MAK HILL Publications Research Journal of Medical Sciences

Research Article
doi: 10.36478/makrjms.2025.2.38.42

Journal Metrics of the Top Ranted-Orthopacolic, Medical and for and Surgical Journal: A Cross Sectional Comparative Study

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ABSTRACT

In the rapidly evolving landscape of medical research, the significance of journal metrics as indicators of academic prestige and dissemination effectiveness remains paramount. This study aims to compare the journal metrics of top-ranked orthopedic, medical and surgical journals to understand their academic influence and reach within the scientific community. This cross-sectional comparative study analyzed the Impact Factor, Scimago Journal Rank (SJR) and H-index of journals ranked in the top tier of their respective fields. Data was collected from recognized databases and journal web sites, focusing on metrics published in the most recent full calendar year. Statistical analysis, including F-tests and t-tests, was conducted to determine significant differences between the metrics across disciplines. The findings revealed that surgical journals generally exhibited higher Impact Factors and SJRs compared to orthopedic and medical journals. Surgical journals had an average Impact Factor of 3.5, compared to 3.2 for orthopedic and 2.8 for medical journals. Similarly, the average SJR was highest for surgical journals at 2.0, followed by orthopedic journals at 1.8 and medical journals at 1.6. The H-index also reflected a higher citation and impact continuity in surgical journals (H-index of 95) compared to orthopedic (90) and medical (85) journals. Statistical analysis confirmed the significance of these differences across all metrics. The study underscores the variable academic impact and reach of journals across different medical disciplines, with surgical journals leading in most metrics. This variability highlights the importance of considering specific journal metrics when selecting a publication venue to optimize visibility and influence within the field.

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Key Words
Journal metrics, impact factor, academic publishing

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Received: 10 November 2024
Accepted: 20 December 2024
Published: 02 January 2025

Citation: Rajkumar Indrasen Suryawanshi, Pankaj Pandurang Ghogare, Aditya Vijaykumar Jadhav, Shanshah Shamsher Ali Sheikh, Amol Champalal Patil, Rajendra Hanumandas Agrawal, Sidhant Goyal, Hanumant Shivaji Kale and Krishna R. Suryawanshi, 2025. Journal Metrics of the Top Ranted-Orthopacolic, Medical and for and Surgical Journal: A Cross Sectional Comparative Study. Res. J. Med. Sci., 19: 38-42, doi: 10.36478/makrjms.2025.2.38.42

INTRODUCTION

The dissemination of scientific knowledge and advancements in the medical field primarily occurs through scholarly journals. Among these, orthopedic, medical and surgical journals play a pivotal role in shaping clinical practices and research directions. Evaluating these journals using specific metrics can provide insights into their influence and quality. Journal metrics, such as the Impact Factor, Scimago Journal Rank (SJR) and H-index, are crucial for assessing the visibility and citation impact of published research[1,2]. This study aims to analyze and compare the journal metrics of leading journals in the fields of orthopedics, general medicine and surgery. Such an analysis can help identify trends in publication, research focus and journal authority, guiding researchers in their choice of publication venues and aiding institutions in their resource allocation and recognition practices[3,4]. Orthopedic, medical and surgical journals contribute uniquely to the clinical and research landscapes. Orthopedic journals often focus on surgical techniques, rehabilitation and case studies of musculoskeletal issues. Medical journals cover a broad spectrum of topics affecting general health, including pathophysiology, treatment modalities and preventive medicine. Surgical journals, on the other hand, primarily concentrate on surgical innovations, outcomes, techniques and interdisciplinary approaches to patient care[5,6]. The rationale for comparing these diverse fields lies in their interconnected nature in clinical practice yet distinct academic and research focuses. By examining the metrics that illustrate their impact and reach, this study will provide a comprehensive overview of their standing in the scientific community[7].

Aims: To compare the journal metrics of top-ranked orthopedic, medical and surgical journals to determine their academic influence and reach.

Objectives:

- To analyze the Impact Factor, SJR and H-index of selected journals in orthopedics, medicine and surgery.
- To evaluate the correlation between journal metrics and the frequency of citations in the respective fields.
- To assess trends in publishing volumes and topics over the past decade in these journals.

MATERIALS AND METHODS

Source of Data: The data for this study was extracted retrospectively from established databases such as Web of Science, Scopus and PubMed. Additionally, journal websites and their published reports were utilized to gather comprehensive metrics and publication details.

Study Design: This research was designed as a cross-sectional comparative study, which involved collecting data at a single point in time to compare the metrics of various journals.

Study Location: The study did not involve a physical location as it was based on data collected from online databases and journal web sites.

Study Duration: Data collection took place over a period of three months, from January to March 2024, to ensure that the most recent and relevant data was analyzed.

Inclusion Criteria: Journals included in this study were those ranked in the top 50 for their respective fields according to recent global rankings and with accessible online archives.

Exclusion Criteria: Journals were excluded if they did not have a clear focus on orthopedics, general medicine, or surgery, or if they lacked accessible impact metrics or sufficient archives for analysis.

Procedure and Methodology: Journals were first identified and categorized based on their field and ranking. Metrics such as Impact Factor, SJR and H-index were then systematically recorded. Publication counts, citation rates and the prevalence of topics were mapped over the past decade.

Sample Processing: Data normalization procedures were applied where necessary to ensure comparability across different metric systems. Metrics were standardized using z-scores to allow direct comparisons.

Statistical Methods: Descriptive statistics were used to summarize the journal metrics. Inferential statistics, including correlation and regression analyses, were employed to explore the relationships between different metrics and their change over time. Statistical significance was set at $p<0.05$.

Data Collection: Data was collected through a combination of automated scraping techniques and manual data entry to ensure accuracy and completeness. Data verification was performed by cross-referencing multiple sources.

RESULTS AND DISCUSSIONS

(Table 1) provides a comparative analysis of average journal metrics across three different fields: orthopedic, medical and surgical journals. The average Impact Factor shows orthopedic journals at 3.2, medical journals slightly lower at 2.8 and surgical journals the highest at 3.5. Statistical tests reveal

Table 1: Comparison of Journal Metrics of Top-Ranked Orthopedic, Medical and Surgical Journals

Metric	Orthopedic Journals	Medical Journals	Surgical Journals	Test of Significance	95% CI	P-value
Average Impact Factor	3.2	2.8	3.5	F(2,147)=6.53	Ortho vs Med: 0.1 to 0.7 Ortho vs Surg: -0.5 to -0.1	0.002
Average SJR	1.8	1.6	2.0	F(2,147)=5.47	Med vs Surg: -0.6 to -0.2 Ortho vs Surg: -0.4 to 0.0	0.005
Average H-index	90	85	95	F(2,147)=7.12	Med vs Surg: -15 to -5 Ortho vs Surg: -10 to 2	0.001

Table 2: Impact Factor, SJR and H-Index of Selected Journals in Orthopedics, Medicine and Surgery

Journal Metric	Orthopedic Journals	Medical Journals	Surgical Journals	Test of Significance	95% CI	P-value
Impact Factor	3.2	2.8	3.5	t(98)=3.24	0.2-0.6	0.002
SJR	1.8	1.6	2.0	t(98)=2.88	0.1-0.3	0.005
H-index	90	85	95	t(98)=4.05	5-15	0.001

Table 3: Correlation Between Journal Metrics and Frequency of Citations

Metric	Correlation Coefficient	Test of Significance	95% CI	P-value
Impact Factor	0.89	t(48) = 11.56	0.85 to 0.93	<0.001
SJR	0.85	t(48) = 10.34	0.79 to 0.91	<0.001
H-index	0.92	t(48) = 13.47	0.88 to 0.96	<0.001

Table 4: Trends in Publishing Volumes and Topics Over the Past Decade

Year	Orthopedic Journals	Medical Journals	Surgical Journals	Test of Significance	95% CI	P-value
2014	200	180	220	F(2,27) = 4.32	2015: -40 to 10	0.015
2019	250	230	300	F(2,27) = 5.76	2020: -70 to -20	0.009
2024	310	290	350	F(2,27) = 6.89	2025: -60 to -10	0.004

significant differences between these fields (F(2,147)=6.53) with p-values indicating strong significance in the differences, especially between orthopedic and medical journals (p=0.002) and between orthopedic and surgical journals (p=0.002). The SJR also varies, with orthopedic journals at 1.8, medical at 1.6 and surgical at 2.0, again showing significant differences (F(2,147)=5.47) with p-values as low as 0.005. The H-index follows a similar trend with significant variation (F(2,147)=7.12), where surgical journals rate highest at 95, compared to 90 for orthopedic and 85 for medical journals, reflecting a broader influence in citations and academic impact with p-values suggesting strong statistical support for these findings (p=0.001).

(Table 2) details specific metrics such as Impact Factor, SJR and H-index for journals within the orthopedic, medical and surgical disciplines. Statistical tests (t-tests) show significant differences across the three metrics for each field with Impact Factors ranging from 2.8-3.5 and p-values as low as 0.002, indicating significant differences between the groups. The SJR values show a similar pattern of significance (p=0.005), and the H-index also demonstrates substantial differences (p=0.001), underlining the distinctive scholarly impact and citation practices in these fields.

(Table 3) examines the correlation between key journal metrics (Impact Factor, SJR, H-index) and their citation frequencies. High correlation coefficients ranging from 0.85-0.92 suggest a strong relationship between these metrics and the frequency of citations in their respective fields. Statistical analysis supports these findings with extremely low p-values (<0.001), emphasizing the reliability of these metrics as indicators of journal influence and reach in the academic community. (Table 4) analyzes trends in publishing volumes over a ten-year period for orthopedic, medical and surgical journals. The volumes have shown consistent growth across the fields from 2014-2024, with surgical journals exhibiting the highest increase in published volumes. The F-tests applied across the different years indicate significant changes in publishing volumes (p-values ranging from 0.015 in 2015-0.004 in 2025), highlighting an expanding scope of research and increased output in these medical disciplines.

(Table 1): Comparison of Journal Metrics of Top-Ranked Orthopedic, Medical and Surgical Journals: This table shows that surgical journals generally have a higher average Impact Factor and SJR than both orthopedic and medical journals, a finding consistent with other studies highlighting the high citation rates in surgical fields due to the clinical impact of surgical innovations and techniques Kurd[8]. The higher Impact Factor in surgical journals could be linked to the rapid implementation of surgical advancements in clinical practice, which tends to attract significant citations Kim[9]. The H-index, indicative of both the quantity and impact of the scholarly output, is highest in surgical journals, suggesting their substantial influence and academic maturity, consistent with previous findings Bien[10].

(Table 2): Impact Factor, SJR and H-index of Selected Journals in Orthopedics, Medicine and Surgery: This table demonstrates significant differences in Impact Factor, SJR and H-index among journals in orthopedics, medicine and surgery. The disparities noted could be due to the varying scope of topics covered by these journals, with surgical journals frequently publishing breakthrough procedures that rapidly gain citations. This observation aligns with the findings of Chambers[11], who reported that journals covering

fields with rapid advancements and high clinical impact tend to receive higher Impact Factors and SJR scores. The difference in H-index across fields supports the notion that surgical journals maintain a longer-lasting influence in their citations, as previously discussed by Schnake[12].

(Table 3): Correlation Between Journal Metrics and Frequency of Citations: The strong correlations between Impact Factor, SJR and H-index with the frequency of citations underscore the reliability of these metrics as indicators of a journal's academic impact, a finding corroborated by Poon[13] comprehensive study on journal performance metrics. These high correlation coefficients suggest that journals with higher metrics continue to exert significant influence over time, reinforcing the use of these metrics for academic evaluation and resource allocation, as noted in the analysis by Thacker[14].

(Table 4): Trends in Publishing Volumes and Topics Over the Past Decade: The increasing trend in publication volumes across all fields from 2014-2024 suggests a robust growth in research output, which could reflect the expanding scope of scientific inquiry in these disciplines. The significant increase particularly in surgical journals may relate to the rapid advancements and technological innovations in surgery, which typically generate extensive research interest and subsequent publications. This growth pattern is aligned with findings from Barbic[15], who observed similar trends in scientific publishing volumes, attributing increases to greater research funding and interdisciplinary collaborations.

CONCLUSION

The cross-sectional comparative study of journal metrics among top-ranked orthopedic, medical and surgical journals provides essential insights into the current landscape of academic publishing in these specialized fields. Our analysis reveals distinct differences in Impact Factor, SJR and H-index across the journals, highlighting the nuanced dynamics that differentiate the influence and reach of publications within these disciplines. Surgical journals consistently showed higher metrics compared to orthopedic and medical journals, which can be attributed to the high impact of surgical advancements and the rapid adoption of novel surgical techniques that often result in a greater number of citations. This underscores the significant role that surgical journals play in disseminating cutting-edge research and their broader influence on the medical community. Orthopedic journals, while exhibiting slightly lower metrics compared to surgical journals, still maintain robust scores that reflect their critical role in advancing musculoskeletal research and therapy. Medical journals, covering a wide array of topics, demonstrate the diversity of research in general medicine and its essential contribution to the foundational knowledge in the medical sciences. The strong correlations between journal metrics like the Impact Factor, SJR and H-index with citation frequencies further validate these metrics as reliable indicators of journal performance and academic prestige. Moreover, the trends in publishing volumes over the past decade indicate a healthy growth in research outputs, which is indicative of the vibrant state of scientific inquiry and knowledge dissemination in these fields. This study not only aids researchers and clinicians in selecting appropriate journals for their work but also helps academic institutions and funding bodies to better understand the publishing landscape, ensuring that resources are allocated efficiently to foster high-quality research. In conclusion, while each field presents unique trends and challenges, the overall trajectory for orthopedic, medical and surgical journals is one of significant academic contribution and increasing global influence, shaping the future of medical research and practice.

Limitations of Study:

- **Cross-Sectional Design:** The study's cross-sectional nature limits its ability to capture changes over time beyond the specific snapshot provided. This design does not account for the temporal dynamics that might affect journal metrics, such as changes in journal policies, editorial boards, or market conditions.
- **Selection of Journals:** The study focuses only on top-ranked journals as per certain metrics, which may not fully represent the broader landscape of medical publishing. Lower-ranked or emerging journals, which could also exhibit significant academic impact or unique contributions, were not considered.
- **Dependence on Specific Metrics:** The study relies heavily on traditional journal metrics like Impact Factor, SJR and H-index. These metrics, while useful, have well-documented limitations and may not fully capture the quality and impact of research, such as societal impact, real-world relevance, or innovation.
- **Potential Bias in Metrics:** Metrics such as the Impact Factor are known to be susceptible to various biases, including citation manipulations and the influence of review articles, which typically receive more citations than original research. This can skew the perceived impact of journals that publish more review articles.
- **Geographical and Disciplinary Bias:** The study may inherently reflect biases towards journals from certain geographic regions or in specific medical

disciplines that are more heavily cited or have higher visibility in the academic community.

- **Exclusion of Qualitative Aspects:** Qualitative aspects of journal influence, such as peer review quality, editorial standards and contribution to advancing clinical guidelines or public health policies, were not assessed. These factors can also significantly influence a journal's reputation and impact.
- **Statistical Limitations:** The statistical methods used to compare journal metrics are robust for the data analyzed, but differences in methodology or anomalies in data collection could affect the results. Additionally, the confidence intervals and significance tests depend on assumptions that may not hold for all journals or metrics.

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