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A Bibliometric Analysis of Türkiye's Contribution to Pediatric Dentistry Research and Its Impact in SCI-E: A Cross-Sectional Study

Türkiye'nin Çocuk Diş Hekimliği Araştırmalarına Katkısının Bibliyometrik Analizi ve SCI-E'deki Etkisi: Kesitsel Çalışma

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ABSTRACT Objective: To elucidate Türkiye's position among nations in pediatric dentistry research and its contribution to the scientific literature. **Material and Methods:** This investigation utilized the Science Citation Index Expanded (SCI-E) from the Web of ScienceTM database. Studies related to pediatric dentistry were identified, and the number of publications, total number of citations, citation rate per publication, Hirsch-index (H-index), and Türkiye's status were analyzed based on these parameters. The temporal distribution of publications from Türkiye, types of publications, SCI-E journals in which they were published, institutional affiliations supporting publications, the most prolific and highly cited authors were examined. **Results:** The USA demonstrates the highest number of publications and citations. Türkiye ranked 5th with 361 publications. However, it was noted that Türkiye, ranked 9th in the H-index, is not among the top 10 in terms of citation rate per publication. The studies were published sequentially in the Journal of Clinical Pediatric Dentistry, European Journal of Paediatric Dentistry, International Journal of Paediatric Dentistry, Pediatric Dentistry, and Journal of Dentistry for Children. Only 58 (16.1%) of the studies conducted in Türkiye received institutional support. **Conclusion:** To enhance the volume and citation rates of publications from Türkiye, it is imperative that the state must increase its support for academic institutions engaged in research and development. Efforts should be made to augment the number of Turkish journals in pediatric dentistry that are indexed in international databases. Additionally, it is advisable include more Turkish articles as references in scientific publications.

Keywords: Türkiye; pediatric dentistry; publications; bibliometric analyses

ÖZET Amaç: Çocuk diş hekimliği alanında Türkiye'nin dünya ülkeleri arasındaki yerini ve literatüre olan katkısını ortaya koymak amaçlanmıştır. **Gereç ve Yöntemler:** Çalışma, Web of ScienceTM Core Collection veri tabanında Science Citation Index Expanded (SCI-E) indeks sistemi kullanılarak yapıldı. Çocuk diş hekimliği alanındaki çalışmalar elde edilerek en çok yayın yapan ülkelerin yayın sayısı, toplam atıf sayıları, yayın başına düşen ortalama atıflar, Hirsch-indeksleri (H-indeksleri) ve Türkiye'nin dünya ülkeleri arasındaki seviyesine bu parametreler üzerinden bakıldı. Türkiye'den yapılan yayınların yıllara göre dağılımı, yayınların türü ve yayımlandığı SCI-E dergiler, bu yayınları destekleyen kurum bilgileri, en çok yayın yapan ve en çok atıf alan yazarlar araştırıldı. **Bulgular:** En çok yayın yapan ve en çok atıfa sahip ülkenin ABD olduğu tespit edildi. Türkiye 361 adet yayımla beşinci sırada yer almaktaydı. Fakat H-index sıralamasında dokuzuncu sırada olan Türkiye'nin, yayın başına düşen ortalama atıf sıralamasında ilk 10 içerisinde yer almadığı görüldü. Çalışmaların yayımlandığı SCI-E indeksli dergiler "Journal of Clinical Pediatric Dentistry", "European Journal of Paediatric Dentistry", "International Journal of Paediatric Dentistry", "Pediatric Dentistry ve Journal of Dentistry for Children" olarak tespit edildi. Türkiye'den yapılan çalışmaların sadece 58'inin (%16,1) kuruluşlar tarafından desteklendiği saptandı. **Sonuç:** Ülkemizden kalitesi ve atıf sayısı yüksek yayınların çıkması için, devletin araştırma ve geliştirme yapan akademik kurumları daha çok desteklemesi, uluslararası indekslere giren çocuk diş hekimliği alanındaki dergi sayısının artırılması ve bilimsel yayımlarda referans olarak Türkiye kaynaklı makalelere daha fazla yer verilmesi gerekmektedir.

Anahtar Kelimeler: Türkiye; çocuk diş hekimliği; yayınlar; bibliyometrik analiz

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Bibliometric studies are defined as investigations that assess the performance of scientific literature on a specific subject by examining publications produced by institutions or individuals within a particular period and region as well as analyzing the relationships between these publications.^{1,2} Bibliometric studies can be utilized to evaluate the performance of individuals, institutions, or countries in any given subject area and their contributions to the literature can be quantitatively assessed.^{3,4} Interest in these studies and the number of investigations are rapidly increasing in Türkiye and worldwide. A comprehensive analysis of the literature through bibliometric studies has informed researchers in the design of subsequent investigations.^{5,6}

The quantity and quality of a nation's publications serve as indicators of its scientific contributions.⁷ Economic development is intrinsically linked to the aggregate budget allocated to research, financial support for institutions to enhance scientific productivity, and academic opportunities.⁷⁻⁹

Metrics such as the number of publications in indexed journals, the frequency of citations, and the Hirsch-index (H-index) are fundamental for assessing scholarly productivity. The H-index, developed by Hirsch, constitutes a fundamental metric for assessing a researcher's scientific productivity and impact.¹⁰⁻¹² Bibliometric indicators such as the H-index are highly significant due to their potential influence on allocating scientific awards and research funding.^{10,13}

Pediatric dentistry is a scientific discipline encompassing all aspects related to the oral health of children and young adults.^{14,15} In contemporary pediatric dentistry, the approach encompasses diagnosing and treating diseases resulting from dental caries, pulpitis, and infected pulp tissue, which are associated with pain and inflammation. Additionally, it incorporates preventive measures to inhibit caries formation and maintain dental arch integrity in cases of tooth loss due to caries or trauma.^{15,16} Restorative techniques, pulp treatments, space preservation, preventive orthodontics, behavior guidance techniques, and treatment of children with special needs constitute the primary subjects of pediatric dentistry.¹⁷ The

quantity and diversity of publications pertaining to this scientific discipline, which covers a broad spectrum of research areas in Türkiye and globally, have been increasing.

The objective of this study was to evaluate the publications produced by researchers in Türkiye in Science Citation Index Expanded (SCI-E) journals in the field of pediatric dentistry and to compare them with those from other countries. This represents the first bibliometric analysis to assess research from Türkiye that has an international impact on pediatric dentistry field.

MATERIAL AND METHODS

The research utilized the "Thomson Reuters Web of Science (WOS)" database. As this study involves a bibliometric analysis utilizing solely published and publicly available data, neither ethical approval nor informed consent from human participants was required. Database scanning was completed on November 22, 2024. Publications indexed in the SCI-E database from 1984 to 2024 were included in the study. The SCI-E index was selected within the Web of Science™ Core Collection database section. The "Dentistry, Oral Surgery&Medicine" category was selected from the "Web of Science Categories", and all publications were examined retrospectively. The "Pediatrics" subcategory was subsequently chosen within this category. Data from articles published in all pediatric dentistry journals indexed in the SCI-E were used in this study. Publications for which the primary author was affiliated with a Turkish university were selected for inclusion. Using the "Analyse Results" function of the software, the number of publications of the countries with the highest publication output, the distribution of their rankings, and Türkiye's position among countries were examined. Employing the "Citation Report" option, the total number of citations of the countries' publications, citation rate per publication, and H-index were obtained. The number of publications in pediatric dentistry originating from Türkiye was accessed by selecting "Türkiye" as the country of interest. Publications in this field were recorded according to their annual frequency. The distribution of articles and citation numbers, the volume of publications by the

university, information on the most frequently published articles, the types of publications from Türkiye, the SCI-E journals in which they were published, and the information on the institutions supporting these publications were examined. No language restrictions were applied in this investigation. The authors with the highest number of articles and citations were visualized with VOSviewer v1.6.20 (Leiden University, Leiden, The Netherlands), based on data from the WOS database. The data are presented as numerical values and/or percentages.

RESULTS

A total of 7,188 publications in pediatric dentistry were found in SCI-E journals in the WOS database.

The USA had the highest number of publications and total citations globally. Brazil and Italy followed in 2nd and 3rd positions, respectively. The USA ranked 1st in the H-index ranking, with Brazil and England occupying the 2nd and 3rd positions (Table 1). Türkiye was ranked 5th, contributing 361 publications (Figure 1). However, Türkiye's position in the H-index ranking was 9th and did not feature among the top 10 countries in the citation rate per publication ranking (Table 1).

More than half of the publications produced by Türkiye in the international arena were published after 2016 (Figure 2). Of the publications from Türkiye, 97.2% (n=351) were articles, 1.4% (n=5) were letters, 0.8% (n=3) were reviews, 0.28% (n=1) was an early access publication, and 0.28% (n=1) was a proceeding paper (Table 2). These publications

TABLE 1: Number of publications, total citations, citation rate per publication, and H-indices of countries (Top 10)

Countries	Publication counts	Total number of citations	Citation rate per publication	H-index
USA	2,214	24,639	11.13	58
Brazil	706	9,974	14.13	39
Italy	530	6,279	11.85	34
India	461	4,910	10.65	30
Türkiye	361	3,477	9.66	26
England	338	5,116	15.14	38
Israel	231	2,427	10.51	25
China	199	2,820	14.17	28
Australia	184	3,886	21.12	34
Canada	173	2,622	15.16	27

H-index: Hirsch-index

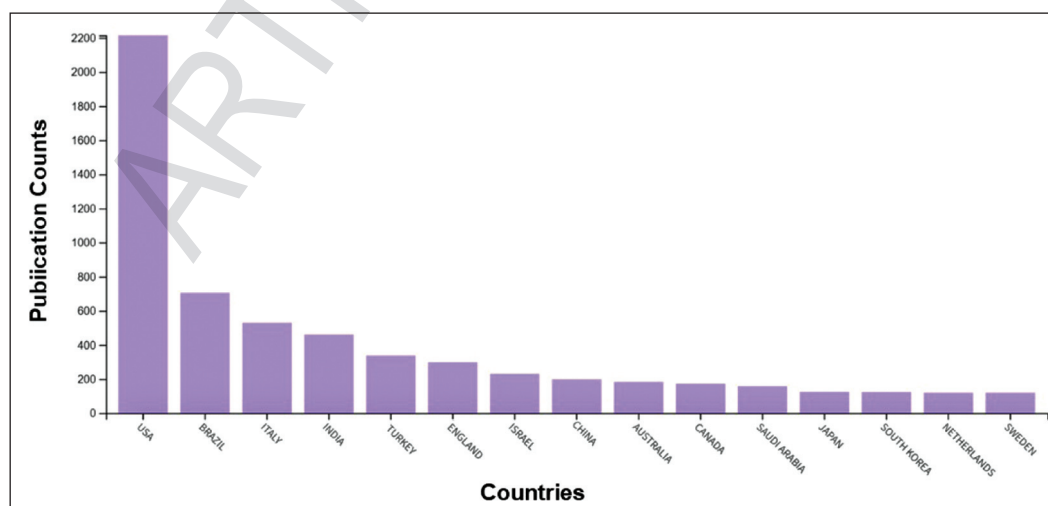


FIGURE 1: Number of publications by country

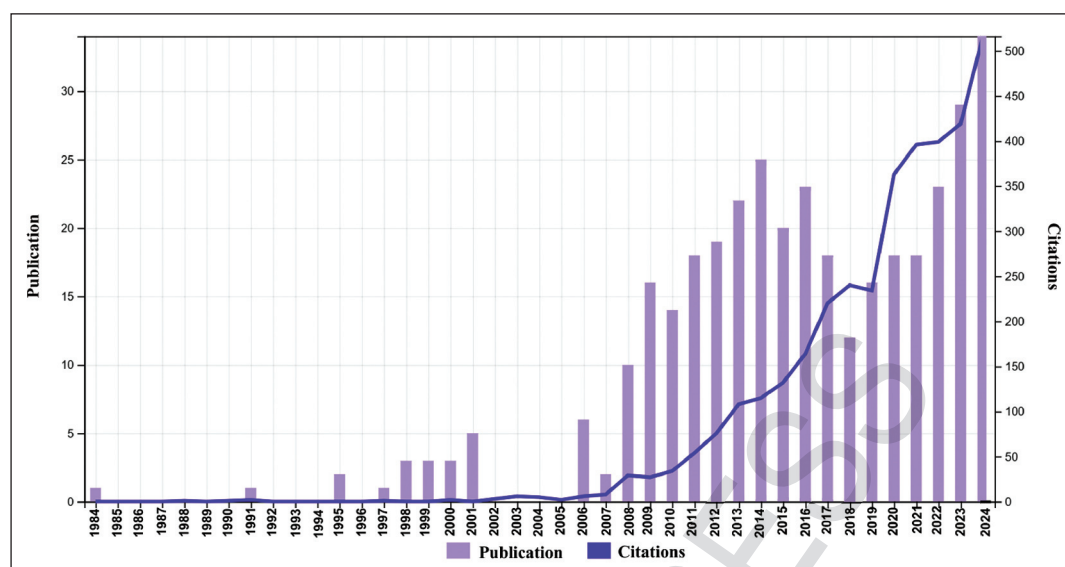


FIGURE 2: Distribution of publication and citation counts by year

TABLE 2: Document types of publications

Document types	Publication counts	%
Article	351	97.22
Letter	5	1.38
Review article	3	0.84
Early access	1	0.28
Proceeding paper	1	0.28

were disseminated in the Journal of Clinical Pediatric Dentistry, European Journal of Paediatric Dentistry, International Journal of Paediatric Dentistry, Pediatric Dentistry, and Journal of Dentistry for Children, respectively, in descending order of publication frequency (Table 3). Of the 361 studies conducted in Türkiye 58 (16.1%) received institutional support, with the Scientific and Technological Research Council of Türkiye being the primary funding body, followed by Marmara University, Akdeniz University, Başkent University, and Hacettepe University, respectively (Table 4).

The majority of publications originated from established and prominent universities in Türkiye, including Gazi University, Hacettepe University, Ankara University, Ege University, İstanbul University, and Marmara University (Table 5). Figure 2 illustrates the distribution of publications and citation numbers per annum. As of now 51 SCI-E publications have not yet received any citations.

The researchers who made the most significant international contributions to pediatric dentistry from Türkiye were Nuket Sandalli and Zafer C. Cehreli (Figure 3). The researcher with the highest citation count was Nuket Sandalli, a visualization of the num-

TABLE 3: Number of articles published in journals

Journals	Publication counts	%
Journal of Clinical Pediatric Dentistry	153	42,38
European Journal of Paediatric Dentistry	77	21,32
International Journal of Paediatric Dentistry	68	18,83
Pediatric Dentistry	44	12,19
Journal of Dentistry for Children	19	5,28

TABLE 4: Funding agencies supported the articles (Top 10)

Funding Agencies	Publication Counts	%
The Scientific and Technological Research Council of Türkiye	7	1,94
Marmara University	6	1,66
Akdeniz University	4	1,11
Başkent University	4	1,11
Hacettepe University	4	1,11
İstanbul University	4	1,11
Ankara University	3	0,83
Cumhuriyet University	3	0,83
Kocaeli University	3	0,83
Kırıkkale University	3	0,83

Affiliations	Publication counts	%
Gazi University	37	10,25
Hacettepe University	34	9,42
Ankara University	30	8,31
Ege University	28	7,76
İstanbul University	26	7,20
Marmara University	22	6,09
Erciyes University	20	5,53
Cumhuriyet University	19	5,25
Atatürk University	18	4,99
Ondokuz Mayıs University	16	4,43

DISCUSSION

Researcher	Publication Count
Cehret ZC	10
Sandalli N	10
Elbay M	9
Bayrak S	8
Bulduz B	8
Sari S	8
Elbay US	7
Kaplan A	7
Kaya E	7
Aulekci G	7
Ozbakas ME	7
Topcuoglu N	7
Yilmaz Y	7
Altoren O	6
Canlekli K	6
Copulu D	6
Karayilmaz H	6
Kargul B	6
Orhan K	6
Sen Tunc E	6
Seymen F	6
Taven PK	6
Tirali RE	6
Tutluglu N	6
Topcuoglu G	0

FIGURE 4: Authors with the most citations

duction of numerous and high-quality studies. The contributions of countries that recognize the significance of this matter to the scientific community have led to an increase in the number of articles published in pediatric dentistry and the rate of publication in indexed journals. This study represents the first bibliometric analysis evaluating SCI-E publications from Türkiye in this field.

The countries with the highest number of publications in pediatric dentistry were predominantly developed or developing nations. The USA, a significant global economic power, accounts for 30% of the total publications in this field. Türkiye ranks 5th in terms of publication volume. The economic development of a country and its investment in research and development (R&D) activities likely play a significant role in this outcome.¹⁹

The H-index remains one of the most commonly used tools for assessing the academic impact of researchers and institutions on both individual and national levels.²⁰ Although Türkiye, ranks 5th in the number of publications, is observed to be behind the countries that follow it in ranking when comparing the number of citations, the citation rate per publication, and the H-index. The well-established scientific backgrounds and global economic and scientific prominence of these countries may contribute to the perceived credibility of their publications.

It is imperative for nations to allocate a specific proportion of their budget to scientific R&D activities to establish a significant scientific and economic presence globally. According to 2023 statistics, the budgetary allocation for R&D activities in European Union countries exceeds that of Türkiye. Furthermore, it is evident that these countries dedicate a higher percentage and a greater absolute amount of their general budgets to R&D than Türkiye.²¹ Over the past 15 years, there has been a substantial increase in the number of publications in the field of pediatric dentistry in Türkiye. However, the citation rate per publication and the H-indices of countries ranked below Türkiye in the top 10 for publication volume may have surpassed those of Türkiye. This outcome may be attributed to the heightened interest in the subject matter of publications from other countries,

consequently leading to increased focus on these publications.

Economically robust nations' financial allocation to scientific research significantly influences the global visibility of their research outputs and enhances the likelihood of publication in prestigious journals. Nevertheless, the case of China, the world's second-largest economy, demonstrates that economic strength alone is insufficient to guarantee commensurate research impact. Despite China's substantial R&D budget, its publication and citation metrics are lower than those of Türkiye.¹⁹

The significance of publications extends beyond their quantity, encompassing the attention they garner and their relevance to researchers. Consequently, citations play a crucial role in assessing publication quality. Despite having more publications than England and Australia, Türkiye received fewer citations. This disparity may be attributed to the considerable interest generated by publications from these 2 nations.

This investigation was limited to utilizing the WOS database. Future investigations could broaden their scope by employing multiple databases and including studies from those sources. Additionally, this analysis focused on articles published in WOS-indexed journals within the pediatric dentistry field. Future studies could examine articles written by academics in pediatric dentistry that are published in journals categorized under different fields.

CONCLUSION

Türkiye has experience a steady growth in the pediatric dentistry publications. To promote the production of high-impact, well-cited research from Türkiye, the government should strength its support for academic institutions involved in research and development. Additionally, efforts should be made to expanding the presence of pediatric dentistry journals listed in international indices, and to encouraging greater citation of Turkish articles.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that pro-

vides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: Semih Ercan Akgün, İrem Okumuş; **Design:** Semih Ercan Akgün; **Control/Supervision:** Semih Ercan Akgün; **Data Collection and/or Processing:** Semih Ercan Akgün; **Analysis and/or Interpretation:** İrem Okumuş; **Literature Review:** Semih Ercan Akgün; **Writing the Article:** Semih Ercan Akgün; **Critical Review:** Semih Ercan Akgün, İrem Okumuş; **References and Fundings:** İrem Okumuş.

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