Web of Science data shows the reach of the journal [Figure 5]. The top citing country was the USA, followed by Saudi Arabia (the publishing country), China, the UK, Iran, India, Italy, Egypt, and Canada. The diversity of the citing countries reflects the wide audience and readership of the journal as well as the global impact. The top citing institutions have been local universities and research institutes as well as Harvard University, Harvard Medical School, the University of London, Shaqra University, American University of Beirut, and Tehran, Yale, California, Toronto, and Cairo Universities.

Most-cited papers

Many articles in IJHS had a global impact, which was demonstrated in the citation counts and the diversity of the citing articles. Analysis of the most-cited articles also demonstrates this fact. An article entitled “Prevalence of periodontal disease,

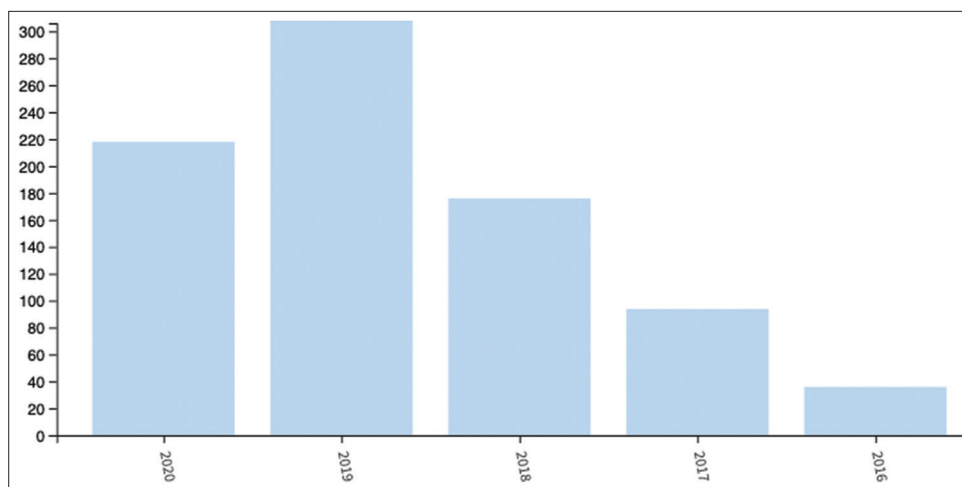


Figure 4: Growth on Web of Science citations

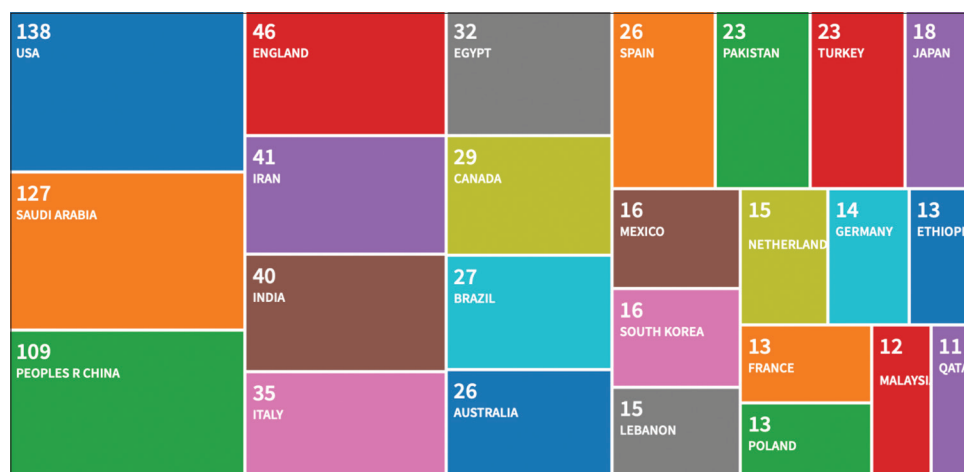


Figure 5: A graph of citing countries

its association with systemic diseases and prevention” published by IJHS in 2017 pointed out several novel factors that showed a fatal link between periodontal disorders and the onset of systemic diseases such as cardiovascular disorders, diabetes, and adverse pregnancy outcomes.^[14] This article has been cited 227 times. Another article, entitled “Is diabetes becoming the biggest epidemic of the twenty-first century?” (2007), explained several preventive measures and options for diabetes drug design.^[16] The article has been cited 165 times. An article entitled “Knowledge, attitudes, and practices surrounding breast cancer and screening in female teachers of Buraidah, Saudi Arabia” (2007) has been cited by 158 articles.^[17] This IJHS article examined several screening methods for the identification of breast cancer, including a method of breast self-examination. The article also explained several treatment options for breast cancer patients. The article entitled “Vitamin D deficiency and its association with thyroid disease” (2013) has been cited 120 times.^[18] The findings of this article have led to an important conclusion that Vitamin D supplements are a treatment option for patients with thyroid disorders.

Five other articles have been cited just over 100 times each:^[19-23] A review article entitled “Effect of diet on type 2 diabetes mellitus” (2017) that explained the role of diet in the management of diabetes;^[19] another review article entitled “Obesity in Gulf Countries” (2014), which summarized several factors responsible for obesity in Gulf populations;^[20] a cross-sectional survey entitled “Knowledge, attitudes, and breastfeeding practices of postnatal mothers” (2015) that investigated several benefits of breastfeeding, not only for infants but also for mothers and noted that prenatal education on breastfeeding is important;^[21] an editorial article entitled “Vitamin D deficiency – an ignored epidemic” (2010) that concluded that the deficiency of Vitamin D is a worldwide epidemic;^[22] and a review article entitled “Cucurbitacins – a promising target for cancer therapy” (2013) that described the importance of cucurbitacins and its active constituents for cancer therapy. Specifically, the article pointed out several molecular cell signaling based therapeutic targets for cucurbitacins that might be helpful, including STAT and cyclooxygenase-2.^[23]

Discussion

There is a rise in the adoption and endorsement of OA publishing in the commercial and non-profit sectors. Several top-level publishers, such as Nature Publishing Group, Blackwell, Springer, and Elsevier Science, have each established a special track for OA publishing of scholarly articles.^[1,24] Similarly, major journals, such as Proceedings of the National Academy of Sciences and Nucleic Acids Research, have also implemented OA publishing policies.^[1,24-26] Several universities and funding agencies are now encouraging faculty to publish in OA journals and to archive articles in institutional repositories.^[8,27] Motivated by the momentum behind the OA movement, IJHS was launched as OA and based on an open source platform.

The present study was conceptualized to see if the current model of OA self-publishing has achieved the sought impact. To test this, we analyzed the IJHS authorship, readership, and impact. Using scientometric methods, the analysis of all published articles of the journal from 2007 to 2019 was performed. The findings demonstrated that the authorship of the journal is diverse, but most authors were from the United States, Europe, Asia, and the Middle East. The diversity of the authorship of IJHS clearly points to its global reach. These observations have also been supported by other published reports on the diversity of authors.^[28,29] It is well documented that the impact of any journal is measured by the number of article citations,^[30] which was 11.29 per article and the self-citation was very low, that is, 0.023. The impact factor of the journal was 2.28, also based on Google Scholar. The data obtained from Web of Science showed a continuous increase of citations since 2016, and the average citation per article was calculated to be 2.45, indicating a continuous improving trend. The United States was found to be the top citing country, followed by Saudi Arabia, China, the UK, Iran, India, Italy, Egypt, and Canada. This diversity of citing countries further reflects the global reach and readership of the journal.

The findings of this analysis demonstrate the obvious local and global impact of a locally published journal that uses an unrestricted open source publishing platform. The journal's success at attracting diverse topics, authors, and readers is a testament to the power of the OA model. The local themes of research are important and relevant as they facilitate giving the Global South a voice and a platform for disseminating their important scientific trends, which are frequently ignored by larger commercial publications. Based on the findings of this analysis, it is recommended that universities and small institutions publish their own OA journals without relying on large and expensive publishers. We hope that this can be a motivation for other journals and research institutions to opt for similar methods. Such practices would help tear down the walls currently limiting equal access and remove the financial barriers to scientific innovations.

Conclusions

OA self-publishing has proven sustainable, feasible, and rewarding. Our findings illustrate that OA enables a global reach for research and scholarly work so that under-represented regions can make their mark in scientific fields. Local journals can help the Global South to disseminate their scholarly work, which is currently frequently ignored by commercial and established publications.

Ethics Approval and Consent to Participate

Not applicable.

Availability of Data and Material

The data used in this study are available and will be provided by the corresponding author on reasonable request.

Competing Interest

The authors of the article have worked as editors in the journal on a voluntary basis. There has never been financial or commercial benefit as the journal has no article processing charges, and the journal is completely supported by generous funding from Qassim University.

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Authors' Contributions

AA and MS conceived of, designed, and coordinated the study and drafted the manuscript. ZR was involved in revising the manuscript critically for important intellectual content. The corresponding author has full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. All authors approved the final version to be published.

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