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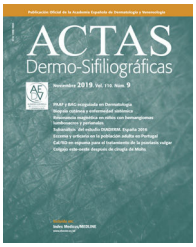

CASE AND RESEARCH LETTER

[Translated article] Significant Contribution of Spanish Dermatology Toward Understanding COVID-19: A Bibliometric Study of PubMed-Indexed Articles

La significativa aportación de la dermatología española al conocimiento de la COVID-19: estudio bibliométrico en PubMed

To the Editor:

Spain, a country among those most affected by the COVID-19 pandemic, was particularly impacted during the first year, when 2 820 000 cases and 64 221 confirmed deaths were registered between February 2020 and the end of January 2021.[1] This pandemic has generated a historic number of scientific publications. As the specialty of dermatology helped contribute knowledge over this short period of time, we wondered whether publications by Spanish dermatologists were proportional to the national impact of the disease.

To answer this question, we searched the literature for all publications in PubMed corresponding to the following search string: (SARS-CoV2[Title]) OR COVID-19[Title]) AND (Skin[Title] OR Cutaneous[Title] OR Dermato-[Title]). The time frame specified was February 1, 2020, to January 31, 2021. After excluding 76 articles that were not directly relevant to our objective, we analyzed 254 publications, recording country of origin and the authors' workplace. When more than a single country was mentioned among the authors' affiliations, the article was classified as multinational. Articles were also classified into 2 categories according to whether they made contributions directly related to clinical practice (such as case reports or case series) or did not make such contributions. Epidemiologic data were obtained from World Health Organization registries, and population statistics for 2019 came from the World Bank.

In absolute terms, the United States was the country that published the largest number of articles in dermatology (38). Second place was shared by Italy and multinational author groups, with 33 each. Spanish dermatology occupied third place, with 32 publications, or 12.60% of the total number published during the 12 months studied (Table 1).

To estimate researcher effort according to country size, we adjusted output for population. In that analysis, Spain was the leader, with 0.68 pandemic-related dermatology publications per 100 000 population, followed by Italy, with 0.055. Spain and Italy were the countries hardest hit by COVID-19 during the period our study focuses on (Table 2).

However, associations between publication output and incidence and mortality must be interpreted more cautiously given that the accuracy of epidemiological data is highly disputed.[2] Based on known data, Spain ranked seventh in the world in number of publications, with 1.135 articles per 100 000 cases (Table 3). Asian countries ranked as high as they did in this analysis because of the low number of cases and deaths they reported. One observation is that 3 countries with a high absolute number of publications — Spain, Italy, and the United States — all have cumulative incidence rates above 4000. From these data we can infer that even though it is not possible to detect a direct correlation between cumulative incidence and scientific output, the countries that most contributed articles on dermatology and COVID-19 are also those that were more severely impacted by the disease.

More reliable comparisons can be made between European Union countries given that they have similar health systems and socioeconomic conditions and have also used similar approaches to diagnosing COVID-19. Here the indicators do provide a useful tool for showing which countries made more contributions to the literature according to pandemic severity during the first year. Our data show that Spain and Italy, with more than 1 article published per 100 000 cases of COVID-19 diagnosed, were at the head of European output in dermatology.

Another interesting comparison is whether articles were published by authors affiliated with a single hospital or multiple centers. Spanish authors more often collaborated with colleagues from other centers (for 78.1% of Spanish dermatology's publications), whereas authors from other countries collaborated among centers for 67.3% of theirs.

We reviewed the literature until May 2021 but found no bibliometric studies focusing on dermatology in relation to

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Table 1 Absolute and Relative Publication Output According to Country.

Country	No. of articles	%	Country	No. of articles	%
USA	38	14.96	Indonesia	2	0.79
Multinational	33	12.99	Netherlands	2	0.79
Italy	33	12.99	Portugal	2	0.79
Spain	32	12.60	Russia	2	0.79
France	14	5.51	Singapore	2	0.79
Iran	14	5.51	Austria	1	0.39
China	11	4.33	Belgium	1	0.39
Turkey	10	3.94	Bulgaria	1	0.39
UK	9	3.54	Colombia	1	0.39
Brazil	6	2.36	Ireland	1	0.39
India	6	2.36	Morocco	1	0.39
Thailand	5	1.97	Mexico	1	0.39
Japan	4	1.57	Nigeria	1	0.39
Germany	3	1.18	Norway	1	0.39
South Korea	3	1.18	Pakistan	1	0.39
Switzerland	3	1.18	Poland	1	0.39
Canada	2	0.79	Romania	1	0.39
UAE	2	0.79	South Africa	1	0.39
Egypt	2	0.79	Tunisia	1	0.39

Abbreviations: UAE, United Arab Emirates; UK, United Kingdom; USA, United States of America.

Table 2 Population-Adjusted Publication Output by Country.

Country	Articles/100 000 population	Country	Articles/100 000 population
Spain	0.06760666	South Korea	0.0058017
Italy	0.05533061	Canada	0.00526243
Singapore	0.03506311	Romania	0.00517362
Switzerland	0.03485927	Germany	0.00360763
France	0.02079613	Japan	0.00316982
Ireland	0.02014326	Brazil	0.00285514
Portugal	0.01944201	Morocco	0.00274185
Norway	0.01863037	Poland	0.00263449
UAE	0.01860638	Colombia	0.00198515
Iran	0.01681298	Egypt	0.00198259
Bulgaria	0.01438542	South Africa	0.00167723
United Kingdom	0.01342772	Russia	0.00136287
Turkey	0.01188015	China	0.00078569
USA	0.01156911	Mexico	0.00078252
Netherlands	0.01148924	Indonesia	0.00074018
Austria	0.01123461	Nigeria	0.0004976
Belgium	0.00867905	Pakistan	0.00047946
Tunisia	0.0084868	India	0.0004391
Thailand	0.00718123	Multinational	–

Abbreviations: UAE, United Arab Emirates; UK, United Kingdom; USA, United States of America.

COVID-19. We did find, however, studies of general publication output over different time periods. Haghani et al.[3] and Liu et al.[4] found that US and Chinese authors produced the largest number of articles, whereas Spain ranked 15th in both studies. Diéguez-Campa et al.[5] reported similar findings, with China and the US leading in publications; Spain ranked 18th in that study. In another study, Spain ranked seventh or ninth, however, depending on which database was being analyzed.[6]

Yet another interesting observation based on our data is that 81% of the Spanish publications on dermatology and COVID-19 were case reports and case series (versus 58% of the articles from the rest of the countries in our study). By contrast, 70% of all publications between November 2019 and March 2020 were case reports and case series.[7]

In conclusion, we wish to emphasize the outstanding role Spanish dermatology played in contributing direct clinical knowledge during the COVID-19 pandemic. Spain ranked third in the world in total number of articles focused on the skin in this disease, but it ranked first when output was adjusted for population.

Table 3 Publication Output by Country Adjusted for Number of Covid-19 Cases and Deaths.

Country	Articles/100 000 cases	Articles/100 000 deaths	Country	Articles/100 000 cases	Articles/100 000 deaths
Thailand	26.596	6493.51	Canada	0.259	10.1
China	12.077	241.02	Austria	0.244	13.1
South Korea	3.836	211.27	UK	0.236	8.53
Norway	1.597	177.62	Morocco	0.212	12.11
Italy	1.299	37.38	Netherlands	0.205	14.34
Egypt	1.209	21.59	Indonesia	0.188	6.73
Spain	1.135	49.83	Pakistan	0.184	8.6
Japan	1.034	70.75	USA	0.148	8.77
Iran	0.992	24.18	Belgium	0.14	4.71
Nigeria	0.766	63.37	Romania	0.138	5.48
UAE	0.605	238.66	Germany	0.135	5.27
Switzerland	0.574	33.4	South Africa	0.069	2.28
Ireland	0.512	30.38	Brazil	0.066	2.69
Tunisia	0.482	14.97	Poland	0.066	2.69
Bulgaria	0.457	11.08	India	0.056	3.89
France	0.448	18.55	Mexico	0.054	0.64
Turkey	0.405	38.66	Russia	0.052	2.73
Portugal	0.281	16.42	Colombia	0.048	1.88

Abbreviations: UAE, United Arab Emirates; UK, United Kingdom; USA, United States of America.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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C. Miñones-Ginarte[a], M. Pereiro-Ferreirós[b], M. Ginarte-Val[b,*]

[a] *Departamento de Cirugía y Especialidades Médico-Quirúrgicas, Facultad de Medicina, Universidad de Santiago de Compostela, Santiago de Compostela, A Coruña, Spain*

[b] *Servicio de Dermatología, Departamento de Cirugía y Especialidades Médico-Quirúrgicas, Complexo Hospitalario Universitario de Santiago, Facultad de Medicina, Universidad de Santiago de Compostela, Santiago de Compostela, A Coruña, Spain*

* Corresponding author.
E-mail address: mginartev@aedv.es (M. Ginarte-Val).