A bibliometric picture of hand surgery subspecialty in Turkey: Where are we heading?
Hakan Kocaoglu, Mahmut Kalem

ABSTRACT

Objectives: In order to provide up-to-date and effective results for patients any medical field should bring up its academic productivity since it is a powerful indicator for the advancement of that specific research field. There are no specific studies that evaluate the current academic productivity of hand surgery at Turkey. With this study we aimed to compare and contrast the quality and the quantity of the hand surgery publications derived from Turkey for two five-year periods.

Method: Between 2008-2017, publications containing original articles and reviews published with country of origin as Turkey (CU=TURKEY) in Web of Science (WoS) indexed journals were included in the study. Papers were sorted from WoS categories of surgery, orthopedics and emergency medicine. Then works containing "Hand" as a keyword grouped into two according to the publication year, 2008-2012 and 2013-2017. The bibliometric data such as the journal in which the publication is published, index of the journal and the number of citations were compared.

Results: A total of 16848 publications that meet the criteria published between the specified dates have been evaluated. 421 of these publications contain the keyword "Hand". 187 of these publications were published in between 2008 and 2012 and 234 were printed after 2012. A chi-square test showed that there was no significant association between these two periods, X² (1, N=16848) = .206, p=.65. However, it is seen that after 2012, more publications were started to be published about orthopedics and traumatology (p = .032) and the publications were published more in high-quartile journals (p = .014). There was no significant difference between the number of citations, where average citation per paper was 3.88±5.56 (h-index:12) prior to 2012 and 4.26±6.09 (h-index:14) after (p= .505).

Conclusion: Considering the tendency of total publications between 2008-2017, a significant quantitative change is not observed for the second half of this ten-year period. However, contrary to the previous period, publications were accepted by high top-tier journals. It is evident that more incentives are needed to increase scientific productivity and stay competitive with the rest of the world.

Key words: Bibliometrics, hand surgery, subspecialty, medical education

Introduction

Scientific developments in the field of medicine are ever-expanding. New surgical techniques and instruments come into use every day [1]. Parallel to changing medical practice and exponentially increasing knowledge, specialty education in medicine is getting lengthier and is becoming subspecialized [2]. Hand surgery is a subspecialty that had long roots in clinical practice.
however recently introduced at 2012 as a formal training program in Turkey [3,4].

In order to provide up-to-date and effective results for patients any medical field should bring up its academic productivity since it is a powerful indicator for the advancement of that specific research field [5,6]. Bibliometric analysis is the evaluation of the quantity and the quality of the scientific publications. Best of our knowledge there are no bibliometric studies that evaluate the current state and development of the hand surgery in Turkey. A bibliometric picture of the hand surgery subspecialty can aid planning and further development of this field [7]. Thus, we aimed to compare and contrast the quality and the quantity of the hand surgery publications derived from Turkey for two five-year periods.

Method

The original articles and reviews published between January 2008 and December 2017 with country of origin as Turkey (CU=TURKEY) in Web of Science (WoS) indexed journals as of 1st January 2020 were included in the study. Papers were sorted from WoS categories of SURGERY (general surgery and plastic and reconstructive surgery are included to this subject category), ORTHOPEDICS and EMERGENCY MEDICINE. "Hand" is searched from this pool of papers as the keyword, because it will be more specific for the hand surgery than the other anatomical parts of the upper extremity.

All the articles were checked by the two authors for subject suitability and the compliance with the criteria mentioned above. These papers then grouped into two according to the publication year. First group consisted by publications printed from 1st January 2008 to 31st December 2012. Second group involved papers from 1st January 2013 to 31st December 2017. The bibliometric data such as the total number of publications, the journals, number of citations in the consecutive three years, subject category (orthopedics, surgery, other or combinations of these categories), quartile of the journal were compared.

Statistics

Statistical evaluation was made using IBM SPSS 11.5 software (SPSS Inc., Chicago, IL, USA). Numerical variables showing normal distribution were stated as mean ± standard deviation (SD), and those not showing normal distribution as median (minimum-maximum) values. Categorical variables were stated as number (n) and percentage (%). Differences between the groups in numerical variables not showing normal distribution were evaluated with the Mann Whitney U-test, and relationships between categorical variables were determined with the Pearson Chi-square test and the one-way ANOVA test. A value of p<0.05 was accepted as statistically significant.

Results

A total of 16848 publications that meet the criteria published between the specified dates have been evaluated. 421 of these publications contain the keyword "Hand". 187 of these publications were published in the 5-year period before 2012 and 234 were printed after 2012. A chi-square test showed that there was no significant association between these two periods, X2 (1, N=16848) = .206, p=.65 (Table 1). The distribution of top ten journals in which the articles were published can be seen at Figure 1.

However, it is seen that after 2012, more publications were started to be published about topics of orthopedics and traumatology (p = .032). (Table 2) Also more papers were published at Q1 and Q2 journals (p = .014). (Table 2) However there was no significant difference between the number of citations, where average citation per paper was 3.88±5.56 (h-index:12)
prior to 2012 and 4.26±6.09 (h-index:14) after (p = .505). (Table 2)

Discussion

As our bibliometric study results show, the quantity of the studies published from Turkey with the “Hand” keyword increase 125% after 2012 however, when this aforementioned increase is compared relative to the total number of published studies from Turkey it was found that there is not a significant difference.

Another noteworthy factor is the increase in the number of publications around the world due to the digital publishing and easiness in reaching the produced publications [8]. For instance, arthroplasty publications around the world have increased by 172% compared to the 5-year periods between 2006-2011 and 2011-2016, while Turkey has followed this trend with an increase of 123% in similar dates [9]. When the publications on hand surgery published from Turkey were examined in 5-year periods, it increased from 187 to 234 (125%). However, when this number is compared to the total number of publications produced in our country, it is observed that there is no remarkable increase in the number of publications in hand surgery subspecialty field [10]. These results show that the increase in the number of publications is not specific to hand surgery.

Similar trends can be observed in other specialties [8]. When 10 years of anesthesiology publication data in Turkey was examined, it was found that Turkey has risen to 18th place from being the 20th in the list between 1975 and 2016 [11]. Also in a recently pub-
lished editorial letter, it shows that scientific studies are presented widely at the national congresses but have not turned into printed articles adequately [12]. There are probably some recondite components that needs to be changed in order to increase the number of publishing such as the scientific infrastructure and allocated sources. It is clear that it is necessary to increase the scientific productivity of the country and especially the publications on hand surgery field.

By going into detail about the qualities of the publications, it was found that there was no difference in terms of 2-year citations and related impact factors. By the nature of publication process first a publication needs to be read, thus a publication requires some time to have an impact in its field. Although citations up to 2 years after the publication date have been taken into consideration for this current study in order to prevent bias, it may be more appropriate to examine 5 to 10-year-old impact factors for future studies.

Another important factor in terms of having an impact is that authors ability to publish their publications as open access. Open access publications can reach a wider reader segment and receive faster impact [13], [14]. As the study of Sabharwal et al. (2012) stated open access publications are increasing in number in the orthopedic literature and at the same time they indicated that the authors are paying the open access fee personally in general [15]. This fee is 3000 USD on average in journals that publish in the field of orthopedics. In countries with lower economic power like our country, the rates of publishing open access publications by paying those level of fees are low [16].

Another factor that may be important for the quality of publication apart from the individual impact of the articles is the journal in which the article is accepted [17]. When the journals in which the articles were published was examined according to the printing periods, for both periods the top three journals accepted the most publications were Acta Orthopaedica et Traumatologica Turcica, Journal of Trauma Emergence Surgery and Joint Diseases and in Related Surgery respectively. These three open access journals, which one of them are not taking article processing fee, publish publications also from our country. Although there was no significant difference between the impacts of the journals published before 2012 and after, the articles have started to be published more frequently in higher quartile (Q1 and Q2) journals (Table 2). Even though a study conducted in Brazil showed that the publication quality cannot be increased by the change in regulations/criteria, a new academic promotion criteria (associate professorship) initiated after 2016 and the establishment of hand surgery as a formal subspeciality in Turkey might support and encourage to publish more qualified publications and might increase the number of publications [18]. Yet this relationship can be the focus of a different study.

Another observation of the bibliometric data might suggest the start of the formal training at 2012 might influence the academic productivity is that the topics of the publications have started to be related more with the field of orthopedics. In America, a similar change was observed after hand surgery was established and it was observed that orthopedists were increasingly leading the hand surgery [1,2]. Although it is observed that most of the candidates having an origin of orthopedics tend to work about hand surgery, apart from Turkey the candidates in the USA having an origin of plastic surgery tend to generate more publications [9]. This may be attributed to the formations received by candidates from different surgical disciplines [19].

There are some limitations of this current study. Firstly, the journals which were included in the review are WoS indexed journals which means that many of the non-WoS indexed journals especially those in Turkish, cannot be evaluated in this study. Also, it might not be always accurate to evaluate the value of an article or a journal by only examining its impact it receives or the indexed area [20,21]. Another important limitation that should be taken into account is that only the word
“Hand” is used as a search criterion. Other topics may be more hot topics in the current literature.

As a result, although there is no numerical change in the publications after the initiations of hand surgery educations in our country, it can be observed that the articles are started to be published in higher quartile journals. However to stay competitive with the world Turkish hand surgery community need a boost at the academic field. It is evident that more incentives are needed to increase scientific productivity.

**Conflict of interest statement**
The authors have no conflicts of interest to declare.

**References**
11. Özbilgin Ş, Hancı V. [Anesteziyoloji alanında science citation index ve citation index-expanded indekslenen dergilerde Türkiye kaynaklı yayınlar: Bibliografik bir analiz.][Article in Turkish]. Turk Anesteziyoloji ve Reanimasyon Dern Derg 2017;45:26–35.
18. Lira RPC, Moreno RN, Rocha EM. The number of citations in a scientific journal does not increase through an administrative act. Arq Bras Oftalmol 2018;81:1-5.