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A worldwide bibliometric analysis of published literature in plastic and reconstructive surgery

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KEYWORDS

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Summary *Background:* Bibliometrics is the analysis of the content and citations of journal articles to quantify trends in published data. In this study, we aimed to use bibliometric analysis to identify the contribution of various countries to the plastic surgical literature over a 5-year period.

Methods: In this study, the top 20 countries publishing articles on surgery and 10 plastic surgical journals with the highest impact factors (IFs) were included. The number of scientific articles published in each journal per year (2009–2013) in each country was found using PubMed. As a marker of quality, the mean IF for each country was calculated using the number of articles and journal IF. These data were compared with population, gross domestic product (GDP) and dollars spent on research.

Results: A total of 10,051 articles were included. The USA was the largest contributor, with 4008 articles published over 5 years, followed by the UK (1163 articles). The USA's mean IF was 2.084, closely followed by Canada (2.037). The UK had the highest number of publications per million population (PMP; 18.14 publications PMP). When considering the overall research spending per country, Turkey had the most cost-effective publication output. The least cost-effective country was South Korea. Sweden, the Netherlands and Canada had the greatest increase in publication quality.

Conclusions: Bibliometric analysis can be used to identify not only major centres of plastic surgical research, such as the USA and UK, but also centres that produce high-quality data, such as Canada, and cost-effective research, such as Turkey. It can also highlight the areas of increasing success in plastic surgical research.

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Introduction

Bibliometrics is the process of analysing the content and citations of journal articles to quantify trends in publication type, topic area, institutions of origin and dissemination of published data.¹ The most frequently encountered use of bibliometric analysis is to find a journal's impact factor (IF), which indicates the number of times an article is likely to be cited in 1 year once published in a particular journal.¹ This is only a relatively simple example of the use of this form of statistical analysis, and more in-depth analyses are used globally by research institutions, governments and universities to evaluate and direct research efforts.¹

Bibliometric analysis has been used previously by other authors to investigate the impact of historical papers on a field and hence determine a list of influential papers,^{2,3} thus creating guides of recommended reading within specialities. It has also highlighted deficiencies in the currently available literature and guided future research.

In this study, we aimed to use bibliometric analysis to identify the contribution of various countries to the plastic surgical literature over a 5-year period. Although this has been done in other surgical specialities,⁴ a study of the same size is yet to be completed for plastic and reconstructive surgery.

Methods

The top 20 countries based on the number of articles published in the field of surgery, as per the SCImago Country Rank, were included in this study.⁵ Ten plastic and reconstructive surgical journals with the highest IFs between 2009 and 2013 were included in this study. Journals without an IF for each of the 5 years were excluded. Historical IFs were gathered from the Bioxbio Impact Factor Search website.⁶

A search phrase was constructed on PubMed using country of affiliation, year of publication and journal title. Comment articles, editorials, letters and congress proceedings were excluded. The number of scientific articles published per year, between 2009 and 2013, in each country was gathered for each journal. Population and gross domestic product (GDP) data were gathered from the World Data Bank website.⁷

The total IF for each country per year was calculated by multiplying the journal's IF for that year by the number of articles published. These were added across years and journals to get the total IF for that country. The total IF was subsequently divided by the total number of articles published to find the overall mean IF for the 5-year period.

The analysis involved the comparison of total number of articles published and the mean 5-year IF with population, percentage of GDP spent on health, percentage of GDP spent on research, total dollars spent on research and total dollars spent on health. Trends across the 5-year period were also analysed.

Results

Journals included

IF data between 2009 and 2013 showed that the leading journals on the basis of IF were the Journal of Plastic, Reconstructive and Aesthetic Surgery; Plastic and Reconstructive Surgery; Burns; Annals of Plastic Surgery; Journal of Burn Care and Research; Clinics in Plastic Surgery; Journal of Reconstructive Microsurgery; Facial Plastic Surgery; Archives of Facial Plastic Surgery; and Aesthetic Plastic Surgery.

Absolute figures

A total of 10,051 articles were included. The largest contributor was the USA, with 4008 articles published over 5 years, followed by the UK (1163 articles). The total number of articles published by each country is shown in Table 1. The mean 5-year IF was highest for the USA (2.084), followed by Canada (2.037). Full rankings by total publications and mean 5-year IF are shown in Table 1.

Adjusted for demographics

Adjustment of the data for population revealed that the UK had the highest rate of publication per million population (PMP), with 18.14 publications PMP. This adjustment moved the ranking of the USA to sixth, with Australia, the Netherlands, Taiwan and Austria producing more publications per million population. With regard to its population,

Table 1 Total publications and mean 5-year impact factor per country, with each country's associated rank for these findings.

Rank by total publications	Country	Total publications	Mean 5-Year IF	Rank by mean IF
1	USA	4008	2.084	1
2	UK	1163	1.707	16
3	China	768	1.722	13
4	Japan	529	1.728	12
5	Germany	416	1.713	15
6	Turkey	406	1.521	20
7	Australia	391	1.869	3
8	Italy	366	1.822	6
9	Canada	328	2.037	2
10	Taiwan	311	1.845	5
11	Netherlands	247	1.813	8
12	Brazil	238	1.752	11
13	France	195	1.820	7
14	Spain	138	1.644	18
15	India	123	1.717	14
16	Austria	112	1.868	4
17	Sweden	99	1.781	10
18	Switzerland	99	1.692	17
19	South Korea	66	1.806	9
20	Greece	48	1.636	19

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