A bibliometric analysis of publications on emergency medicine in Türkiye

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Abstract:

OBJECTIVES: Publications and literature related to emergency medicine (EM) have been consistently increasing. There are 4048 studies in total in the EM journals published until the present day in Türkiye in the Web of Science (WoS) database. Our aim is to define the bibliometric features of scientific studies published in EM journals in Türkiye, to gain insights into the trends of the literature.

METHODS: We retrospectively analyzed the bibliometric data of scientific studies published in EM journals in Türkiye until today on the WoS database related to the EM field. The bibliometrix package of R statistical software was used in the bibliometric analyses in the study.

RESULTS: A total of 4048 scientific studies from Türkiye indexed on the WoS database from 10,263 authors in four different journals were analyzed. Among these, 3681 (90.9%) were articles, 188 (4.7%) were reviews, 97 (2.4%) were editorial material, 60 (1.5%) were letters, and 5 (0.1%) were corrections. Average number of citations per study was 3.6, with the most cited study having 2016 citations. The most frequent title's words were emergency, patient, and acute.

CONCLUSION: This study shows that there is an increasing trend in the number of EM publications and citations in Türkiye with the first most cited study having 2016 citations, and the top contributing countries were Türkiye, Iran, and India. The results of this study may be useful in understanding the historical and prospective development of EM, including the identification of general information about its publications, differentiation of the top-cited ones, and presentation of a bibliometric analysis of scientific activity to date.

Keywords:
Bibliometric analysis, emergency medicine, publications, Türkiye

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Introduction

Emergency medicine (EM) residency program was first established in the United States in 1972. EM is a rapidly growing discipline in Türkiye since its establishment in 1993.[1] Since its establishment in Türkiye, the number of institutions providing residency training has been increasing daily. In Türkiye, there are 105 institutions providing residency training and approximately 3500 EM specialists.[2] When we look at scientific journals in the

field of EM from Türkiye, the *Turkish Journal of Trauma and Emergency Surgery* was founded in 1995 and indexed in 2007 in the Web of Science (WoS). The *Turkish Journal of EM* was founded in 2000 and indexed in 2006 in the WoS. The *Eurasian Journal of EM* was founded in 2003 and indexed in 2006 in the WoS. The *Journal of EM Case Reports* was founded and indexed in 2010 in the WoS. In the period that has passed until today, the contribution of EM to the current medical literature has also been gradually increasing. When we evaluate the past literature summaries, in a study evaluating the contribution of EM to the literature in

Box-ED section

What is already known on the study topic?
- There are various bibliometric analyses in the literature on emergency medicine, but there is no bibliometric analysis of the studies published in Turkish scientific journals indexing the Web of Science database.

What is the conflict on the issue? Has it importance for readers?
- The publications in the field of emergency medicine in Türkiye are important in terms of providing information and foresight about the most cited articles and studies carried out so far.

How is this study structured?
- This is a retrospective bibliometric study including all 4048 publications in the WoS database in the field of emergency medicine from journals published in Türkiye.

What does this study tell us?
- This study shows all 4048 publications from four different scientific journals from Türkiye indexed in the WoS database and their bibliometric features such as number of citations, document type, and most frequently used keywords.

the first 10 years between 1993 and 2004, there were 84 articles in total, while there are 4048 studies in total when we look at the EM journals published until the present day in Türkiye in the WoS database.[3] Our aim in this study was to define the bibliometric features of scientific studies published in EM journals in Türkiye, to gain insights into the trends of the literature.

Methods

Study design
We retrospectively analyzed the bibliometric data of scientific studies published in EM journals from Türkiye indexed in the WoS database until today.

Selection of sample
The WoS database allows the selection of subcategories such as subjects, journals, and region selection.[4] All publications, available in Clarivate Analytics' WoS database, in the EM field until the current date were selected. Results were then refined to articles from Türkiye and then in the final to four journals that publish in this category. All publications from these four journals were included and analyzed.

Methods and measurements
While creating the dataset, "EM" was selected as a subcategory through the WoS search engine on December 18, 2023, and no date range was specified to gather all data on the database, since all publications of EM journals published in Türkiye would be included. According to the data obtained, it was seen that the first study in the WoS database was in 2006. Among the four scientific journals indexed in the WoS database, all were open-access journals; the *Turkish Journal of Trauma and Emergency Surgery* was indexed in the Science Citation Index Expanded, while the *Turkish Journal of EM*, *Eurasian Journal of EM*, and *Journal of EM Case Reports* were indexed in Emerging Sources Citation Index, and the data of all scientific studies from these were analyzed. Language selection was not specified in the published scientific studies. As this research was conducted with electronic bibliometric data from the WoS database and did not involve any patient data, ethical committee or institutional review board approval was not required.

Outcome measures
The primary outcome was the number of publications, citation counts, and frequency of publications in the EM field in Türkiye. Secondary outcomes were the authors, countries, and keywords identifying common characteristics of the studies, publication index, and a look at the characteristics of the 10 most cited articles.

Data analysis
Bibliometric analysis includes WoS categories, publication types, scientific index, number of authors, number of citations, keywords, references, language, region, and journals in which the publications were published. The author information, publication journal, year of publication, and citation details of the top 10 most-cited studies were also examined. A word cloud matrix was created using bibliometric features of the data. The bibliometrix package of R statistical software (R Core Team, Vienna, Austria) was used in the bibliometric analyses in the study.[5]

Results

A total of 4048 scientific studies from four different journals were included in the analysis. While the total number of authors in these publications was 10,263, there were 186 studies published with a single author. The total number of publications was 34 in 2006 and 235 in 2023. The year with the highest number of publications was 2022 with 398 studies.

In terms of the number of citations per year, the highest number of citations was in 2022 with 398 citations, the mean total citations per both article and year was the highest in 2018. Details on number of citations per year are presented in Table 1.

Regarding the types of publications in this study, 3681 (90.9%) were articles, 188 (4.7%) were reviews, 97 (2.4%) were editorial material, 60 (1.5%) were letters,

and 5 (0.1%) were corrections. Of the published studies, 3230 (79.8%) were in English and 818 (20.2%) were in Turkish [Table 2].

Table 1: Average citations of publications per year

Year	Number of total citations (*n*)	Mean total citations per article (*n*)	Mean total citations per year (*n*)
2006	34	2.88	0.16
2007	126	3.66	0.22
2008	139	3.67	0.23
2009	206	5.16	0.34
2010	225	5.19	0.37
2011	252	4.61	0.35
2012	253	3.25	0.27
2013	270	3.15	0.29
2014	258	3.82	0.38
2015	241	4.15	0.46
2016	231	4.45	0.56
2017	207	3.83	0.55
2018	235	12.64	2.11
2019	227	2.88	0.58
2020	272	2.21	0.55
2021	239	1.21	0.4
2022	398	0.59	0.3
2023	235	0.14	0.14

Table 2: General characteristics and analysis of the publications reviewed in the study

Information	*n*/*n*(%)
All publications, *n* (%)	4048 (100)
Article	3698 (91.4)
Editorial material	97 (2.4)
Letter	60 (1.5)
Review	188 (4.6)
Correction	5 (0.1)
Publication's index (*n*)	
SCIE	1994
ESCI	2054
Journal's publications (*n*)	
Turkish Journal of Trauma and Emergency Surgery	1994
Eurasian Journal of EM	818
Turkish Journal of EM	677
Journal of EM Case Reports	559
Authors (*n*)	
Total number of authors in all articles	10,263
Number of authors, who published an article as a single author	151
Coauthoring (*n*)	
Number of publications with a single author	186
Average number of coauthors in publications	4.72
Publication's contents (*n*)	
Keywords plus (ID)	4285
Author's keywords (DE)	7614
References (*n*)	
Total number of references	62,889
Average citations per publication	3.637

SCIE: Science Citation Index Expanded, ESCI: Emerging Sources Citation Index, EM: Emergency medicine

In terms of the countries where the research studies were conducted, the top contributing countries were Türkiye (*n* = 3230, 79.8%), Iran (*n* = 114, 2.8%), India (*n* = 86, 2.1%), South Korea (*n* = 43, 1%), and China (*n* = 41, 1%). In terms of contributing authors, Türkiye (*n* = 7885), Iran (*n* = 291), India (*n* = 150), the United States of America (*n* = 104), and the Republic of Korea (*n* = 93) contributed the most. Contributions of the countries per author are presented in Figure 1.

The institutions with the highest number of published studies were University of Health Sciences (*n* = 395, 9.75%), Istanbul University (*n* = 260, 6.42%), Gulhane Military Medical Academy (*n* = 173, 4.27%), Selcuk University (*n* = 166, 4.10%), Ankara Numune Training and Research Hospital (*n* = 165, 4.07%), Dicle University (*n* = 152, 3.75%), Dokuz Eylul University (*n* = 144, 3.55%), Akdeniz University (*n* = 139, 3.43%), Ataturk University (*n* = 136, 3.35%), and Ege University (*n* = 133, 3.28%).

While the average number of citations per study was 3.6, the most cited study had 2016 citations. The number of articles published in journals, H-index, G-index, total number of citations, and average number of citations are shown in Table 3. These are academic evaluation methods in which productivity is measured according to the number of publications and citations.

Regarding the top 10 most-cited studies analyzed, the first most-cited study had 2016 citations, while the second and third most-cited studies had 133 and 106 citations, respectively. Other characteristics of the most-cited studies are shown in Table 4.

The most frequently used "Keyword plus," "Author's keywords," and "Title's words" were also analyzed and shown in Figure 2. Common words most frequently used as Keywords Plus were Management, Mortality, and Diagnosis, Author's keywords were Emergency Department, Trauma, and Mortality, and Title's words were Emergency, Patient, and Acute, respectively.

Discussion

While the average number of authors per study in the world medical literature is 4.4, the average number of authors per publication in our study is 4.7, which is comparable to the world average.[6] A bibliometric study analyzing EM field publications between 2008 and 2017, as published by Kokulu *et al.*, reveals that Türkiye holds the 4th position among other countries in terms of contributions to the EM literature.[7]

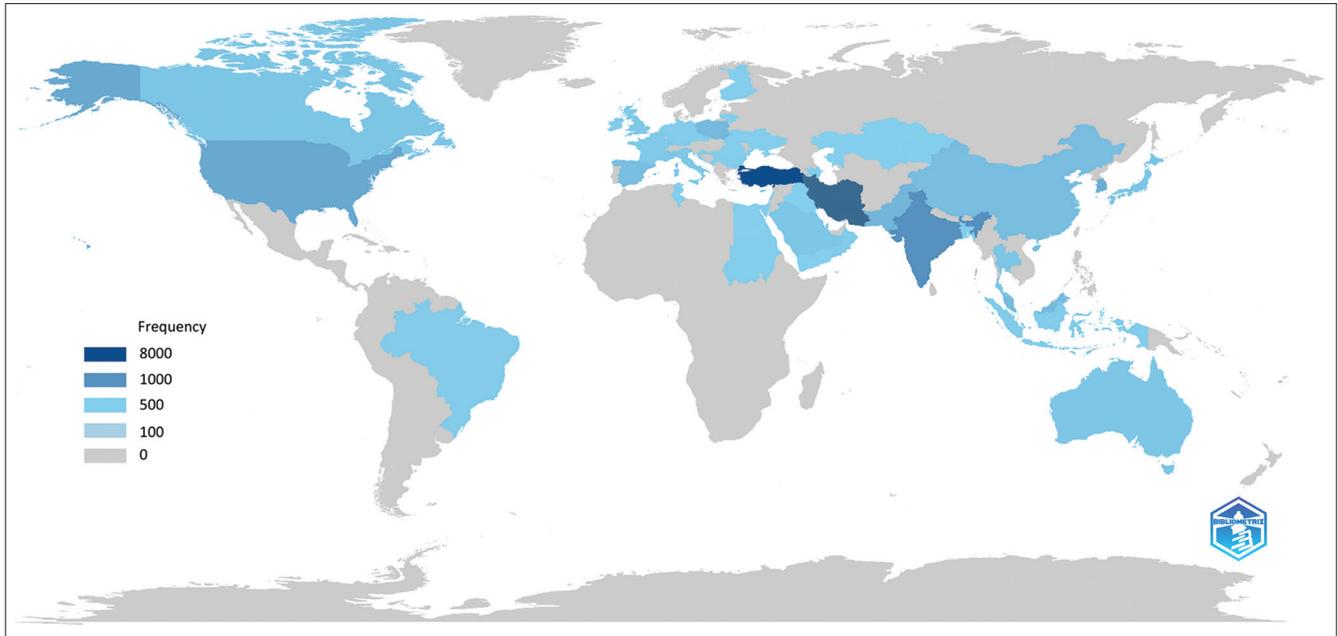Considering the annual distribution of the number of studies, while the average number of studies per year

Figure 1: Worldwide distribution of scientific production by country

Figure 2: Word cloud analysis. Size of the word indicates the frequency

Table 3: Citation analysis of the journals

Journal	H-index	G-index	Number of publications	Total citations	Average citations per publication
Turkish Journal of Trauma and Emergency Surgery	27	36	1994	9261	4.64
Turkish Journal of EM	19	55	677	4305	6.35
Eurasian Journal of EM	10	13	818	949	1.16
Journal of EM Case Reports	5	5	559	208	0.37

EM: Emergency medicine

is 225, this number is 398 in 2022, the year in which the highest number of studies were published. The reason for this increase might be due to the increase in the frequency of publication of the *Turkish Journal of Trauma and Emergency Surgery*, which contributes the most in terms of the number of studies among these journals, as of 2022, and the increased interest in the field of EM and the number of scientific studies conducted in this area over time.

Our study reveals that the mean total citations per article and year were the highest in 2018. This increase can be attributed to two reviews published in 2018 in the *Turkish Journal of EM*. On examining these articles, it is evident that studies related to statistical analysis occupy the first two ranks among the 10 most-cited studies. The reason for this may be that statistical analysis is also used and of interest in fields other than EM.

Among the top 10 most-cited studies, three focused on acute appendicitis, and one other about spinal cord injury in animal models was from the *Turkish Journal of Trauma and Emergency Surgery*. Although indexed under the EM category, the journal is dedicated to trauma and emergency surgery, which might contribute to a higher citation rate in those subjects, especially when considering academics in the fields of surgery and anesthesiology. In addition, acute appendicitis is one of the most common abdominal emergencies, and the

Table 4: General characteristics of the 10 most-cited studies

Author	Journal	Year	Article title	Total citations	Normalized total citations*	Average citations per year†	Document type
Akoglu, H.	*Turkish Journal of EM*	2018	User's guide to correlation coefficients	2016	159.46	336	Review
Dogan, N.O.	*Turkish Journal of EM*	2018	Bland–Altman analysis: A paradigm to understand correlation and agreement	133	10.52	22.17	Review
Kahramanca, S. *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2014	Neutrophil-to-lymphocyte ratio as a predictor of acute appendicitis	106	27.1	10.6	Article
Turhan, A *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2009	Comparison of operative and nonoperative management of acute appendicitis	91	17.65	6.07	Article
Orhon, R. *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2014	Comparison of trauma scores for predicting mortality and morbidity on trauma patients	54	14.13	5.4	Article
Sevinc, M *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2016	Diagnostic value of basic laboratory parameters for simple and perforated acute appendicitis: an analysis of 3392 cases	53	11.9	6.63	Article
Kavakli H *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2011	Antioxidant effects of curcumin in spinal cord ınjury in rats	46	9.98	3.54	Article
Saadat, S *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2011	The ıncidence of peripheral nerve ınjury in trauma patients in Iran	45	9.76	3.46	Article
Gok, A.F.K *et al.*	*Turkish Journal of Trauma and Emergency Surgery*	2020	Recommendations for trauma and emergency general surgery practice during the COVID-19 pandemic	43	19.46	10.75	Review
Erenler, A.K *et al.*	*Turkish Journal of EM*	2014	Reasons for overcrowding in the emergency department: Experiences and suggestions of an education and research hospital	40	10.47	4	Article

*Normalized total citations are the average number of times an article is cited per year since its publication. It is calculated by dividing the citation count by the number of years after publication of the article, †Average citations per year are calculated by dividing the total number of citations by the number of years the journal has been publishing papers. EM: Emergency medicine

high prevalence, clinical complexity, and diagnostic challenges of the subject may also have contributed to the substantial number of citations.

Another notable finding of the study is that the majority of the published studies are published in English. This shows that researchers in Türkiye aim to reach and influence a wider audience in the international arena.

When the countries contributing to the studies are examined, it is seen that there is a high rate of studies and authors originating from Türkiye. This may indicate that collaborative studies might have been published in other scientific journals located outside of Türkiye.

Although the University of Health Sciences is observed as the institution producing the highest number of studies, there are a total of 60 individual training and research hospitals in Türkiye, with 25 located in Istanbul, 15 in Ankara, and 18 in other cities across the country; they are gathered under a single name in the WoS database.

The average number of citations per study is 3.6 in this analysis. In a study by Cetin *et al.* examining EM publications worldwide in the last 10 years, the average number of citations per study was 11.7.[8] Factors such as language choice, research design, methodology, publication strategies and the level of international collaboration may be underlying this difference. This suggests that EM studies in Türkiye have the potential to receive more citations on a global scale.

Based on the studies, when the performance of four journals in the field of EM in Türkiye is evaluated, the *Turkish Journal of Trauma and Emergency Surgery* stands out with its high H-index and overall number of publications, while the *Turkish Journal of EM* stands out with its average number of citations per publication and G-index. This assessment can guide researchers in journal selection and help them better understand the performance of journals.

When the most commonly used words are analyzed, it is seen that these words are mostly words reflecting general medicine (management, mortality, and diagnosis) but also reflect the characteristics and dynamics of EM (emergency and acute).

Limitations

Similar to other bibliometric studies, this study has some important limitations. Only journals in the WoS database

were used. This may cause studies published outside of WoS to be unrecognized. In the WoS database, other article types such as case series and case reports are also included under the article category besides the original research paper, which may have affected the expected number of citations per publication. Another limitation is that the *Turkish Journal of Trauma and Emergency Surgery* includes other subsections besides EM, like surgery.

Conclusion

This study shows that there is an increasing trend in the number of EM publications and citations in Türkiye with the first most-cited study having 2016 citations, and the top contributing countries were Türkiye, Iran, and India. The results of this study may be useful in understanding the historical and prospective development of EM, including the identification of general information about its publications, differentiation of the top-cited ones, and presentation of a bibliometric analysis of scientific activity to date.

Author contributions statement
- Mustafa Can Güzelce: Conceptualization, methodology, formal analysis, investigation, Writing - Original Draft, Review and Editing, Supervision, Project administration
- Ertuğ Orhan and Sefer Özgür: Conceptualization, methodology, investigation, software, resources, data curation, visualization, writing – review and editing.

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