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Original Article

A bibliometric analysis of the Journal of Musculoskeletal Surgery and Research

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ABSTRACT

Objectives: The Journal of Musculoskeletal Surgery and Research (JMSR) is a relatively new publication focusing on research related to musculoskeletal surgery and related research. We aimed to analyze its bibliometrics to help the concerned community and JMSR's audience, authors, and editorial team get to know the journal more in-depth.

Methods: We performed a manual search of the JMSR's publications for assessing various bibliometric parameters, including the type of published documents and their citation frequencies, authors with most papers, authors affiliations (national vs. international), and frequency distribution of keywords from the Journal's inception in the mid-2017 through 2021. We used the Google scholar database and analyzed the data using Microsoft Excel VOS viewer software.

Results: Two hundred and twenty-nine documents have been published from mid-2017 through 2021 in JMSR by 540 authors (458 males and 82 females), having a trend of the annual increment (R^2 0.3684). There were 97 original articles published to date with a mean of 5.14 ± 4.20 articles in each issue. By the end of 2021, JMSR has received 192 citations from 197 citable papers out of 229 published documents from 2017 through 2021, with an average of 38.40 cites/year and 0.97 cites/paper, and an h–index of 6. We found 2.4 ± 1.5 (Range 1–6) institutions per article, with 110 (55.7%) being local institutes, whereas 85 (44.3%) were international institutes. The number of authors per paper ratio was 4.3 ± 1.7.

Conclusion: JMSR is providing quality scholarship publications in orthopedics and musculoskeletal research, which could provide global insight pertaining to the field, to its viewers, authors, and editorial team.

Keywords: Author, Bibliometrics, Citations, Orthopedics, Musculoskeletal

INTRODUCTION

Bibliometrics is a quantitative study of scientific publications.[1] It is considered one of the significant analytical components of information science.[2] Recently, this field has shown progressive evolution with the advent of emerging methodologies and scientific analytic software aiding in conducting such scientific evaluation. Hence, there is a boom of such studies in the healthcare field.[3]

Musculoskeletal surgery is one such field that has become increasingly important with the aging and working for population worldwide.[4] This specialty now has around 60 journals indexed in the Directory of Open Access Journals.[5] Bibliometric analysis of few noted journals in this field,

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namely, American Journal of Sports Medicine,[6] Journal of Bone and Joint Surgery,[7] Journal of Orthopaedic Trauma,[8] and Journal of Foot and Ankle Surgery[9] assessing trends in the authorship and research characteristics of their respective journals was documented in the literature.

The Journal of Musculoskeletal Surgery and Research (JMSR) is a relatively new journal having an open-access double-blind review process peer-reviewed policy for its publications and is owned by the Saudi Orthopaedic Association. It started in mid-2017. It publishes free of charge, which makes it more independent and not under any pressure. It is currently published quarterly by the Scientific Scholar. The journal focuses on theories, concepts, clinical cases, frameworks, and research related to the field of the musculoskeletal system, orthopedics, rheumatology, spine surgery applied basic sciences, rehabilitation and physiotherapy, and orthopedic nursing and education.[10] Recently, Khalifa *et al.* found gender diversity and affiliation trends of the authors in the regional Egyptian Orthopaedic journal which is the official publication of the Egyptian Orthopaedic Association, and found encouraging results.[11]

Studying the intangible framework of a neoteric scientific journal in a domain-specific healthcare field can provide valuable insight to clinical practitioners and academicians in recognizing its scientific composition and subject assimilation.[12-14] Therefore, we conducted the bibliometric study on the JMSR publications to provide an outline of its scientific trends to the practitioners in the musculoskeletal field, JMSR's viewers, authors, and its editorial team.

MATERIALS AND METHODS

We performed a manual search of the JMSR journal to assess various scientific parameters, including the type of published documents and authors with most papers, authorship linkages (national and international), and frequency distribution of keywords. Citations of the published papers were analyzed manually in Google scholar Database from the inception of the journal in mid-2017 till the end of 2021.

The data were documented in the Microsoft Excel software for further analysis. The Scientific parameters, including frequency distribution, were calculated in the same software and depicted as tables and bar graphs, whereas the authorship linkages and keyword distribution were mapped in VOS viewer software.

RESULTS

Publications and their citations

Since its inception, the JMSR has been published quarterly. The content distribution of the JMSR is shown in [Table 1]. The number of all published documents (including technical notes, surgical techniques, book reviews, and radiology quizzes) increased from only 12 documents in 2017 to 62 in 2021, with a trend of the annual increment (R^2 0.3684). The total number of original articles was 97, with a mean of 5.14 ± 4.20 in each issue [Figure 1].

[Figure 2] shows the annual distribution of JMSR publications' citations through the end of 2021. JMSR has received 192 citations. A paper that was published in 2018 received 12 citations, whereas, in the years 2017 and 2019,

Table 1: The types of JMSR published documents (*n*=229).

Original Article	97
Case Report	41
Review Article	32
Editorial	18
Letter to Editor	14
Radiology Quiz	13
Commentary	5
Surgical Technique	3
Technical Note	2
Guest editor Profile	1
Protocol	1
Book review	1
Author's Correspondence	1

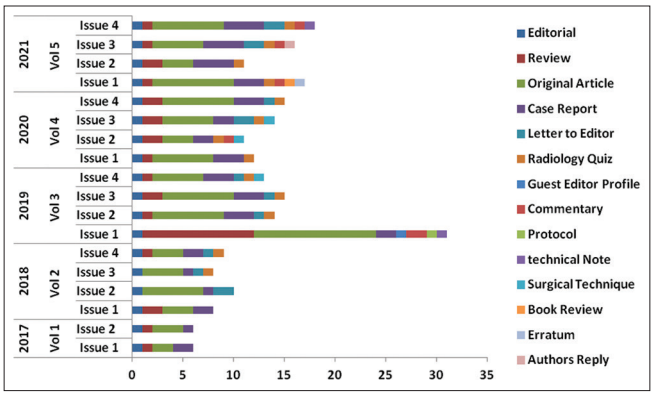

Figure 1: Year-wise publications in JMSR.

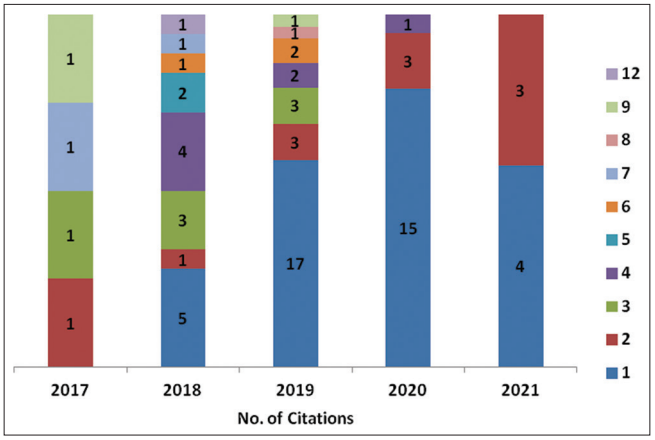

Figure 2: Year-wise citation distribution of JMSR.

respectively, two papers received nine citations each. The trend of received citations is increasing (R^2 0.2528), which is at par with the global trend of increased citations of older articles and fewer citations for the newer articles, which is the case in most of the JMSR publications.

Journal metrics

By the end of 2021, the JMSR has received 192 citations from 197 citable papers out of 229 published documents from 2017 to 2021, with an average of 38.40 cites/year and 0.97 cites/paper. The author/paper ratio was 4.3 ± 1.7 with an h–index of 6. [Table 2] shows that Gallagher's article was the highest cited paper published by the JMSR. It received 12 citations, with an average of four citations per year.

Authors and their affiliations

Power D. was the most prolific author with 23 articles followed by Khoshhal K. with seven papers. Other frequent authors were Alshammari A., Alhandi A. and Aljuhani W. Each of these authors had six publications.

Authors with maximum citations were Gallagher at 12 followed by Berezowsky and Alfayez at nine each. Alsuhaymi followed with eight citations.

Authorship linkages and collaboration

Among the 540 JMSR authors 458 (84.81%) were males and 82 (15.19%) were females, 57 of them collaborated in at least two papers. [Figure 3] depicts the co-authorship network,

Table 2: Year-wise documents showing their respective citations (included documents with three citations and more).

Cites	Authors	Title	Year
12	Gallagher	Proficiency-based progression simulation training for more than an interesting educational experience	2018
9	Alfayez *et al.*	A review article of medial tibial stress syndrome	2017
9	Berezowsky *et al.*	Usefulness of immersive virtual reality simulation during femoral nail application in an orthopedic fracture skills course	2019
8	Alsuhaymi *et al.*	Flatfoot among school-age children in Almadinah Almunawwarah: Prevalence and risk factors	2019
7	Sonbol *et al.*	Prevalence of femoral shaft fractures and associated injuries among adults after road traffic accidents in a Saudi Arabian trauma center	2018
7	Jawadi *et al.*	Seat belt usage and distracted driving behaviors in Saudi Arabia: Health-care providers versus non-health-care providers	2017
6	Sheweita *et al.*	Osteoporosis in children: Possible risk factors and role of antioxidants	2019
6	Guraya	The changing landscape of surgical education and training	2018
6	Barberio *et al.*	The effect of shoulder abduction and medial epicondylectomy on ulnar nerve strain: A preliminary study	2019
5	Younis *et al.*	External fixation versus open reduction and internal fixation of pilon fractures: A systematic review and meta-analysis	2018
5	Alzahrani *et al.*	Functional anatomy of the hand: prevalence of the Linburg–Comstock anomaly in a young Saudi population	2018
4	Alsultan *et al.*	Comparison of musculoskeletal pain prevalence between medical and surgical specialty residents in a major hospital in Riyadh, Saudi Arabia	2018
4	Hasan *et al.*	Early complications of anterior cervical discectomy and fusion: A case series	2018
4	Nassimizadeh *et al.*	Managing the nerve gap: New tools in the peripheral nerve repair toolbox	2019
4	Almarshad *et al.*	Orthopedic trainees' perspective on coronavirus disease 2019.	2020
4	Challoner *et al.*	Pathogenesis, clinical evaluation, and non-surgical management of symptomatic neuromas: A literature review	2019
4	Alzahrani *et al.*	Postgraduate orthopedic training in Saudi Arabia: A need assessment for change	2018
4	Almalki *et al.*	Prevalence of ankle injuries in physical education and sports classes among Saudi high school male students in Riyadh, Saudi Arabia	2018
3	Ahmad *et al.*	A new radiological classification system for developmental dysplasia of the hip in pediatric patients aged 6-months and older	2017
3	Alsheikh *et al.*	Burnout syndrome among orthopedic surgery residents in Saudi Arabia: A multicenter study	2019
3	Alhussainan	Developmental dysplasia of HIP: A Saudi national concern	2018
3	Khalid	Educating the educators: Perspectives on surgical education	2018
3	Van *et al.*	Failed carpal tunnel surgery: A guide to management	2019
3	Ebeid *et al.*	Long-term Outcome of Giant Cell Tumors around the Knee with Associated Pathological Fractures Treated By Curettage and Cementation	2019
3	Rai *et al.*	Study of outcome of 300 cases of arthroscopic anterior cruciate ligament reconstruction with quadrupled hamstrings tendon graft using anterior cruciate …	2018

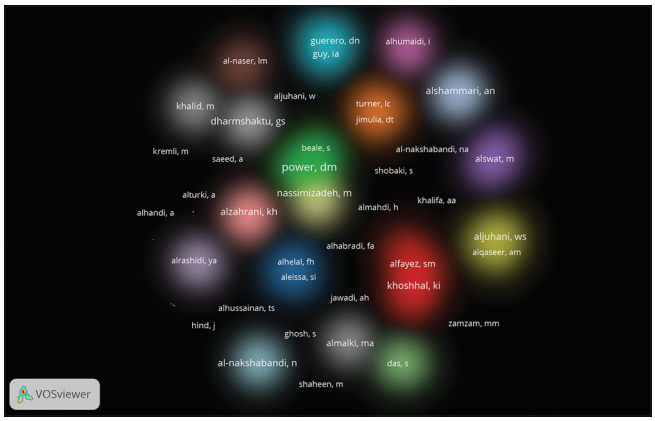

Figure 3: Co-citation network of Authors. Source: Visualization in VOS viewer from Google Scholar Profile. 57 items and 12 clusters and 2.19 links.

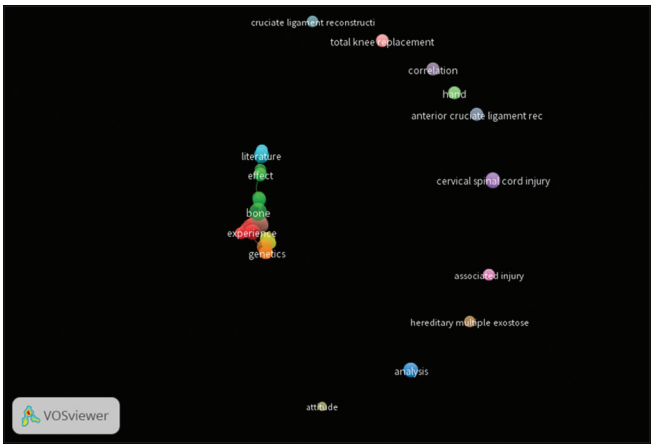

Figure 4: Keyword Cluster density visualization map showing 134 keywords each occurring 3 times or more in the title and abstract list (produced by VOS viewer). The distances between each of the keywords indicate the relatedness of these research topics. The top keywords, their times of occurrence, and their TLS are shown in different colors.

with 12 clusters and 2.19 links with a total link strength of 59 with at least two authors in each cluster. Two foundation authors in the co-authorship clusters were Power DM and Alfayaz SM.

Power DM had nine articles and total link strength of 5, Alfayaz SM had three documents with total link strength of 5 and Guerero DN had three documents with total link strength of 5.

Authors' affiliations trends and Inter-institution linkage

We found 2.4 ± 1.5 (Range 1–6) institutions per article, with 110 (55.7%) being local institutes, whereas 85 (44.3%) were international institutes. Thirty-seven (19%) authors were found to be affiliated with the same national institution, 53 (27%) were affiliated with the different national institutions, 46 (23.5%) were affiliated with the same international institution, 43 (21.9%) were affiliated with the different international institutions, and 17 (8.6%) were affiliated with national and international institutions.

Research Trend

The numbers of repeated keywords used in the documents were used to describe the research trends in JMSR publications. Keywords network is visualized in [Figure 4].

We observed 134 keywords out of 1370, which occurred at least to 3 times in the title or abstract of the published documents in JMSR. These keywords were included in five clusters, with 38 keywords; all of them have appeared at least in five papers. Some keywords are invisible on the map due to their much overlap. The keywords with at least five frequencies were included on the map.

The first cluster had ten keywords, namely cervical spinal cord injury, elbow dislocation, knee, Riyadh, Saudi Arabia, surgeon, total knee replacement, and total knee arthroplasty. All these keywords have a relevancy strength of more than 2.26. In the second cluster, there were four keywords such as reinjury, reconstruction, osteoporosis, and surgical management.

All these keywords had relevancy strength between 2 and 2.26. There were five keywords in the third cluster: Burnout, cross-sectional study, Oman, prevalence, and resident. These keywords had relevancy strength between 1.94 and 2.00. In the fourth cluster, there were five keywords, COVID-19, impact, orthopedic surgery, pandemic, and systematic review. These keywords had relevancy strength between 1.81 and 1.93. Finally, there were four keywords in the fifth cluster: Developmental dysplasia, hip, knowledge, and practice. These keywords had relevancy strength between 1.71 and 1.80.

DISCUSSION

This bibliometric study of the JMSR publications was conducted from its inception in mid-2017 through 2021. The analysis was based on the Journal's indexation on the Google Scholar database, one of the largest scientific bibliographic databases and comparable to the other two large multidisciplinary citation databases, Web of Science, and Scopus.[15]

The published papers' number and their citations are an indicator of the Journal's popularity among the disciplinary authors, who contributed to the enhancement of the domain-specific research. We noted an annual increase in publishing trends and citations of papers by the JMSR.

Similar to other medical disciplines, the orthopedic literature has also experienced an increase in the number of authors per article, which is an indication of increased collaboration among researchers and institutions in addressing the increased multidisciplinary approach in medical research.[7,8,16] In JMSR, the average number of authors per article was 4.3 ± 1.7, which was found to be greater than the Egyptian Orthopaedic Journal (EOJ) (2.0 ± 1.0 authors per article), a relatively older journal incepted in the year 2012 and covering the Orthopaedic specialty in the same region (Middle East). Furthermore, the percentage of female authorship in JMSR publications (15.19%) is considerably larger than what is reported in EOJ (0.3%).[11]

From another angle, the results of JMSR are encouraging as they are relatively comparable to global reports on the gender gap in the orthopedic literature, observing a higher rate of male (93.5%) authorship compared to 6.5% female authorship in orthopedics.[17] This low number was considered to be associated with the so-called "pipeline theory," which quotes that "the lower raw number of women authors and leaders is due to the lower raw number of women in the field of practice."[18]

The increase in the number of authors per article in the JMSR was comparable to that reported by previous studies of Schrock *et al.* [6] in the American Journal of Sports Medicine (AJSM) in 2014. They reported an average number of 5.8 authors per article for that journal, whereas Vora *et al.* reported 3.6 ± 1.9 authors per article in three-foot and ankle journals for 24 years.[9] Seetharam *et al.* analyzed the publications from the Journal of Orthopaedic Research for 30 years and found a significant decline in the single authorship from 3.7 ± 1.9 authors per article in 1983 to 6.9 ± 2.7 in 2015.[19] In scientific publications, there is an increasing trend of multinational co-operation among authors from varying affiliations in different institutions. This increase was attributed in part to the recent advancement in communication technology, which has eased the connection between research groups and authors in different locations. JMSR has a mean of 2.4 ± 1.5 (Range 1–6) number of institutions contributing to the articles, which were comparable to those in Dynako *et al.,* who evaluated the bibliometric characteristics of the AJSM and the Arthroscopy journal and reported that the average numbers of contributing institutions per article were 2.5 ± 1.8 and 2.4± 1.4, respectively.[16]

Wininger *et al.* reported an increase in the number of institutions contributing to the articles, with the average number of institutions collaborating on a manuscript being 3.4 ± 3.1.[20] Russell *et al.* analyzed the bibliometric characteristics of the Journal of Orthopaedic Trauma and Injury over 30 years. They found that their average numbers of institutions per article were 1.8 ± 1.3 and 2.0 ± 1.4, respectively.[8] In a study by Dynako *et al.,* 68% of institutions contributing to the AJSM were nationals while 32% were international; in the Arthroscopy journal, 60% and 40% of the publications were from national and international institutions, respectively. JMSR has 55.7% documents with local institution affiliations in contrast to 96% in the EOJ.[16]

JMSR has 44.3% contributions from international institutions across the globe, including Argentina, Brazil, Canada, India, Italy, Korea, Mexico, Nigeria, Switzerland, the UK, the USA, and the different other countries of the Middle East. The increased incidence in the number of contributions from international institutions reported in the current study for the JMSR was also reported by the World Health Organization, demonstrating an increase in Intra-regional collaboration between 1992 and 2001 by more than 10%, and extra-regional collaboration increased by 9% within the same period. This increase is attributed to the increase in international collaboration and linkages among the national institutes.[20]

The inter-regional co-operation among the authors allows knowledge and technology exchange, which leads to the resolution of complex problems resulting in the overall improvement in the qualitative and quantitative scientific research in the domain field.[21]

The most influential and highly cited authors of JMSR a agree with worldwide research interest in the orthopedic field and related subspecialties, including information behavior, information retrieval, and scientific studies.

Research trends showed that the main orthopedic topics had been considered in the journal, ranging from case reports, novel surgical techniques to newly engaging topics such as simulation training. These topics reflect the evolution trend of orthopedic surgery[22] and are embedded in all subspecialties of musculoskeletal surgery.[23]

The present analysis was based on the manual observation of the journal and its Google scholar-based data, limiting the study's present scope as there could be an under or overestimate of its actual impact on the global journals related to the orthopedic field.

CONCLUSION

The bibliometric analysis of the JMSR showed relatively progressive outcomes in terms of the nascent Journal's growth and development, standard of publications, research trends, and international collaboration among its authors. This analysis provides insight into its present status and informs its contributors and viewers of the Journal's progress. The JMSR bibliometric analysis? also benefits its editorial team for decision-making on its continued development. It is also helpful for researchers and practitioners interested in topics in the orthopedic field.

AUTHORS' CONTRIBUTIONS

Both authors have contributed to the conception and design of the work, critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

ETHICAL APPROVAL

The authors confirm that this study had been prepared in accordance with COPE roles and regulations. Given the nature of the study, the IRB review was not required.

DECLARATION OF PATIENT CONSENT

Patient's consent not required as there are no patients in this study.

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CONFLICTS OF INTEREST

KIK is the Editor in Chief of JMSR.

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