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## Comparison of performances of top emergency medicine journals in terms of COVID-19 publications in 2020

Ali Kemal Erenler, MD<sup>a,\*</sup>, Ahmet Baydin, MD<sup>b</sup>

<sup>a</sup> Hitit University, School of Medicine, Department of Emergency Medicine, Çorum, Turkey

<sup>b</sup> Samsun Ondokuzmayıs University, Department of Emergency Medicine, Samsun, Turkey

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### ABSTRACT

**Introduction:** The aim of this study is to evaluate the qualitative and quantitative contribution of Emergency Medicine (EM) journals to scientific literature on COVID-19 and compare the journals in terms of publications.

**Material and methods:** We performed a comparison of top EM journals by hand-search in terms of COVID-19 publications and citations between January 1st and December 31st, 2020. Publications were also categorized according to research field, country and article types. Data were given as numbers and percentages.

**Results:** Among 18 EM journals, Resuscitation ranked in the first place and American Journal of Emergency Medicine ranked in the last place according to Impact Factor. In these journals, 512 (12.2%) articles related to COVID-19 were published. The American Journal of Emergency Medicine and Internal and Emergency Medicine published the greatest amount of publications related to COVID-19 ( $n = 71$ ). The American Journal of Emergency Medicine was also the leading journal in terms of “Total Citations to COVID-19 Articles” ( $n = 1192$ ). Western Journal of Emergency Medicine published the greatest proportion of COVID-19 articles (Total COVID-19 Articles/Total Articles = 0.3). World Journal of Emergency Surgery ranked in the first place in terms of citations per COVID-19 articles ( $n = 33.2$ ). The most common studied field was Effects of COVID-19 on the Health System ( $n = 222$ ). The US was the most productive country with 188 COVID-19 publications and 1411 citations to these publications, followed by Italy.

**Conclusion:** The contribution of EM journals to COVID-19 literature is controversial. “Effects of COVID-19 on the Health System” is the most studied field. “Clinical Properties, Ethical Issues and Treatment Methods” are neglected fields in EM journals.

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## 1. Introduction

A series of pneumonia cases of unknown origin were identified in Wuhan, China in December 2019. Then, the etiological agent was defined as the 2019 novel coronavirus (2019-nCoV). The disease was recently declared by the World Health Organization (WHO) as coronavirus disease 2019 (COVID-19) and a pandemic [1]. The research community has responded rapidly to this new threat to humanity [2]. Since the beginning of the COVID-19 outbreak in December 2019, a substantial body of COVID-19 medical literature has been generated [3]. This growing publication of research related to COVID-19 was of importance to disseminate knowledge and experience [4]. On the other hand, Journal editors and staff face a challenge between the need for rapid dissemination of timely clinical and research findings and rigorous scientific review as the workload increases [5].

Like other journals, Emergency Medicine journals had to take responsibility in the need of a fact-based and broad public health response as well a national plan [6]. In this article, we aimed to determine the performances of EM journals and the subgroups of interest of EM academicians in terms of COVID-19.

## 2. Materials and methods

We determined the top 20 EM Journals from Scimago Journal & Country Rank web site. Two journals were excluded from the study since one was not relevant to EM and the other one was not accessible in the internet. Then, we conducted a separate hand-searching on web sites of each remaining 18 journals. Publications between between January, 1st and December 31st, 2020 were involved into the study. For published studies, one reviewer author extracted the publications relevant to COVID-19. When available, full-texts of the articles were investigated. Original Articles, Letters to the Editor, Correspondences, Reviews, Editorials, Brief Reports, Commentaries, Case Reports, Research Letters, Viewpoints, Perspectives, International Guidelines, Special Contributions, Clinical Aspects, Case Series, Early Access

\* Corresponding author at: Kuzey Kampüsü, Çevre Yolu Blv., 19030 Çorum Merkez, Turkey

publications, Controversies and Clinical Papers were involved into the study. Poster presentations and abstracts were excluded. For each publication, reviewers recorded their opinion about study eligibility, and reasons for exclusion. Disagreements between reviewers in the second screening phase, evaluating full texts, were resolved via discussion.

Data on characteristics of the journals involved were extracted from the web sites of each journal. Citation times for each publication was obtained by entering the title of the publication into Google Scholar Database.

The studies related to COVID-19 were divided into subgroups according to their relevance as Effects on the Health System, Clinical Properties, Diagnosis, Treatment, Complications, Outcomes, Effects on Mental Health, Protective Measures, Telemedicine, Ethical Issues and Education. The categorization of the articles was performed based mainly on titles along with abstracts of the articles. Nevertheless, if the title or abstract is not explanatory or the distinction between subgroups is not clear, full-text of the article was discussed by the authors in terms of suitability to the subgroups.

Distribution of the articles according to countries were determined according to the institution of the corresponding author.

The publications were also categorized according to article types, and citation times were calculated.

Data were given as numbers and percentages.

### 3. Results

According to SCImago Journal Rank Indicator, Resuscitation ranked in the first place with 4.57 impact factor and American Journal of Emergency Medicine ranked in the last place with 1.7 impact factor on the top 20 EM Journals List. Of the journals, 9 were from the USA, 6 were from England, 1 was from Netherlands, 1 was from Italy and 1 was from Australia. Majority of the journals were hybrid ( $n = 13$ ) in terms of publication policy. The characteristics of the top EM Journals are summarized in Table 1.

During the study period, a total of 4168 articles were published in 18 journals and 512 (12.2%) of them were related to COVID-19. The American Journal of Emergency Medicine published the greatest amount of publications regardless of COVID-19 ( $n = 734$ ), followed by Injury ( $n = 587$ ) and Resuscitation ( $n = 432$ ).

When total COVID-19 articles were considered, American Journal of Emergency Medicine and Internal and Emergency Medicine published the greatest amount of articles ( $n = 71$  for each). Additionally, The American Journal of Emergency Medicine was the leading journal in terms of Total Citations to COVID-19 Articles ( $n = 1192$ ) followed by

Academic Emergency Medicine ( $n = 514$ ) and Internal and Emergency Medicine ( $n = 506$ ). Western Journal of Emergency Medicine published the greatest proportion of COVID-19 articles (Total COVID-19 Articles/Total Articles = 0.3). World Journal of Emergency Surgery ranked in the first place in terms of citations per COVID-19 articles ( $n = 33.2$ ), followed by Advances in Wound Care ( $n = 24$ ), Critical Care and Resuscitation ( $n = 22.1$ ) and American Journal of Emergency Medicine ( $n = 16.7$ ). The details are summarized in Table 2.

When the articles were categorized, it was determined that majority of the articles were related to Effects of COVID-19 on the Health System ( $n = 222$ ) followed by Treatment Methods ( $n = 72$ ) and Diagnosis ( $n = 66$ ). Clinical Properties and Ethical Issues were at the bottom of the list ( $n = 4$  and  $n = 3$ , respectively). See details in Table 3.

The United States of America was the most productive country with 188 COVID-19 publications and 1411 citations to these publications (7.5 citations per publication). Italy was in the second place with 80 publications and 1006 citations (12.5 citations per publication), followed by England and China. Greece was in the first rank in terms of citations per publication with 121 citations to 6 articles (Citations per Publication = 20.1). Table 4 presents publications and citations according to countries.

While majority of the articles were original articles ( $n = 138$ , citations = 7.2), letters to the editor ranked in the second place ( $n = 104$ , citations = 345). When publications were ranked according to citations per publication, the ranking was as follows: Clinical Paper ( $n = 1$ , citations = 115), Point of View ( $n = 2$ , citations = 151), Guidelines ( $n = 5$ , citations = 257) and Review ( $n = 31$ , citations = 663). Table 5 summarizes the COVID-19 publications according to categories.

### 4. Discussion

According to our study, the USA was the most productive country when publications related to COVID-19 in EM journals are considered. The American Journal of Emergency Medicine published the greatest proportion of articles. World Journal of Emergency Surgery had the greatest number of citations per COVID-19 articles. Majority of the publications were original articles.

In a study with top 20 EM journals, it was reported that all were English-language journals and that 13 (65%) were published out of Europe and seven (35%) were published in the US. Nearly all journals had an open access option with a median charge of \$2845. Fourteen journals (70%) accepted brief reports/research letters, and 14 journals (70%) accepted case reports/case images [7]. It was reported that while proportion of original articles decreased, proportion of case reports increased

**Table 1**  
Characteristics of the top emergency medicine journals.

Journal	SCImago Journal Rank Indicator	Impact Factor	Issues per Year	Publishing Policy	Cites per Documents (2 Years)	Country
Resuscitation	3.109 (Q1)	4.57	12	Hybrid	4.25	Netherlands
Academic Emergency Medicine	1.479 (Q1)	2.5	12	Hybrid	2.98	The USA
Annals of Emergency Medicine	1.389 (Q1)	5.35	12	Regular	3.22	The USA
World Journal of Emergency Surgery	1.328 (Q1)	3.71	Continuous	Open Access	4.35	England
Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine	1.107 (Q1)	2.37	Continuous	Open Access	2.33	England
Current Heart Failure Reports	1.102 (Q1)	2.95	6	Hybrid	2.95	The USA
Shock	1.057 (Q1)	3.20	12	Hybrid	2.54	The USA
Advances in Wound Care	1.051 (Q1)	3.11	12	Hybrid	2.85	The USA
Prehospital Emergency Care	1.051 (Q1)	2.69	6	Hybrid	2.19	England
Burns	0.909 (Q1)	2.16	6	Hybrid	2.17	England
Injury	0.904 (Q1)	2.13	12	Hybrid	2.29	England
Emergency Medicine Journal	0.872 (Q1)	2.04	12	Hybrid	1.77	England
Critical Care and Resuscitation	0.869 (Q1)	3.3	Continuous	Regular	2.18	Australia
European Journal of Emergency Medicine	0.749 (Q1)	2.17	6	Hybrid	2.22	The USA
Western Journal of Emergency Medicine	0.734 (Q1)	1.8	6	Open Access	1.76	The USA
Journal of Burn Care and Research	0.712 (Q1)	1.53	6	Hybrid	1.70	The USA
Internal and Emergency Medicine	0.703 (Q1)	2.32	8	Hybrid	2.01	Italy
American Journal of Emergency Medicine	0.659 (Q1)	1.7	12	Hybrid	1.93	The USA

**Table 2**  
Total articles and citations to COVID-19 articles since January 1, 2020

Journal	Total Articles	Total COVID-19 Articles	Total COVID-19 Articles/Total Articles	Total Citations to COVID-19 Articles	Citations per COVID-19 Articles
Resuscitation	432	62	0.1	371	5.9
Academic Emergency Medicine	228	45	0.2	514	11.4
Annals of Emergency Medicine	294	34	0.1	126	3.7
World Journal of Emergency Surgery	79	9	0.1	299	33.2
Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine	118	15	0.1	36	2.4
Current Heart Failure Reports	46	1	0.02	0	0
Shock	206	9	0.04	61	6.7
Advances in Wound Care	39	1	0.02	24	24
Prehospital Emergency Care	97	0	–	0	0
Burns	294	16	0.005	67	4.1
Injury	587	31	0.05	93	3
Emergency Medicine Journal	205	42	0.2	90	2.1
Critical Care and Resuscitation	64	17	0.2	377	22.1
European Journal of Emergency Medicine	124	19	0.15	130	6.8
Western Journal of Emergency Medicine	206	66	0.3	248	3.7
Journal of Burn Care and Research	150	3	0.02	5	1.6
Internal and Emergency Medicine	265	71	0.2	506	7.1
American Journal of Emergency Medicine	734	71	0.09	1192	16.7

in the pandemic period [5]. Even so, we determined that majority of the journals were hybrid or open access and majority of the articles on COVID-19 were original articles, in concordance with the previous studies.

In the early days of the pandemic, China published majority of the articles since it was the country where COVID-19 originated. Unsurprisingly, majority of the publications on this novel disease were

case reports and case series [2]. This knowledge and experience sharing was important for the scientific community and made a substantial contribution to preparedness in the warfare against the pandemic. Between 1 January and 24 March 2020, China produced the highest number of publications with 323 articles, followed by the USA. As the pandemic progressed, non-COVID-19-related articles began decreasing in volume as COVID-19-related articles increased. Additionally, number of

**Table 3**  
Distribution of articles according to categories.

Journals	Categories											Total
	Effects on the Health System	Clinical Properties	Diagnosis	Treatment	Complications	Outcomes	Effects on Mental Health	Protective Measures	Telemedicine	Ethical Issues	Education	
Resuscitation	45		2	5				5		1	4	62
Academic Emergency Medicine	17		15	6	3	1	1	1	1			45
Annals of Emergency Medicine	12		8	3			3	8				34
World Journal of Emergency Surgery	6		2					1				9
Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine	12		2					1				15
Current Heart Failure Reports	1											1
Shock	1		2	6								9
Advances in Wound Care	1											1
Prehospital Emergency Care												0
Burns	16											16
Injury												
Emergency Medicine Journal	28		3	4				4	3			42
Critical Care and Resuscitation	5		5	5				1	1			17
European Journal of Emergency Medicine	18		1									19
Western Journal of Emergency Medicine	19		10	14	2	2	2	9	6		2	66
Journal of Burn Care and Research	3											3
Internal and Emergency Medicine	20	1	7	19	15	4		1	2	2		71
American Journal of Emergency Medicine	18	3	9	10	18	2	1	7	2		1	71
Total	222	4	66	72	38	9	7	38	15	3	7	481

**Table 4**  
Distribution of publications and citations according to countries.

Countries	Number of Publications	Number of Citations	Citations per Publication
The USA	188	1411	7.5
Italy	80	1006	12.5
England	46	205	4.4
China	36	325	9
France	25	149	5.9
India	14	128	9.1
Australia	14	43	3
Taiwan	13	42	3.2
Spain	12	127	10.5
Singapore	11	128	11.6
Germany	9	29	3.2
Japan	9	77	8.5
Canada	9	9	1
Iran	7	37	5.2
Turkey	7	44	6.2
Israel	6	9	1.5
Greece	6	121	20.1
Belgium	6	88	14.6
Switzerland	3	20	6.6
Poland	3	32	10.6
Russia	3	4	1.3
Ireland	3	0	0
Pakistan	2	2	1
Austria	2	7	3.5
Malaysia	2	3	1.5
Island	2	40	20
Sweden	2	0	0
Nederlands	2	23	11.5
South Africa	1	1	1
Morocco	1	1	1
Romania	1	0	0
Lebanon	1	0	0
Peru	1	0	0
Indonesia	1	11	11
Croatia	1	1	1
Norway	1	15	15
Finland	1	0	0
Thailand	1	1	1

publications originating from the Western World increased, substantially [3,8]. Simultaneously, research institutions halted patient enrollment in clinical studies in the ED and number of publications in EM journals escalated [5].

In the setting of the COVID-19 pandemic, because of additional stressors such as daily tragedy, changes in therapeutics, personal

**Table 5**  
Citations according to article types.

Article Type	Number	Times Cited	Citations per Publication
Original Article	138	995	7.2
Letter to the Editor	104	345	3.3
Correspondence	68	507	7.4
Review	31	663	21.3
Editorial	29	122	4.2
Brief Report	24	69	2.8
Commentary	21	168	8
Case Report	19	394	20.7
Research Letter	17	178	10.4
Viewpoint	9	107	11.8
Perspective	5	32	6.4
International Guideline	5	257	51.4
Point of View	2	151	75.5
Special Contribution	2	8	4
Clinical Aspect	2	28	14
Case Series	1	0	0
Early Access	1	0	0
Controversy	1	0	0
Clinical Paper	1	115	115

protection, and controversies regarding epidemiology and management, and reduction or loss of income, baseline stress in EM is magnified [9].

Although emergency physicians battle on the frontline in the warfare against COVID-19, scientific contribution of EM to the COVID-19 literature is questionable. By December 22, 2020, when Web of Science® Database was investigated, EM Category ranked in 36th place among other disciplines such as General Internal Medicine, Public Environmental Occupational Health, Infectious Diseases, Surgery, Psychiatry, etc. [10].

As members of a relatively novel specialty, EM academicians focused on researches involving risk factors, healthcare utilization, ultrasound, sepsis and operational metrics before the pandemics [11]. With the pandemic, numerous changes occurred in the ED setting. Use of protective clothes, increased workload and stress and changes in the ED management procedures in many ways have been reflected in scientific studies. According to our results, while Effects of COVID-19 on the Health System, Treatment Methods and Diagnosis are the most studied fields, Effects of the Pandemic on Mental Health of the Staff, Ethical and Educational issues are the most neglected fields in terms of EM publications. Considering all COVID-19 literature, it was reported that the researchers focus on clinical features and diagnosis of the disease. Many areas of potential research remain underexplored, such as mental health, the use of novel technologies and artificial intelligence and pathophysiology of COVID-19 [3]. Emergency physicians may contribute to the literature in these neglected areas.

## 5. Limitations of the study

Our study also has some limitations. Due to cross-sectional nature of the study design, number of publications and citations may vary by time. Additionally, although performed elaborately, hand-search procedure may also cause overlook of some articles.

There have also been controversies between authors when determining the categories of some publications. There have been articles that could be involved in more than one category.

Nevertheless, these challenges have not affected the overall results of this study.

## 6. Conclusions

In addition to almost existing stress on ED physicians, the pandemic process increased this stress by causing scarcity in resources, including medications, physical space, equipment, and staff [9]. In this stressful environment, EM physicians also have responsibility to make contribution to the scientific literature and take the place they deserve in the struggle against COVID-19.

The publication of research related to COVID-19 is of importance to disseminate findings of clinical care, understandings of disease trajectory, and health service preparedness and response [4]. According to our results, The highest number of articles was published in the American Journal of Emergency Medicine. Majority of the articles were related to “Effects of COVID-19 on the Health System”. According to our study, Clinical Properties and Ethical Issues are the least investigated fields in EM journals.

## Declaration of Competing Interest

None.

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