

ORIGINAL ARTICLE

Medicine Science 2020;9(4):901-6

Bibliometric analysis of journal articles indexed in TR Index published with a pediatric dentist author: A snapshot of 21st Century **Mustafa Sarp Kaya***Bezmialem Vakif Foundation University, Faculty of Dentistry, Department of Pedodontics, Istanbul, Turkey*Received 11 June 2020; Accepted 29 July 2020
Available online 08.10.2020 with doi: 10.5455/medscience.2020.06.102**Abstract**

Bibliometric profile of articles published by pediatric dentists from Turkey were investigated in this study. Records of articles written with a pediatric dentist author between 2000- 2019 indexed in TR-Index database were compiled. Recurrent records and articles without a pediatric dentist author were excluded. Abstracts and full texts of the articles were processed to gather data of; year published, language, article's area of interest (AoI), study design (Sd) and citation counts. Keyword co-occurrences were analyzed using VOSVIEWER® software. Spearman correlation analysis was performed between the numbers of dental schools, and number of published articles. Frequencies of categorical data were compared using chi square test. Differences between groups for continuous variables were assessed using Mann Whitney U test. $P < 0.05$ determined statistical significance. 512 articles were included. There was a positive correlation between the number of articles published and the number of dental schools who had started education ($r=0.79$, $p < 0.001$). The number of articles published in Turkish were more than English ($X^2=157.531$, 1) ($p < 0.001$). 300 of the articles were featured as research, 119 were reviews and 93 were case reports. Overall most frequently studied AoI was dental materials (23.8 %), followed by cariology/preventive dentistry (14.8%) and dental anomalies (10.2%). Laboratory research was the most preferred (26%) Sd, followed by literature review (23%), case reports (18.2%). Articles published in English were cited more than articles in Turkish ($p = 0.02$). Occurrences of the keywords were mostly nonspecific terms. Number of articles with pediatric dentist authors have been increasing remarkably since 2000. The increase in both the number of dental journals and the number of dental schools might have attributed to this trend. The next step for the authors of this field might be to branch out to less studied areas of interest and study designs to provide higher levels of evidence.

Keywords: Bibliometry, pediatric, dentistry, dentistry**Introduction**

Advances in communication and information technologies made accessing and citing scientific articles easier in the last 20 years beyond previous comprehension. Technological leap brought on an exponential increase in the number of journals and articles published [1]. Dentistry is no exception from this trend. Researchers in Dentistry from all around the world aspire to publish their scientific works in journals indexed in international scientific databases due to its prestige, visibility or for academic promotion criteria and citation metrics [2, 3].

Bibliometry can be described as applying mathematical and statistical analytics to scientific bibliographic data. Bibliometric studies present facts such as author, subject, citation metrics of published articles in a given field, journal, department, university or country.

The results of bibliometric studies can be used to measure publication activities, assess and arrange policies on science and provide insight of the research landscape [3, 4]. Data gathered can show frequently studied areas of interest, study designs, relevance of the subject in scientific arena via citation metrics and research networks focusing on specific subjects for collaboration. Results of bibliometric studies can help both researchers and administrators to plan for research fund management/ application, staff coordination and most importantly help avoid wasting time with repetitive research activity [5].

Previously bibliometric articles from health sciences have been published from Turkey, on medical specialties, nursing and dentistry [4- 8]. In dentistry, previous bibliometric studies published were reports on specific dental journals and another report on prosthodontic specialty [2, 3, 9, 10]

Pediatric dentistry as a dental specialty is relatively younger than prosthodontics, oral surgery or restorative disciplines both from history and patient's age perspectives. The pediatric dental care concept began in the early years of 20th century, with individual efforts of dentists who chose to specialize on the topic of

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providing oral care to children and adolescents. Discipline became institutionalized with organizations such as American Academy of Pediatric Dentistry in 1945 (USA), in 1952 British Society of Pediatric Dentistry (UK), in 1969 International Association of Dentistry for Children/ International Association of Pediatric Dentistry, 1990 European Academy of Pediatric Dentistry [11, 12]. In Turkey, The Turkish Society of Pediatric Dentistry was established in 1977 [13]. Physiological and psychological differences between adults and children grant quite a large area of interest to the specialty [1].

According to our literature search no previous study was found assessing the bibliometric performance of pediatric dentistry in Turkey. This study aimed to investigate the bibliometric profile of articles published by pediatric dentists from Turkey, in order to inspect; the research areas of interest, study design and to describe the current research landscape of the field.

Material and Methods

This was a descriptive retrospective bibliometric study. Literature search was performed on April 1st 2020 in TR Index Database and EBSCO Database TR Index. The search string was: Author Affiliation= ("pedodonti" or "çocuk diş hekimliği" or "pediatric dentistry" or "pedodontics") articles were filtered to be published between 2000- 2019. Records of Title, Journal name, year published, abstract, keywords in Turkish, language of the text were retrieved (xls and bibtex file format). Data sets of the same string search from TR Index Database and EBSCO TR Index were combined in order to avoid missing articles due to database errors. Repeating records were excluded from data analyses using find duplicates function in Endnote (Version X8.1 Philadelphia, PA,

US) and also manually. Records of the studies were also checked whether it included a pediatric dentist from Turkey as an author and the ones without were excluded. Resultant number of articles were primary output variable which aimed to measure the quantity of the articles published in TR Index by the researchers of pediatric dentistry.

Additional information such as number of authors, affiliation of the first author, affiliation of the journal, article type, article's area of interest and study design, date of submission and date of acceptance, age of study sample, and keywords in Turkish were gathered from abstracts and full texts. Author and journal affiliation was recorded according to the name of the University. Citation counts were obtained from Google Scholar records.

Duration of article review was calculated by subtracting the date of submission from the date of acceptance. Article study design and area of interest were categorized according to Poletto et al. [14] (Table 1). Studies which used human data, were categorized according to the sample's ages (child: 0-12 years, adolescent: 12- 18 years, 18- and their combinations). To assess the effect of journal preference of authors, manuscripts were categorized as the ones whose first author and institution of the journal publishing the article were the same and those whose were not.

Turkish keywords used by authors were manually entered to records in Endnote and exported for co-occurrence analysis (in. ens file format). Keyword co-occurrences were analyzed and graphically mapped using VOSVIEWER (Version 1.6.15) bibliometric software [15]. Keywords with more than 5 occurrences were mapped and binary count was used to avoid the effect of repeating terms. Keywords in figure 5 were edited to be presented in English.

Table 1. Study design and area of interest categories

Study design		Areas of interest	
1.	Case Report and Series of Cases	1.	Behavioral Guidance
2.	Cohort and Control Case	2.	Cariology / Preventive dentistry
3.	Cross-sectional Study	3.	Dental anomalies
4.	Expert Opinion	4.	Dental Erosion
5.	Laboratory Research	5.	Dental materials
6.	Literature Review	6.	Dental trauma
7.	Non Randomized Clinical Trial	7.	Dentition growth / development
8.	Randomized Clinical Trial	8.	Endodontics
9.	Retrospective	9.	Microbiology
10.	Systematic Review and Meta-analysis	10.	Oral Pathology
11.	Unclear	11.	Orthodontics
		12.	Periodontics
		13.	Sedation/ General Anesthesia
		14.	Special Patients
		15.	Syndromes and genetics
		16.	Others

Statistical analysis

Statistical analyses of the data was performed using IBM Statistical Package for Social Sciences software (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY). Distribution of normality was tested by Shapiro Wilk's test. Median and (minimum- maximum, quartile) was used to summarize quantitative continuous variables. Qualitative categorical variables were summarized using frequency and percent values. Spearman correlation analysis was performed to assess relationship between the numbers of dental schools, and number of published articles. Pearson chi-square was used to assess statistical difference between number of articles in English and Turkish, between the number of articles submitted from inside or outside the journal's institution, between number of articles with child sample and adolescent sample. Mann Whitney U test was used to compare revision duration and citation count according to article language.

Intraclass correlation coefficient; based on a single rater, absolute agreement, 2 way mixed effects model was used for intrarater reliability analysis. Author categorized 100 articles from the sample according to study design 1 week apart to assess his methodology reliability. $P < 0.05$ was determined for statistical significance.

Results

A total of 1239 article records were retrieved from TR Index and EBSCO Search Engine TR index. Both datasets were reviewed for recurrent records and sieved according to inclusion and exclusion criteria. 512 articles were assessed for descriptive bibliometry (Figure 1). From year 2000 to 2019 median number of published articles yearly was 19.5 (min: 5- max: 62) (Figure 2). Number of published articles significantly correlated to number of dental schools who had started undergraduate education ($r=0.79$, $p=0.00024$). The number of Turkish articles was significantly higher than the number of those in English ($X^2=157.531$, 1) ($p < 0.001$). The number of authors ranged from 10 to 1 with a median of 3. Affiliate Institutions of the first authors were mostly dental schools ($n=479$); Gazi University Dental School ($n=46$), Ankara University Dental School ($n=38$) and Ondokuz Mayıs University Dental School were in the top three. Articles were published in 53 different journals, majority were dental journals: Atatürk University Dental Journal ($n=118$), Gazi University Dental Journal ($n=67$), Hacettepe University Dental Journal ($n=47$) ranked at the top three for the journals which published an article with a pediatric dentist as an author most recurrently. 300 of the articles were featured as research, 119 were reviews and 93 were case reports. Most frequently studied area of interest was dental materials (23.8%), cariology/preventive dentistry (14.8%) followed by dental anomalies (10.2%). Most preferred study

design was laboratory research (26%), followed by literature review (23%), case report and series of cases (18.2%) (Figure 3). More than half of the articles did not have human sample ($n=253$), majority of the studies with human samples were children below 12 (48.8%) whereas only a fraction of the studies had a sample between 12- 18 years of age (13.3%) (Figure 4). Number of articles with a sample consisting of children were higher than those consisting of adolescents ($X^2=50.286$, 1) ($p < 0.001$).

Reviewer assessment duration ranged from 2- 910 days with 91 median ($Q3=168$). Number of articles submitted by a first author outside the publishing journal's institution ($n=334$) were significantly higher than those submitted from the same institution ($n=178$) ($X^2=47.531$, 1) ($p < 0.001$). Duration of revision was significantly higher for articles written in English (median: 85 days (0- 910)) than Turkish (median: 65 days (0- 539)) ($p < 0.01$). Overall median citation count was 0 (ranged from 0- 43). Articles written in English (median: 2 (0- 15)) received more citations than Turkish (median: 1 (0- 43)) ($p=0.02$).

Out of 1096 keywords, 35 were mapped that were over the minimum of 5 occurrence threshold, (Figure 5). Colors represent different keyword clusters and keyword frame sizes represent occurrence weight. 6 clusters were identified in this article sample with 85 links between keywords. Occurrences of the keywords in the top 10 were nonspecific mostly terms such as child, dentistry, pediatric dentistry but dental caries (rank 3) and fluoride (rank 5) were also used often. Nonspecific keywords even contained synonyms and singular and plural form of the same term in Turkish.

The intra-rater reliability of the study design rating was 0.818 (95% CI: 0.740-0.875) which indicated good reliability

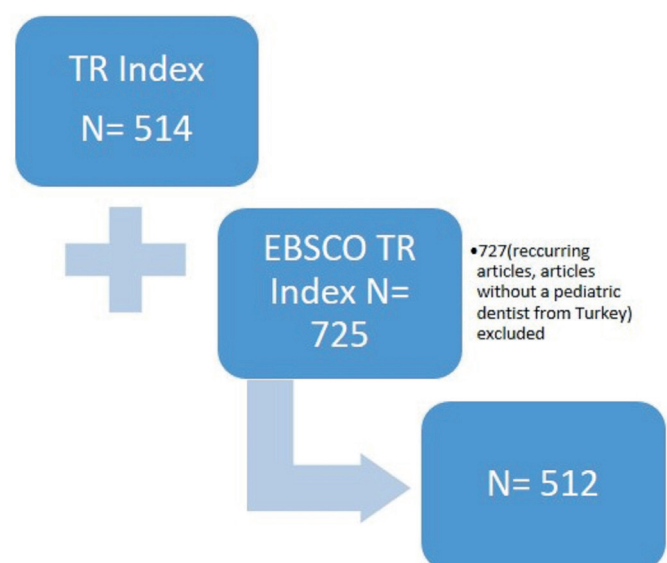
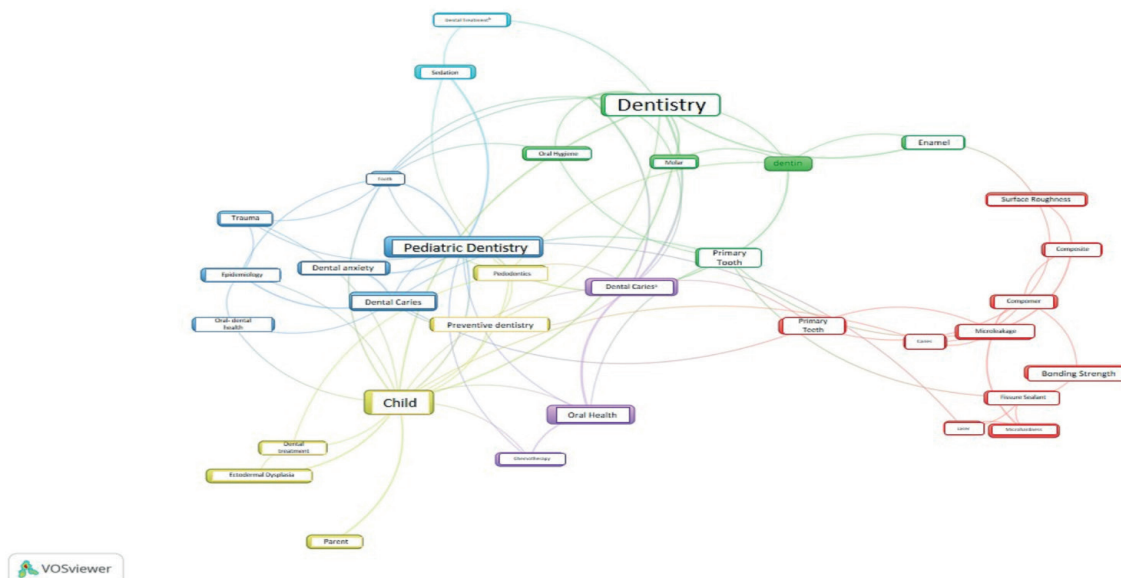
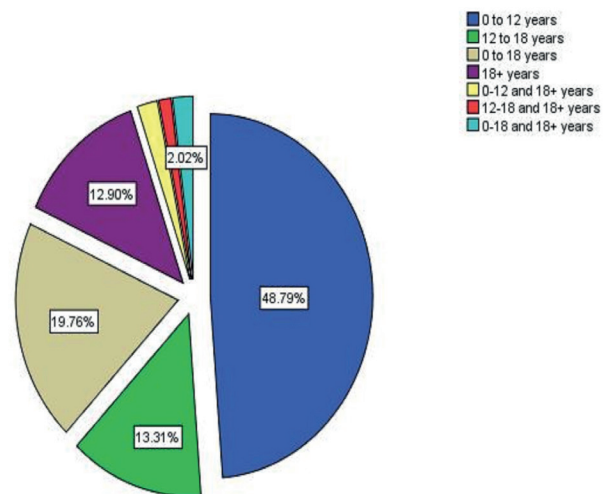
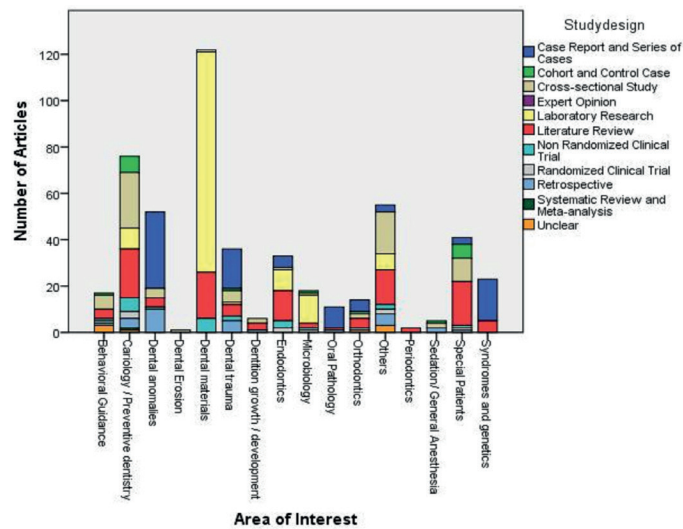
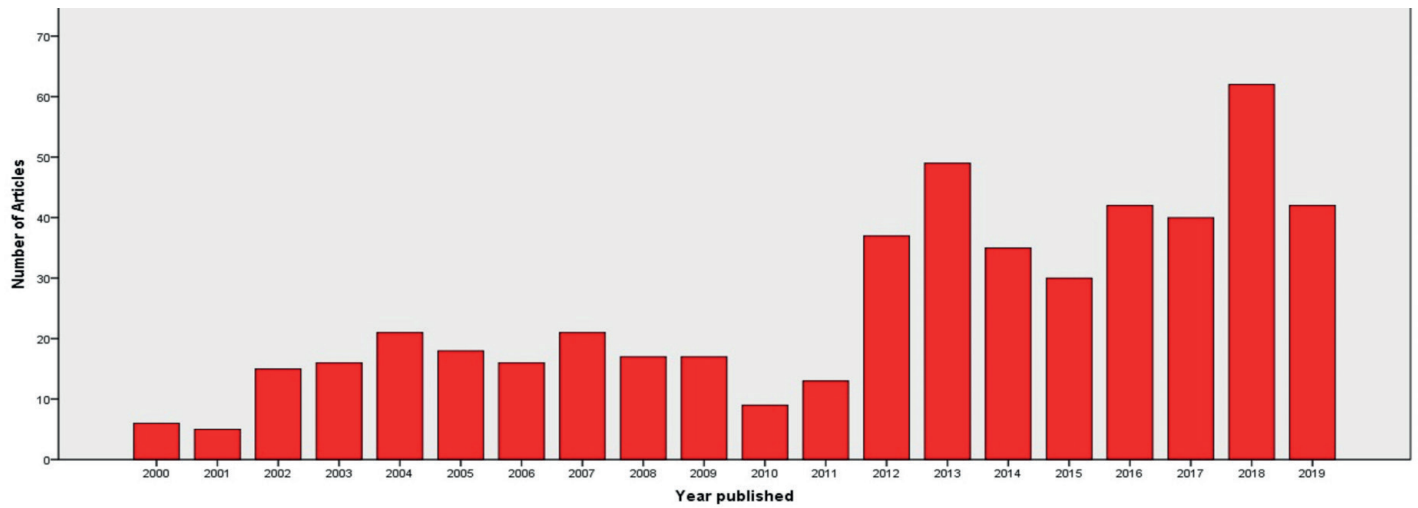


Figure 1. Flowchart of the study data set



Discussion

Tremendous increase in the number of published scientific articles necessitates a revision of the works to gain a perspective of the field through bird's eye view for research and resource planning. A bibliometric analysis of articles published with a pediatric dentist author was performed in this study to describe the what, how and where of research output of pediatric dentistry in Turkey.

Number of articles from Turkey shows an increasing trend since 1996, leading the country's rank in the ISI Web of Science to the first 20 according to a report published in 2015. Number of international citation to articles published from Turkey is reported to be increasing also [16]. In the last 20 years in order to increase number of physicians, new medical and dental schools were established. From 2000 to 2020 number of dental schools increased from 15 to 73 in Turkey [17, 18]. An upward trend was detected in number of articles published since 2000 in TR Index. Number of institutions correlated to this scientific output. Since 2016, the criteria for applying to an associate professor position require the candidate to present a more comprehensive scientific resume which includes a previously overlooked facet, articles in national scientific database TR- Index. Uptick in the number of articles published in the index might be related to this policy also.

From study design perspective; most frequently used methodology were laboratory studies followed by reviews, case reports and cross- sectional studies. Previous bibliometric studies from USA and Brazil reported a similar preference by the researchers with more frequent output case reports and literature reviews [14, 19]. From Turkey Onat et al. [10] and Aydin et al. [3] in their bibliometric studies of separate dental journals revealed that about two thirds of the articles published were comprised of reviews and case reports. In our data set unstructured reviews were preferred rather than systematic reviews/ meta analyses which are superior in terms of evidence level. Although, study designs ranking higher according to evidence based dentistry cannot be applied to all hypothesis testing or study, encouraging systematic reviews might be a step to improve quality in the field.

Areas of interest in the previous pediatric dentistry bibliometric profiles were similar with changes in ranks with our findings. Poletto et al. [14] from Brazil reported cariology and preventive dentistry as the lead, followed by dental materials. Nainar et al. [19] from USA showed also a similar subject distribution.

Pediatric dentistry departments in university clinics in Turkey mostly provide dental treatments for children below 12 and older children are treated adult clinics. Majority of the studies with human samples were performed with children below 12. Considering variability of sample groups in studies performed by pediatric dentists such as: seniors, special needs groups, in the future more attention should be directed to adolescent oral health needs due to their unique Bio-psycho-social features. As a similar notion Poletto et al.[14] ranked articles with adolescents as area of interest in their study.

Peer review process is the pillar of scientific integrity. From author's

perspective unnecessary delay in article evaluation process risk the scientific work of losing its originality or significance. According to our research most of the articles were revised less than 5 months. The length of this process might be effected by many other factors such as quality of the manuscript, novelty of the study, availability/ schedule of the reviewers and even editorial structure of the journal submitted [20]. In a previous study assessing the bibliometric profile a journal indexed in TR Index duration of revision was reported to range between 2-4 months [10]. In their bibliometric profile study of another dental journal Koprulu et al. in 2005 pointed a preference by the authors for submitting their work to the journals published by their institution and suggested policies to encourage researchers to publish in journals not affiliated to their institution [9]. Similarly Onat et al. pointed out that the dental journal they were inspecting published more articles submitted by authors from their own institution than from outside [10]. According to our analysis the academic landscape has diversified from this aspect considering majority of the first authors were not affiliated to the journal publishing their work.

In recent years new approaches which can provide graphical representations for co-occurrence of terms and authors to display connections have emerged beside descriptive statistical presentations in bibliometric studies [5,14,21]. In our study, keyword co-occurrence of articles showed use of multiple nonspecific even synonymous terms. This might be caused by the irregular policies which regulate suggestion of keywords according to predefined lists in some journals and which leaves author's suggestion of keywords completely unregulated in the others. Although "dental materials" is the most frequently studied area of interest, keywords related to this field had a low level of occurrence. Regulating suggestions for article keywords might guide authors to classify their research according to their originality and help to gain more visibility.

Our choice to limit the database search to TR Index might have restricted the study's ability to fully demonstrate the state of the field. Majority of the scientific work is submitted to journals indexed in international databases especially Web of Science since publishing in these journals are preferred by the academics for performance reviews [2, 9]. But this restricts the scientific work to be disseminated mostly in English. Although this strategy seems beneficial for reaching a worldwide reader base which might have affected the higher citation counts over the articles published in Turkish. Publishing content solely in English also might block Turkish speakers with limited/ non English capabilities such as undergraduate students or laypeople from accessing. Considering the incessant bombardment of free speech sanctioned unfiltered personal views and singular "expert opinions" increase in number of peer reviewed open access scientific articles reachable to the public might help bridging the gap between experts and the public in pediatric dentistry.

The number of articles with pediatric dentist authors have been increasing remarkably since 2000. The increase in both the number of dental journals and the number of dental schools might have attributed to this trend. The next step for the authors of the field might be to branch out to less studied areas of interest and study designs supporting higher levels of evidence.

Conflict of interests

The authors declare that they have no conflict of interest and any financial disclosures.

Financial Disclosure

The financial support no have.

Ethical approval

This study does not include human or animal subjects

Acknowledgements

The author wishes to thank Onur TANKAYA, MD for his critical review of the manuscript.

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