

Mapping the Research Landscape of the Balkan Journal of Dental Medicine (2014–2024): A Bibliometric Analysis

SUMMARY

Background/Aim: The *Balkan Journal of Dental Medicine (BJDM)* is the official scientific publication of the *Balkan Stomatological Society (BaSS)*, established to promote regional cooperation and the dissemination of dental research. This study aimed to evaluate the journal's publication, collaboration, citation, and thematic patterns over an eleven-year period (2014–2024) using bibliometric methods. **Material and Methods:** The analysis included all 324 articles published in *BJDM* between 2014 and 2024. Data were obtained from the Serbian Citation Index (SCIndeks) and supplemented with citation counts from the Web of Science (WoS). After data cleaning and standardization, analyses were conducted in R using the *bibliometrix* package (version 4.3.3) and its *biblioshiny* interface. Descriptive indicators and science mapping techniques were applied to examine publication output, authorship, institutional and international collaboration, citation performance, and thematic evolution. **Results:** Original research articles accounted for about 62% of all publications, with review papers achieving the highest citation rates. Greece and Serbia were the leading contributors, while 13.9% of papers involved international collaboration. The most cited paper (Vouzara et al., 2018) received 14 citations. Keyword and trend analyses revealed consistent focus on core dental fields-prosthodontics, endodontics, and oral surgery-alongside the emergence of newer topics such as dental materials, oral radiology, and forensic dentistry. **Conclusions:** *BJDM* has established itself as a stable regional platform for scientific exchange, with growing thematic diversity and modest but increasing international visibility. Strengthening collaboration, encouraging high-quality evidence-based studies, and maintaining consistent publication standards will further enhance the journal's impact and prospects for indexing.

Keywords: bibliometrics; dental journals; publication trends; collaboration networks; citation analysis; thematic evolution

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Introduction

The Balkan Stomatological Society (BaSS) was established in 1995 with the mission of enhancing the standards of dental medicine and fostering collaboration, friendship, and mutual understanding among dental professionals in the Balkan region. As a non-governmental and non-political organization,

BaSS has provided a platform for scientific exchange and cooperation among countries that share a long history, cultural proximity, and professional aspirations. In addition to its scientific journal, BaSS organizes regular regional congresses, bringing together dental professionals from across the Balkans to share clinical experience, discuss emerging research, and foster professional networks. These congresses, alongside

the BJDM, play a complementary role in uniting researchers, facilitating collaboration, and promoting the dissemination of knowledge within the region.

To further strengthen professional communication and promote the dissemination of scientific knowledge across the region, BaSS founded its official scientific journal - the Balkan Journal of Dental Medicine (BJDM), originally launched as the Balkan Journal of Stomatology in 1997. The journal's primary goal has been to unite researchers from diverse fields of dentistry, encourage the exchange of clinical experience, and highlight regional achievements in dental research.¹ Over the years, the BJDM has evolved from a regional communication platform into a key regional source of scientific information and innovation in dental medicine, disseminating new knowledge and research findings from a growing network of authors and institutions across the Balkans and neighboring regions.

The journal publishes original research, reviews, case reports, and professional articles, all rigorously peer-reviewed by national and international experts. BJDM maintains a regular publication schedule of three issues per year and has developed a digital platform for online access, which significantly increases visibility and accessibility. The journal is indexed in SCIndeks, the Serbian national citation index, and is actively working toward inclusion in relevant international databases, reflecting its commitment to international scientific standards and wider dissemination of regional dental research. Through its continuous publication and international outreach, the journal has become an important venue for presenting contemporary research, clinical advances, and interdisciplinary collaboration within the field.

In 2014, the journal underwent an important transformation, changing its title from the Balkan Journal of Stomatology to the Balkan Journal of Dental Medicine. This change marked a new phase in its editorial policy and international orientation, aligning the journal more closely with global terminology and standards in dental research. Together with BaSS congresses, which provide a platform for in-person knowledge exchange and professional networking, the BJDM serves as a complementary medium for disseminating scientific findings, ensuring that insights shared at the congresses reach a broader audience and contribute to the regional and international dental research landscape.

In line with its mission to promote professional collaboration and scientific advancement in the region, it has become important to assess how the journal has evolved over time in terms of research output, collaboration, and impact. Over the past decades, bibliometric analysis has become an essential methodological approach for evaluating scientific communication, productivity, and influence across journals and disciplines.² By quantifying

publication output, authorship patterns, institutional and international collaboration, and citation impact, bibliometric studies provide valuable insights into the development and visibility of scientific fields and journals.^{3,4} For emerging or regionally focused journals such as the BJDM, bibliometric evaluation plays a particularly important role - helping to identify growth trajectories, assess thematic coverage, and highlight areas that require strategic enhancement to strengthen international reach and impact.

Although BJDM has been publishing continuously since 1997 and has successfully represented the scientific contributions of dental professionals across the Balkans, no comprehensive bibliometric analysis has yet examined its evolution and research landscape. Understanding the journal's publication and citation patterns over time can shed light on its scientific maturity, collaboration networks, and the dynamics of research topics within the region.

Therefore, the aim of this study was to map the research landscape of the BJDM over an eleven-year period (2014–2024) using bibliometric methods. Specifically, the analysis explored publication trends, authorship and collaboration patterns, institutional and geographic contributions, citation impact, and thematic evolution based on author keywords. The findings aim to support the journal's future development, enhance its scientific visibility, and provide a foundation for evidence-based editorial strategies.

Material and Methods

This bibliometric study included all 324 articles published in the BJDM between 2014 and 2024. The dataset was obtained from the Serbian Citation Index (SCIndeks), which provides detailed metadata for each publication, including author names, institutional affiliations, document titles, abstracts, publication year, document type, language, citation counts, cited references, and author-provided keywords.

Citation counts were manually verified in the Web of Science (WoS) database to ensure the accuracy of international citation data. In addition to bibliographic metadata available in SCIndeks, each article was assigned to a field of interest. Two reviewers independently categorized all BJDM articles according to their research field, and any discrepancies were resolved through discussion with a third reviewer.

Data were exported from SCIndeks on March 25, 2025, and citation verification in WoS was completed on April 8, 2025. Before analysis, all records were cleaned and standardized to harmonize author names, institutional affiliations, and keywords.

Data Analysis

The bibliometric analysis was performed using R (version 2024.12.1+563)⁵ with the *bibliometrix* package (version 4.3.3) and its *biblioshiny* web interface.⁶ Both descriptive statistics and science mapping techniques were applied to explore publication output, collaboration patterns, citation impact, and thematic evolution.

The analysis encompassed multiple aspects of the journal's research output, including publication types and annual productivity, authorship patterns, institutional and geographic distribution, collaboration networks at different levels, citation performance, and thematic development based on author keywords and fields of interest.

Author productivity was calculated using both the full counting method, which assigns one full credit to each author of a paper, and the fractional counting method, which divides one credit equally among co-authors (TA – total number of articles; AF – articles fractionalized).⁷

Citation performance was measured through Total Citations (TC), Citations per Year (TC/year), and Normalized Total Citations (NTC), which adjusts citation counts for the publication year to allow cross-year comparison. Citation data were obtained from the Clarivate Web of Science Core Collection (Times Cited Count) to ensure consistency and international comparability.

Collaboration analysis was used to identify co-authorship networks at the level of authors, institutions, and countries.⁸ The extent of international cooperation was quantified through single-country publications (SCP)-papers authored by researchers from one country-and multi-country publications (MCP)-papers co-authored across countries. Within the international collaboration network, the most influential nodes were identified using betweenness centrality (BC) (the degree to which a node connects other nodes), closeness

centrality (CC) (the average distance from a node to all others), and PageRank (PR) (the overall importance of a node in the network).

Keyword co-occurrence analysis was performed to identify the main research areas and conceptual linkages among them. In addition to author-provided keywords, each article was assigned to a field of interest by two independent reviewers. Disagreements were resolved in consultation with a third reviewer.

Trends in research focus were examined using Trend Topics and Thematic Evolution analyses, which identified the year of first appearance (Q1), peak activity (Median), and final year of observed relevance (Q3) for major themes.

All visualizations, including collaboration networks, word cloud, and thematic evolution diagrams, were generated using built-in *bibliometrix* functions and further refined for clarity and visual consistency.

Results

Publication Output and Article Types

During the observed 11-year period (2014–2024), a total of 324 articles were published in the BJDM. Since the journal publishes three issues per year, this corresponds to 33 issues analyzed in total. The annual number of published papers ranged from 25 in 2014 to 30 in most years, with a slight decrease in 2024 (TA=29).

Among all publications, original research papers were the most frequent type, accounting for 201 articles (62.0%). Case reports followed with 67 papers (20.7%), while review papers represented 52 publications (16.0%). Informative papers and perspective articles appeared only occasionally, with three and one papers, respectively.

The annual distribution of publication types is shown in Figure 1, which illustrates the predominance of original papers throughout the analyzed period.

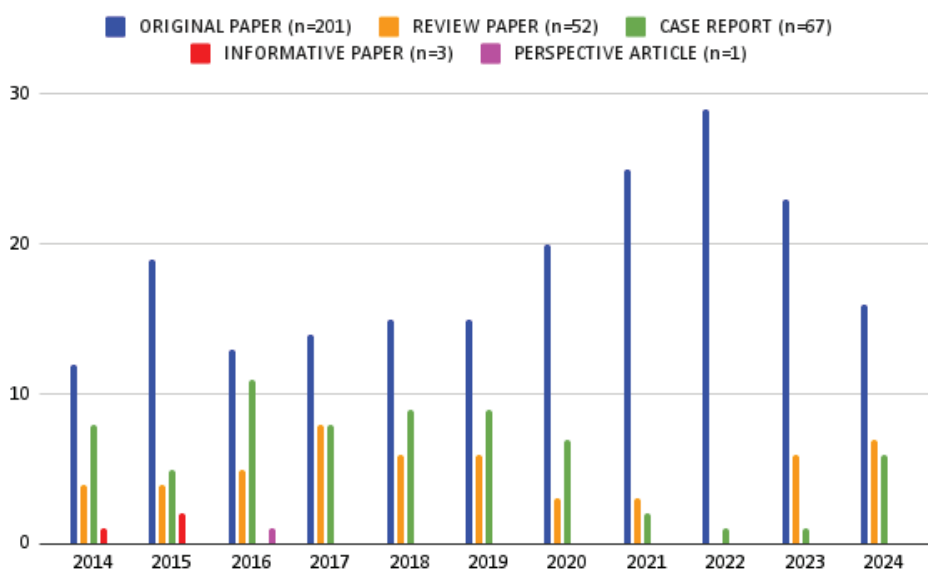


Figure 1. Annual distribution of publication types in the BJDM (2014–2024)

Authorship and Collaboration Patterns

A total of 938 individual authors contributed to the BJDM during the eleven-year period from 2014 to 2024. The average number of authors per paper was 3.81, indicating that multi-authored papers predominated. In total, 24 single-author papers were published, written by 21 different authors.

The analysis of author productivity identified 15 authors who published five or more papers in the BJDM during the analyzed period (Table 1). The most productive author, based on the total number of publications, was Dejan Marković (University of Belgrade) with 14 papers, followed by Athanasios Pouloupoulos and Dimitrios Andreadis (Aristotle University of Thessaloniki), each with 11 papers. They were followed by Bojan

Petrović (University of Novi Sad) (TA=7), Elmedin Bajrić (University of Sarajevo), Kaan Orhan (Ankara University), Stylianos Dalampiras (Aristotle University of Thessaloniki), and Silvia Martu (Grigore T. Popa University of Medicine and Pharmacy, Iași), each with 6 papers.

When fractionalized authorship is taken into account, which adjusts for the number of co-authors per paper, the highest fractionalized contribution values were recorded for Georgios S. Chatzopoulos (AF=2.50), Dejan Marković (AF=2.68), and Athanasios Pouloupoulos (AF=2.28). This indicates a smaller number of shared co-authorships and a higher individual contribution to the journal's total output.

Table 1 presents the most productive authors ranked by total and fractionalized number of articles.

Table 1. Most productive authors in the BJDM (2014–2024), ranked by total and fractionalized number of articles

Rank by TA	Authors	TA	AF	Rank by AF	Authors	TA	AF
1	MARKOVIC DEJAN	14	2.68	1	MARKOVIC DEJAN	14	2.68
2	POULOPOULOS ATHANASIOS	11	2.28	2	CHATZOPOULOS GEORGIOS S.	5	2.50
3	ANDREADIS DIMITRIOS	11	2.17	3	POULOPOULOS ATHANASIOS	11	2.28
4	PETROVIC BOJAN	7	2.24	4	TODOROVIC LJUBOMIR	3	2.25
5	BAJRIC ELMEDIN	6	1.96	5	PETROVIC BOJAN	7	2.24
6	ORHAN KAAAN	6	1.38	6	ANDREADIS DIMITRIOS	11	2.17
7	DALAMBIRAS STYLIANOS	6	1.34	7	ANITUA EDUARDO	2	2.00
8	MARTU SILVIA	6	1.10	8	NICHOLSON JOHN W.	2	2.00
9	CHATZOPOULOS GEORGIOS S.	5	2.50	9	BAJRIC ELMEDIN	6	1.96
10	ECONOMIDES NIKOLAOS	5	1.67	10	ECONOMIDES NIKOLAOS	5	1.67
11	DIKILITAS AHU	5	1.50	11	DERMATA ANASTASIA	4	1.58
12	KARAASLAN FATIH	5	1.50	12	DIKILITAS AHU	5	1.50
13	UNUR MERAL	5	1.01	13	KARAASLAN FATIH	5	1.50
14	URSARESCU IRINA	5	0.98	14	SEIMOVIC EDIN	3	1.50
15	ZISIS VASILEIOS	5	0.90	15	SIDIROPOULOU SOSSANI	3	1.45
16	DERMATA ANASTASIA	4	1.58	16	ORHAN KAAAN	6	1.38
17	MATIAKIS APOSTOLOS	4	1.33	17	DALAMBIRAS STYLIANOS	6	1.34
18	ZOULOU MIS LAMPROS	4	1.03	18	MATIAKIS APOSTOLOS	4	1.33
19	PANTELAS GEORGIOS	4	1.00	19	TUGCE TEMUR KATIBE	2	1.33
20	CETENOVIC BOJANA	4	0.92	20	DERVISOGLOU THEODOROS	3	1.17
21	MINOVSKA ANA	4	0.87	21	KUTER BERNA	3	1.17
22	SOLOMON SORINA	4	0.78	22	MARTU SILVIA	6	1.10
23	PERIC TAMARA	4	0.63	23	ARHAKIS ARISTIDIS	3	1.08

TA - the total number of articles; AF - adjusted frequency that reflects multiple-authored articles

Author Productivity Over Time

A steady increase in the number of contributing authors was observed during the analyzed period, particularly after 2019, coinciding with an expansion in the number of published articles.

Figure 2 presents a temporal visualization of author productivity among the 10 most active contributors to the BJDM between 2014 and 2024. Each line represents an individual author's publication history, while circles mark the number of papers published in a given year. The size of the circles corresponds to the number of publications, and the color intensity indicates the number of citations received.

Among the analyzed authors, Dimitrios Andreadis, Athanasios Pouloupoulos (Aristotle University of Thessaloniki), and Dejan Marković (University of Belgrade) maintained a continuous publishing presence throughout the observed period. Professor Silvia Martu (Grigore T. Popa University of Medicine and Pharmacy, Iași) showed the highest concentration of publications in 2015, while Vasileios Zisis (Aristotle University of Thessaloniki) began publishing in 2021, with five articles recorded since then. These data show annual variations in publication activity among the most productive authors during the observed period.

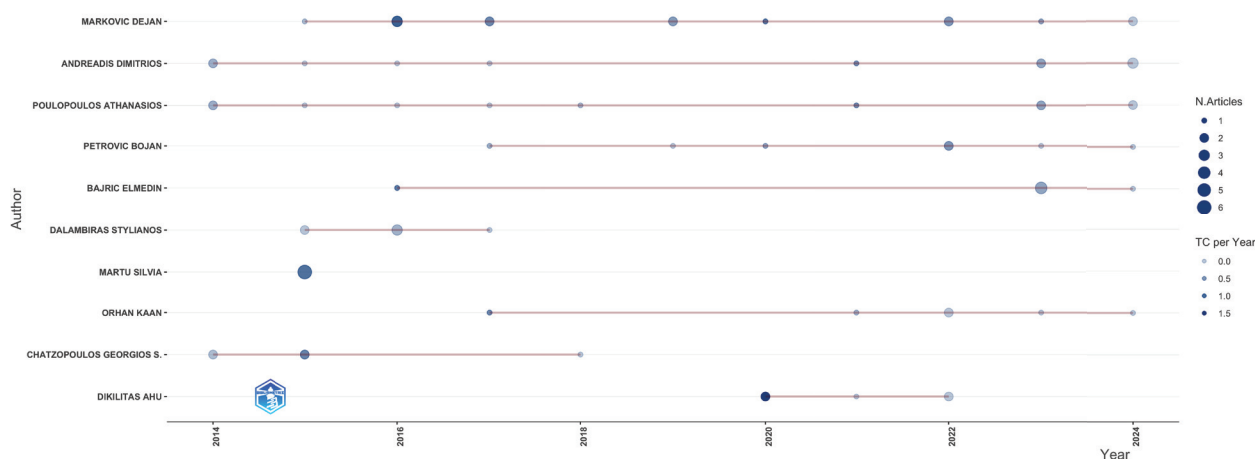


Figure 2. Temporal distribution of publications among the 10 most productive authors in the BJDM (2014–2024)

Institutional and Geographic Distribution

During the analyzed period (2014–2024), authors publishing in the BJDM were affiliated with 412 institutions across 32 countries and four continents, confirming the journal’s broad geographic distribution. Most affiliations originated from Europe (20 countries), followed by Asia (9 countries), Africa (two countries), and North America (one country).

The highest number of publications was recorded from Turkey (TA=217), followed by Greece (TA=115) and Serbia (TA=94). Other contributing countries included Albania (TA=20), Cyprus (TA=12), the United States (TA=10), and Romania (TA=9). A smaller number of papers originated from Montenegro (TA=8), Bulgaria (TA=6), Germany, Switzerland, and the United Kingdom (TA=4 each), as well as Egypt, Pakistan, Slovenia, and Spain (TA=3 each). Countries such as Belarus, India, Italy, Poland, and the United Arab Emirates

each contributed two publications, while Armenia, Azerbaijan, Croatia, the Czech Republic, Denmark, Iran, Ireland, Saudi Arabia, Slovakia, Syria, and Tunisia were represented by one paper each.

The overall geographic distribution of publications is illustrated in Figure 3, which highlights the international diversity of author affiliations.

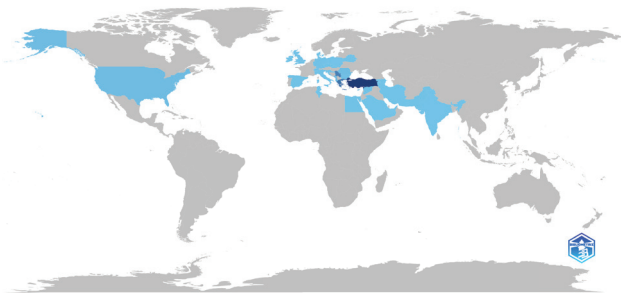


Figure 3. Geographic distribution of author affiliations in the BJDM (2014–2024)

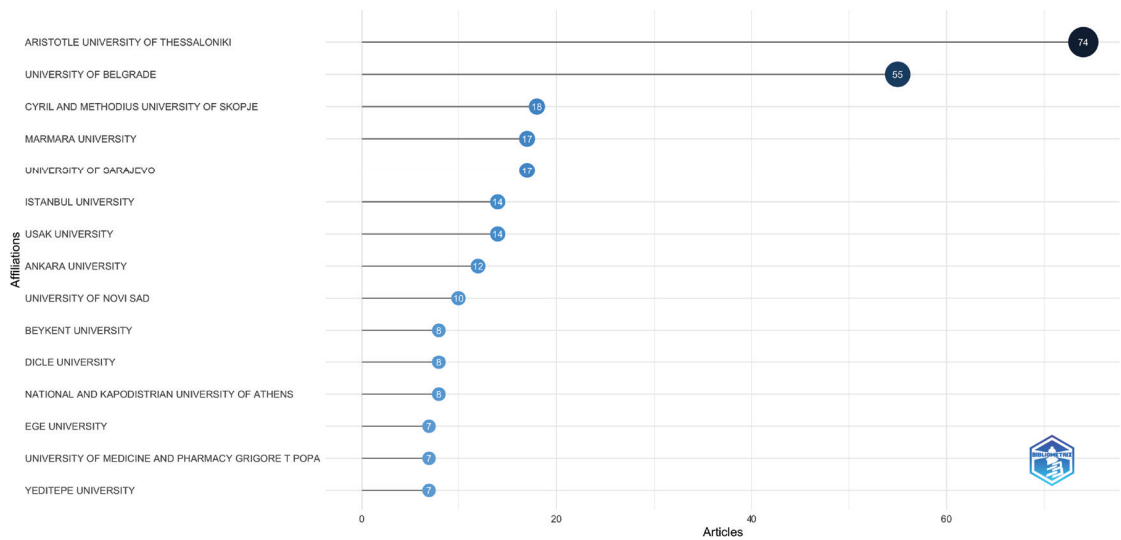


Figure 4. Most relevant affiliations in the BJDM (2014–2024): Top 15 institutions by publication output

Most Productive Institutions and Countries

A total of 412 institutions were identified among the author affiliations in the BJDM during the period 2014–2024. Of these, 15 institutions published seven or more papers, jointly contributing about 52% of all publications in the journal.

The Aristotle University of Thessaloniki (Greece) ranked first, with 74 papers (22.8%), followed by the University of Belgrade (Serbia) with 55 papers (17.0%). Together, these two institutions accounted for nearly 40% of the total output produced by the top 15 affiliations.

Universities from Turkey also occupied a strong position, with Marmara University (TA=17, 5.2%), Istanbul University and Usak University with 14 papers (4.3%) each, and Ankara University (TA=12, 3.7%) among the most active contributors. In addition to Greece, Serbia, and Turkey, other Balkan institutions - including the Cyril and Methodius University of Skopje (TA=18, 5.6%) and the University of Sarajevo (TA=17, 5.2%) - were also represented among the most productive affiliations, highlighting consistent regional participation.

Institutions such as the University of Novi Sad (Serbia), National and Kapodistrian University of Athens (Greece), Ege University (Turkey), and the University of Medicine and Pharmacy “Grigore T. Popa” (Romania) contributed between 7 and 10 publications, suggesting a broader but regionally focused research base.

Figure 4 shows the 15 most productive institutions, demonstrating a predominantly Balkan-centered authorship network, with a smaller number of contributing institutions from outside the region.

International Collaboration

During the analyzed period (2014–2024), corresponding authors of papers published in the BJDM represented 24 countries. Based on the distinction between single-country publications (SCP) and multi-country publications (MCP), the overall rate of international collaboration was 13.89%, indicating that most papers were authored within national research networks.

Among the most productive contributors, Turkey ranked first with 111 papers, of which 10 (9.0%) involved international co-authorship. Greece followed with 73 papers, including 6 (8.2%) multi-country publications, while Serbia produced 45 papers, of which 13 (28.9%) were internationally co-authored. Other countries with notable output included Bosnia and Herzegovina (20 papers, 3 international, 15.0%), North Macedonia (16 papers, 1 international, 6.3%), Albania (11 papers, 2 international, 18.2%), and Romania (8 papers, 1 international, 12.5%). Bulgaria and Cyprus published only single-country papers, without international co-authorship.

Outside the Balkan region, the United States contributed five papers, three of which (60.0%) involved international collaboration. Other non-regional contributors with international participation included the United Arab Emirates, Armenia, and Azerbaijan, each with 100% MCP rate, though based on a small number of publications. Moderate collaboration rates were also observed for Pakistan (50.0%) and Montenegro (33.3%).

Figure 5 illustrates the distribution of single-country and multi-country publications by country of the corresponding author, showing both the total number of papers and the proportion of international collaborations.

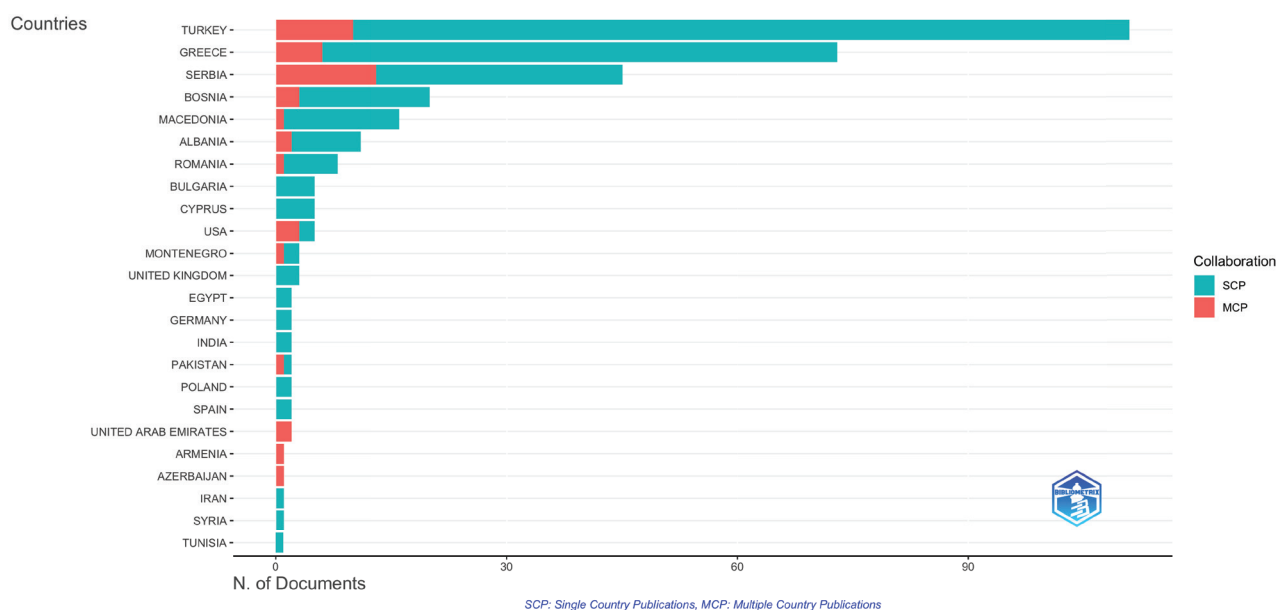


Figure 5. Distribution of single-country and multi-country publications in the BJDM (2014–2024)

Country Collaboration Networks

The co-authorship network based on country affiliations is presented in Figure 6. All countries were grouped into three main clusters, indicating distinct patterns of regional and international collaboration. *Cluster 1* included most of the Balkan countries (Turkey, Serbia, North Macedonia, Bosnia and Herzegovina, Albania, Cyprus, Romania, and Montenegro), as well as several European countries such as Germany, Spain, Italy, Slovenia, and Denmark. *Cluster 2* consisted primarily of Greece and its international collaborators, including the United States, Switzerland, United Kingdom, United Arab Emirates, Armenia, Czech Republic, and Slovakia. *Cluster 3* included Pakistan and Saudi Arabia, representing a small but distinct collaborative component.

Within the network, Greece, Serbia, and Turkey showed the highest centrality scores, indicating their key position within the collaboration structure. Greece had the highest betweenness centrality (BC=102.484) and PageRank (PR=0.131), followed by Serbia (BC=93.739, PR=0.123) and Turkey (BC=78.055, PR=0.115). Countries such as Bosnia and Herzegovina (BC=25.389) and Albania (BC=14.000) also showed moderate levels of betweenness, suggesting their presence within the main collaboration cluster. Other countries, including Cyprus, Romania, and Montenegro, had low or zero centrality values, indicating limited participation in cross-country collaborations.

Figure 6 illustrates the international co-authorship network, highlighting the main clusters and the relative importance of countries within the collaboration structure.

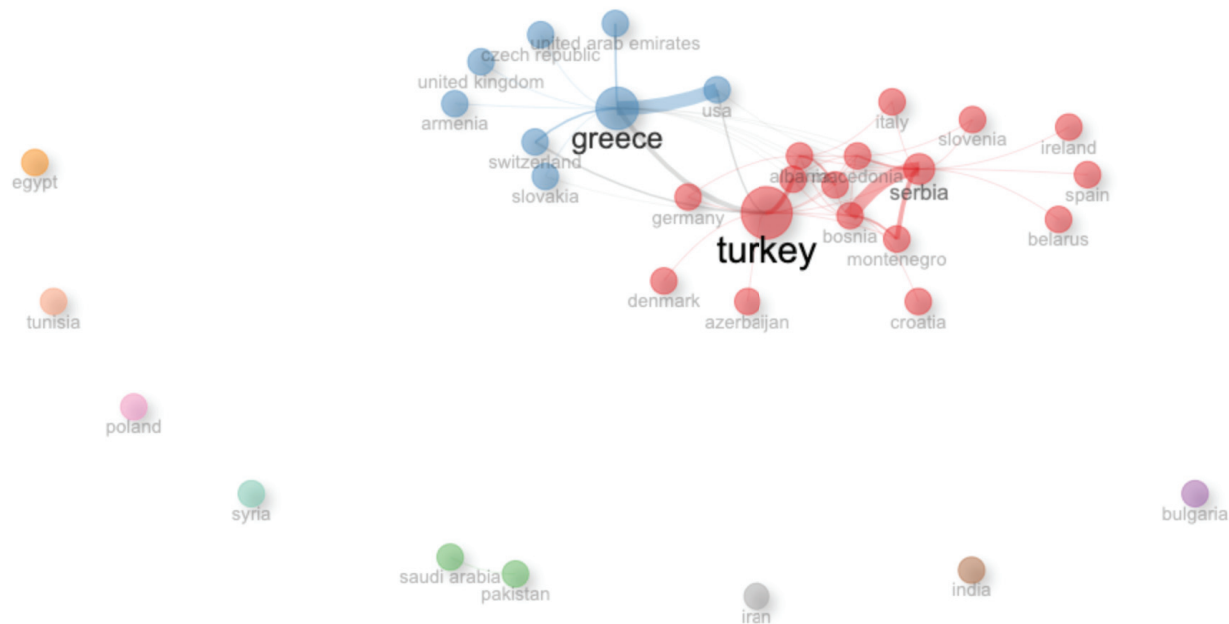


Figure 6. International co-authorship network based on country affiliations in the BJDM (2014–2024)

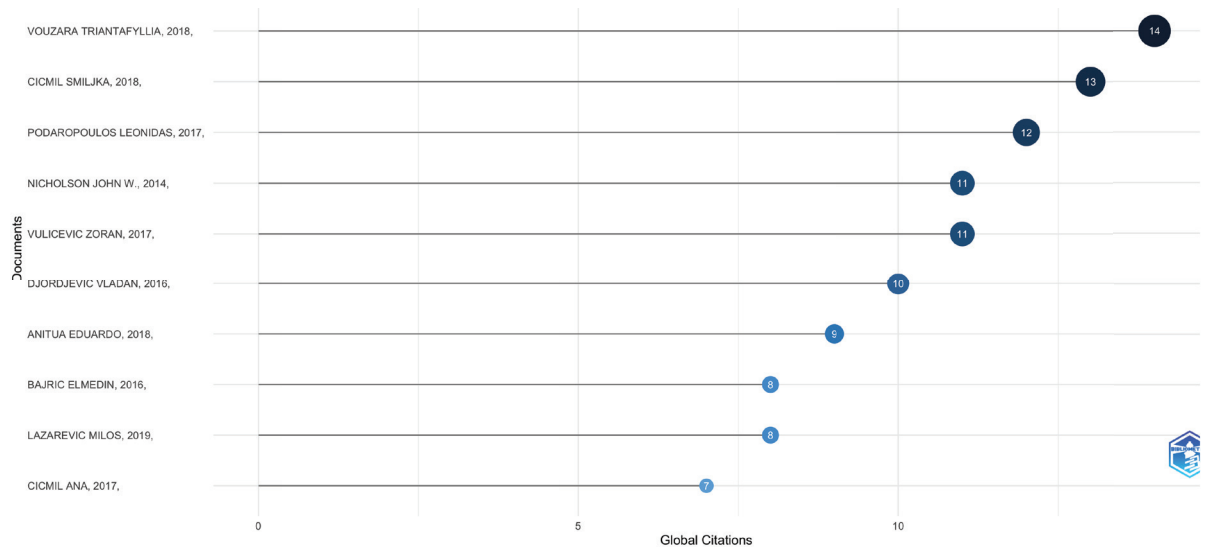


Figure 7. Ten most cited papers published in the BJDM (2014–2024)

Trend Topics and Thematic Evolution

The analysis of research fields represented in the BJDM between 2014 and 2024 provides an overview of how the journal's thematic focus evolved over time. The identification of trend topics was based on the most frequent subject areas per year, with a minimum occurrence threshold of five. For each field, three temporal indicators were determined: the year of first appearance (Q1), the year of peak activity (Median), and the final year of observed relevance (Q3).

Among the most persistent fields, prosthodontics first appeared in 2016, reached its peak in 2019, and remained active until 2021. Endodontics emerged in 2017, maintained presence through 2019, and continued to be represented until 2021. Oral and maxillofacial surgery

showed continuous representation from 2016 to 2022, while implantology appeared in 2017, peaked in 2019, and persisted until 2021. Pediatric dentistry was first recorded in 2018, showed increased activity in 2020, and remained present through 2022.

Several other fields demonstrated long-term or recurring presence, including oral and maxillofacial surgery, oral pathology, and prosthodontics, while newer areas such as oral and maxillofacial radiology, dental materials, and forensic dentistry emerged mainly after 2020. Forensic dentistry, appearing for the first time in 2023, represents the most recent addition to the journal's thematic structure.

A smaller number of fields exhibited short-term activity, such as esthetic dentistry, which appeared between 2016 (Q1) and 2018 (Q3), with its peak in 2016.

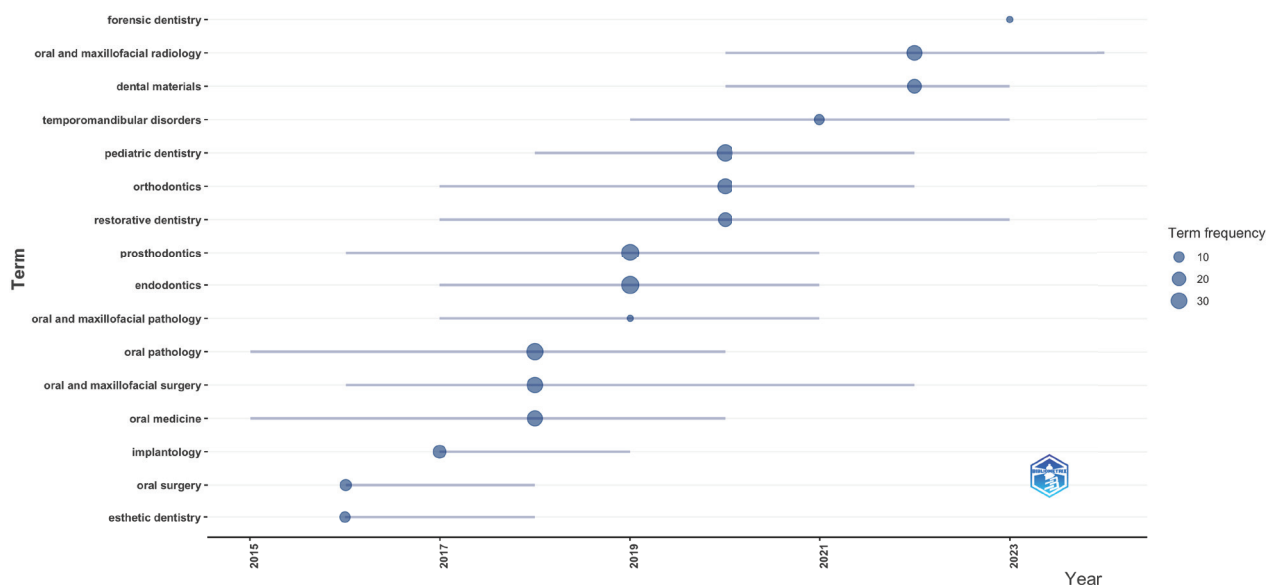


Figure 9. Trend topics in the BJDM (2014–2024) based on author keywords (minimum frequency = 5)

Discussion

This bibliometric analysis provides a comprehensive overview of the publication activity, collaboration patterns, citation performance, and thematic evolution of the BJDM over an eleven-year period (2014–2024).

Publication Output and Article Types

The publication pattern of the BJDM has remained consistent over the analyzed eleven-year period, with approximately ten articles per issue and three issues published annually. This regularity reflects the journal's editorial stability and sustained ability to maintain a steady publication schedule—an important indicator of credibility in academic publishing.¹⁶

In terms of content, original research articles predominated, accounting for nearly two-thirds of all

published papers. This emphasis on primary research aligns with the broader trend in scientific publishing,¹⁷ where original studies are increasingly prioritized for their contribution to new evidence and higher citation potential. The decline in the proportion of case reports, which represented about one-fifth of the total output, further supports the journal's shift toward more rigorous and evidence-based research. Such a pattern mirrors developments observed in other regional dental journals,¹⁸ where the focus has gradually transitioned from descriptive to analytical research.

Review papers maintained a steady but limited presence, with the first systematic reviews appearing only in recent years. Their inclusion represents a positive step toward aligning the journal with international standards of evidence-based practice in dentistry.¹⁹ Systematic reviews are generally among the most cited forms of scientific

communication²⁰, and encouraging their submission could further enhance the journal's visibility and impact.

Overall, the observed distribution of publication types demonstrates that BJDM has successfully evolved toward a research-oriented profile, balancing its regional mission with the methodological expectations of contemporary scholarly publishing.

Authorship and Collaboration Patterns

The authorship structure of the BJDM reflects the collaborative character typical of biomedical research, with most papers produced through multi-author teams.²¹ The average of nearly four co-authors per article indicates a balanced level of cooperation - neither highly fragmented nor limited to small groups - which suggests the presence of active but moderately sized research teams within the region. Such a collaboration pattern is consistent with the trends observed in other national and regional dental journals, where institutional partnerships and co-authorship networks remain essential for maintaining research productivity.^{22,23}

A relatively small number of single-author papers demonstrates that individual research contributions still have a place in the journal, particularly for narrative reviews or specialized clinical topics. However, the overall predominance of multi-authored works underscores the shift toward collective research, which generally produces broader and more interdisciplinary perspectives.

These findings indicate that BJDM functions as both a regional research hub and a collaborative platform connecting key academic centers across the Balkans. Strengthening such collaboration - particularly by diversifying institutional representation - may further enhance the journal's visibility and long-term impact.

The institutional and geographic patterns observed in the BJDM reflect its dual nature - a journal with strong regional roots and an expanding international presence. Although the majority of contributions originated from European institutions, the inclusion of authors from Asia, Africa, and North America demonstrates that the journal has succeeded in extending its visibility beyond the Balkan region. This gradual diversification of authorship indicates growing recognition and an increasingly global readership, particularly within developing dental research communities.

Within Europe, the dominance of institutions from Greece and Serbia underscores the historical and scientific centrality of these countries in the journal's development. The Aristotle University of Thessaloniki and the University of Belgrade emerged as the two leading contributors, together accounting for nearly 40% of all publications from the top 15 institutions. At the same time, the participation of universities from Bosnia and Herzegovina, North Macedonia, Romania, and Turkey

illustrates a healthy network of regional collaboration that aligns with the founding mission of the BaSS.

The inclusion of authors from Egypt and Tunisia represents a particularly noteworthy trend, as it signals a southward expansion of scientific cooperation toward North Africa - an area sharing cultural and professional ties with the Balkans through Mediterranean academic networks. Such cross-regional exchange enhances the journal's international profile and diversifies its research perspectives.

The findings indicate that international collaboration within the BJDM remains relatively modest, with only around 14% of all papers involving co-authors from multiple countries. This pattern aligns with trends previously observed in regional journals from developing or transitional research systems, where national collaboration typically predominates due to geographic, linguistic, and institutional proximity.

The co-authorship network analysis provides deeper insight into the structure of international cooperation observed in the BJDM. Serbia appeared as a central connecting country within the regional network, maintaining close research links particularly with Bosnia and Herzegovina. This finding reflects long-standing academic and professional ties within the former Yugoslav region, as well as shared participation in regional scientific initiatives.

Turkey and Greece also demonstrated strong publishing activity, but their collaboration patterns remained relatively limited, with Turkey showing a regional orientation (notably toward Cyprus), while Greece displayed occasional partnerships with more distant countries such as the United States. These isolated international links suggest potential entry points for expanding the journal's reach beyond the Balkans.

The overall structure of the collaboration network reveals a fragmented yet interconnected landscape, where a few countries act as hubs of regional cooperation, while others, such as Bulgaria, remain largely isolated. This uneven distribution of collaboration intensity is consistent with bibliometric studies of other regional journals,²² where national self-sufficiency and limited funding opportunities often restrict broader engagement.

Citation Analysis and Research Visibility

The citation performance of the BJDM reflects the journal's developing but promising position within the regional and international scientific community. Although the average citation rate (1.41 citations per article) remains modest, it aligns with the expected range for regionally oriented, non-indexed journals in specialized medical fields.^{24,25} Importantly, the temporal trend and the appearance of internationally cited papers indicate a gradual improvement in visibility and recognition.

A particularly noteworthy finding is that all of the five most cited papers were review articles, primarily

published between 2017 and 2018. This pattern is consistent with bibliometric evidence from other dental journals,¹⁹ showing that review-type papers-especially systematic reviews and/or meta-analyses-tend to accumulate more citations due to their broad relevance, methodological synthesis, and long citation lifespan.²⁰ The topics covered by these highly cited papers, including endodontic instrument fracture, osseodensification, and fluoride-releasing restorative materials, address clinically significant and widely discussed issues in modern dental practice.

These results suggest that the BJDM could strategically benefit from encouraging the submission of high-quality review papers, particularly systematic reviews, meta-analyses, and evidence-based updates. Such publications not only attract citations but also strengthen the journal's academic reputation and improve its prospects for inclusion in international citation databases such as WoS, Scopus, and PubMed.

At the same time, the relatively low citation density among original research papers underscores the importance of enhancing research visibility through international collaboration, stronger methodological design, and alignment with global research trends. Fostering partnerships with internationally recognized authors and emphasizing research transparency and reporting quality could further improve the citation performance of original articles over time.

Research Trends and Thematic Evolution

The distribution of author keywords provides valuable insight into the thematic orientation of the BJDM over the past decade. The dominance of the term *oral health* reflects a strong and consistent emphasis on prevention, education, and population-based approaches to dental medicine - areas traditionally prioritized in public health-oriented research within the Balkans. This focus aligns with regional efforts to improve oral health literacy and implement preventive strategies across diverse population groups.

Frequent mentions of *CBCT* (cone-beam computed tomography), *periodontal disease*, and *oral cancer* further emphasize the journal's clinical and diagnostic orientation. The recurrent use of *CBCT* and *panoramic radiography* demonstrates the increasing integration of advanced imaging technologies into regional dental practice and research, while the presence of *oral cancer* as a common keyword highlights continued attention to oncologic diagnostics and early detection.

The regular appearance of keywords such as *dental implants*, *endodontics*, *orthodontics*, and *quality of life* indicates the journal's comprehensive coverage of both restorative and functional aspects of dental care, while the inclusion of *diabetes mellitus* and *bruxism* suggests interest in interdisciplinary connections between oral and systemic health.

Importantly, the emergence of keywords such as *artificial intelligence*, *deep learning*, and *3D printing* in recent years points to a gradual shift toward technologically driven research. Although these topics still appear infrequently, their presence reflects the growing influence of digital dentistry and computational methods within the regional research community.

Taken together, the keyword distribution confirms that the BJDM serves as a multidisciplinary platform that bridges preventive, clinical, and technological domains of modern dentistry. The observed trends suggest that while traditional fields such as oral health, periodontology, and radiology remain central, the journal is gradually evolving to include innovative topics aligned with global developments in dental research.²⁶

The longitudinal analysis of research fields published in the BJDM between 2014 and 2024 reveals a gradual but clear evolution of thematic priorities, reflecting both regional research capacities and broader developments in dental science. The persistent presence of *prosthodontics*, *endodontics*, *oral and maxillofacial surgery*, and *implantology* underscores the journal's strong clinical orientation. These areas form the foundation of most regional dental curricula and research programs, which likely explains their sustained representation across multiple years.

The consistent prominence of *oral and maxillofacial surgery* - spanning from 2016 to 2022 - indicates continuous engagement with complex surgical procedures and interdisciplinary treatment approaches, while *prosthodontics* and *implantology* reflect ongoing interest in functional and esthetic restoration, supported by the growing availability of modern materials and digital fabrication techniques. The endurance of *endodontics* within the thematic structure suggests a stable focus on treatment optimization and biomaterial innovation, mirroring international trends toward evidence-based endodontic practice.

Emerging themes such as *pediatric dentistry* and *forensic dentistry* point to diversification in recent years. The increased visibility of *pediatric dentistry* from 2018 onward highlights a rising awareness of child-centered dental care and preventive strategies, whereas the appearance of *forensic dentistry* in 2023 signals the journal's expanding scope toward specialized and interdisciplinary subfields. Similarly, newer domains such as *oral and maxillofacial radiology* and *dental materials* - which gained presence mainly after 2020 - demonstrate responsiveness to technological progress and innovations in diagnostic and restorative methodologies.

By contrast, transient themes like *esthetic dentistry* suggest that certain areas attract temporary scholarly attention, often driven by technological or societal trends, but do not necessarily establish a long-term presence in the journal's research agenda.

Overall, the thematic evolution of the BJDM reflects a balanced combination of stability and innovation. While core clinical disciplines continue to dominate, the gradual integration of emerging and interdisciplinary fields indicates a healthy diversification of research interests. This evolution not only mirrors the maturation of dental science in the Balkan region but also aligns the journal more closely with global developments in modern dentistry.²⁷

Conclusions and Recommendations

This bibliometric study offers the first comprehensive overview of the BJDM over the 2014–2024 period. The findings show that the BJDM has evolved into a stable regional platform for scientific exchange, with consistent publication output and increasing international participation.

Original research papers represented the majority of publications, indicating the journal's strong focus on primary research, while review articles achieved the highest citation impact. Authorship and institutional analysis revealed that Greece and Serbia remain the leading contributors, reflecting the journal's regional identity, whereas international collaboration still occurs at a modest level. Thematic analyses demonstrated both continuity in core clinical areas and the emergence of new topics such as digital dentistry, pediatric and forensic dentistry, and AI-based diagnostics.

To further enhance its visibility and impact, the journal should encourage greater international collaboration, increase the number of high-quality review and evidence-based studies, and broaden thematic diversity by supporting innovative and interdisciplinary research. Through these efforts, BJDM can continue to strengthen its scientific influence and move closer toward broader international recognition.

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