



Did We Get Lost in Space A Step Away From 2020? Bibliometric Analysis of Turkish-Based Publications from 2008 to the Present in Science Citation Index and Citation Index-Expanded Indexed Journals in the Field of Anaesthesiology

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Abstract

Objective: Despite the rapid increase in economy and general scientific activities, it is thought that the same increase may not be seen in publication quality. We aimed at evaluating the current scientific performance of our country in the field of anaesthesiology in international journals with a high impact value from 2008 to the present.

Methods: The list of anaesthesiology journals in the Science Citation Index (SCI) and SCI-Expanded (SCI/SCI-E) index and the ISSN numbers were obtained. The studies published in these journals from Turkey and from 2007 to September 2018 were listed. The year of publication, subject, method and number of citations and the conducting institution of each study were recorded. Institutions with the highest publications and institutions with the highest number of citations were identified.

Results: A total of 3,486 articles were found. Of them, 583 (16.7%) publications were from Turkey. The highest number of publications was in 2018 (14.4%) and the lowest was in 2015 (5.3%).

Conclusion: Although there seems to be a significant increase in the number of publications in recent years, the same increase is not reflected in the publication quality evaluation criteria and there is no increase in the number of prospective randomised controlled trials and citations.

Keywords: Anaesthesiology, bibliometric analysis, impact factor, Turkey

Introduction

The numerical analysis of publications produced by individuals or institutions in a given area, in a given period and in a specific region and the relationships between these publications is called bibliometrics. Bibliometric studies allow the quantitative assessment of developments in the fields of expertise within the framework of world standards or the comparison of national institutions (1). In fact, it can be shown how the science and technology policies of the countries should be guided after the shortcomings are detected.

The number of studies evaluating scientific performance in medicine is limited. In recent years, bibliometric analyses have been made in various branches such as emergency medicine, transplantation, cardiology and orthopaedics in our country (2-5).

In the field of anaesthesia, there are two bibliometric analyses evaluating Turkey-based works, while the latest publications were made with the data of 2015 and they have not been updated in recent years (6, 7). Presenting the current situation is important in terms of evaluating our scientific publication performance and forming our development policies in the field of anaesthesiology.

For this reason, in our study, we determined the anaesthesiology journals within the scope of Science Citation Index (SCI) and SCI-Expanded (SCI-E). We determined Turkey-based publications in these journals and aimed at evaluating the number and quality of the publications of the institutions in our country from 2008 to the present.

Methods

Our study is a retrospective observational study. This study did not require the approval of an ethics committee as it is a secondary analysis of a database of a public domain and is of free access. At the stage of the study, especially the selection and analysis of the data was prepared in accordance with the ethical principles of the World Medical Association (WMA) Helsinki Declaration. In the first phase of our study, we first selected the publication category ‘anaesthesiology’ in the ‘Thomson Reuters Web of Science’ database and obtained the lists and the ISSN numbers of the journals to be evaluated by SCI and SCI-E, 2017 impact factors and how often they published. At the time of inquiry, the journals on intensive care and pain were listed in the ‘anaesthesiology’ category.

We typed in the ‘IS=ISSN numbers’ between 1 September 2018.1 January 2008, in the advanced search of the Web of Science (WoS) search engine of the Institute for Scientific Information to determine the publications to be evaluated and obtained all the publications of the journal. Then we typed in the words ‘IS=ISSN number AND CU=TURKEY’ and determined the Turkey-based articles. Publications on the same dates were also scanned with the keywords ‘ANAESTHESIOLOGY TURKEY’ in the PubMed database and double-control was ensured. A summary of each publication was reviewed, the publication name, year of publication, the name of the journal, the name of the first author and the institution were recorded. Publications with no anaesthetist in their lists were excluded from the list. In recording the publication name, primarily the name of the institution of the first author was recorded; if the study was a multicentred one with foreign countries, authors and institutions participating from Turkey were recorded. We also classified the publications according to the subjects (anaesthesia, pain, intensive care and paediatrics), type of publication (retrospective, randomised controlled, letter to the editor, case reports/series and experimental) and the type of institution (university hospital, edu-

cation and research hospital (ERH), state hospital and private hospital). In case of doubt, the full texts of the publications were taken into consideration. The number of citations of the publications and institutions in the WoS database between 1 and 10 November, 2018, was individually found and the total number of citations until the date of inquiry was found and sorted. Some ERHs, universities and hospitals newly established in 2013–2014 were connected and their names were changed, but the way the institution names were used in the publication were preserved in our study in order not to cause confusion among the institutions.

Statistical analysis

Descriptive statistical methods were used to determine the relationships between the groups in the data of the study. Descriptive statistics were presented as number (n) and percentage (%) for categorical variables. As a result of the analyzes obtained from the data of the study, network density and modularity values of the network were calculated. Network density indicates how much of the potentially available connections are used in a network.

Results

Because of the scanning, a total of 31 journals were found on the subject of anaesthesiology in the WoS database. Journal list, characteristics and 2017 impact factors are given in Table 1.

In the PubMed database, it was found that there were a total of 3,486 publications from Turkey between these dates, but there were a total of 583 publications in accordance with the criteria we determined among the SCI/SCI-E journals. Twenty Turkey-based studies with no anaesthetists were excluded from the list. After the data cleansing, 563 publications that met the predetermined criteria were identified. The number of publications in these journals and their acceptance rates from Turkey when the WoS database was used are given in Table 1.

When the 563 detected publications were examined according to the types of publication, there were 298 (53%) randomised/controlled clinical trials, 98 (17.4%) observational studies, 54 (9.6%) letters to the editor, 41 (7.3%) case series/presentations, 34 experimental (6.03%), 23 retrospective (4.1%), 8 reviews (1.4%) and seven surveys (1.2%). The progress of the number of publications over the years according to the number and types of publications is given in Figures 1 and 2.

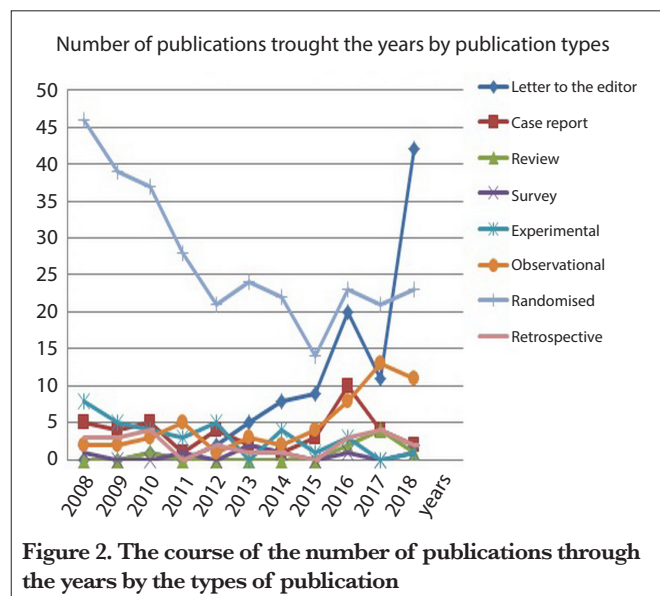
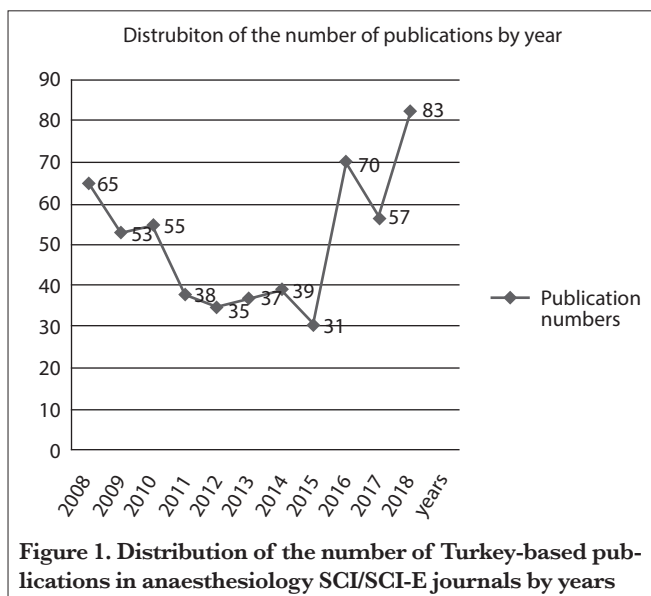
When the publications were examined according to the type of institution, it was seen that 452 (80.3%) publications were based on university hospitals, 99 (17.6%) from ERHs, 10 from public hospitals and two from private hospitals. The number

Table 1. Catalogue information of journals indexed in anaesthesiology SCI/SCI-E and 2008–2018 world- and Turkey-based publications

Journal Name	Language /Country	SCI/SCI-E	Publication Frequency	IF	Q World		Turkey
Anesthesiology	English USA	SCI	1/month	6.52	Q1	4859	7
British Journal of Anesthesia	English French German	SCI	1/month	6.49	Q1	4459	5
Pain	English USA	SCI	21/year	5.55	Q1	3931	0
Anaesthesia	English England	SCI	1/month	5.43	Q1	4145	12
Regional Anesthesia and Pain Medicine	English USA	SCI-E	1/month	4.38	Q1	1539	8
European Journal of Anesthesiology	English England	SCI-E	1/month	3.97	Q1	2063	54
Anaesthesia and Analgesia	English USA	SCI	1/month	3.46	Q1	6532	26
International Journal of Obstetric Anesthesia	English Holland	SCI-E	4/year	3.40	Q2	1100	4
Canadian Journal of Anaesthesia	English French USA	SCI	11/year	3.37	Q2	2226	6
Journal of Neurosurgical Anesthesiology	English USA	SCI	4/year	3.23	Q2	831	7
Clinical Journal of Pain	English USA	SCI-E	9/year	3.20	Q2	1411	1
European Journal of Pain	English England	SCI-E	10/year	2.99	Q2	1798	0
Pain Medicine	English USA	SCI		2,78	Q2	2873	8
Minerva Anesthesiologica	Italish English Italy	SCI-E	1/month	2.69	Q2	2123	34
Current Opinion in Anesthesiology	English USA	SCI-E	1/month	2.58	Q2	1204	1
Pain Physician	English USA	SCI-E	6/year	2.55	Q3	1514	2
Journal of Clinical Monitoring and Computing	English Holland	SCI-E	8/year	2.45	Q3	912	23
Paediatrics Anesthesia	English French	SCI-E	1/month	2.38	Q3	2885	36
Acta Anaesthesiologica Scandinavica	English England	SCI	10/year	2.27	Q3	2293	14
Anaesthesia Critical Care and Pain Medicine	English French	SCI-E	6/year	2.24	Q3	331	10
Pain Practice	English	SCI-E	4/year	2.43	Q3	956	5

Table 1. Catalogue information of journals indexed in anaesthesiology SCI/SCI-E and 2008–2018 world- and Turkey-based publications (continue)

Journal Name	Language /Country	SCI/SCI-E	Publication Frequency	IF	Q World		Turkey
Journal of Clinical Anesthesia	French English USA	SCI-E	8/year	1.81	Q3	1934	129
BMC Anesthesiology	English England	SCI-E	irregular	1.78	Q3	1471	16
Anaesthesia and Intensive Care	English Australian	SCI	1/month	1.70	Q4	2068	18
Journal of Cardiothoracic and Vascular Anesthesia	English USA	SCI	1/month	1.57	Q4	2903	31
Journal of Anesthesia	English Japan	SCI-E	4/year	1.45	Q4	1934	84
Schmerz	German Germany	SCI	1/month	1.21	Q4	845	0
Anaesthetist	English Germany	SCI	1/month	0.99	Q4	1482	6
Anesthesiology and Intensivmedizin	German Germany	SCI-E	1/month	0.88	Q4	902	0
Revista Brasileira De Anesthesiologica	English Brazil	SCI-E	1/month	0.85	Q4	864	16
AnästhesiologieIntensivmedizin Notfallmedizin Schmerztherapie	Germany German	SCI-E	1/month	0.26	Q4	1206	0
Sum						65594	563



of publications of public hospitals and private hospitals by name and year is given in Table 2. It was determined that 70 university hospitals and 26 ERHs produced publications meeting the determined criteria.

Of the 563 publications, it was seen that 495 were in the field of anaesthesia, 40 in intensive care and 28 in pain. At the same time, it was determined that 82 publications were on paediatric patients.

Table 2. Distribution of the number of publications of state hospitals and private hospitals in journals indexed in anaesthesiology SCI/SCI-E by years

Information of Institutions	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
American Hospital	--	1	--	--	--	--	--	--	--	--	--
Bafra State Hospital	--	--	--	--	1	--	--	--	--	--	--
Carsamba State Hospital	--	--	--	--	--	1	--	--	--	--	--
Corum State Hospital	--	--	1	--	--	--	--	--	--	--	--
Gaziantep Dr Ersin Aslan State Hospital	--	--	--	--	--	--	--	1	--	--	--
Giresun İlhan Özdemir State Hospital	--	--	--	--	--	--	--	--	1	--	--
Maltepe State Hospital	--	--	--	--	--	--	--	--	--	--	1
Medicana International Hospital Istanbul	--	--	--	--	1	--	--	--	--	--	--
Nigde Bor State Hospital	--	--	--	--	--	--	--	--	1	--	--
Tatvan State Hospital	--	--	--	--	1	--	--	--	--	--	--
Ulus State Hospital	--	--	--	--	--	1	--	--	--	--	--
Ümraniye State Hospital	--	--	--	--	--	--	--	--	--	1	1
Sum	--	1	1	--	3	2	--	1	2	1	1

Table 3. Top 10 organisations with the highest number of publications and citations

Institution Name	Number of Publications	Institution Name	Number of Citations
Kocaeli University	32	İstanbul University	744
Erzurum University	23	Hacettepe University	618
Ankara Baskent University	19	Baskent University	504
Adana Baskent University	17	Kocaeli University	467
İnönü University	17	Gazi University	346
İstanbul University	17	Dışkapı Research & Training Hospital	279
Hacettepe University	16	İnönü University	253
Dışkapı Research & Training Hospital	15	Selcuk University	187
Ankara Research & Training Hospital	14	Cukurova University	141
Maltepe University	13	Ege University	131

The university with the highest number of publications was Kocaeli University and the most cited university was Istanbul University. A detailed ranking of the top ten universities with the highest number of publications and the top ten most cited universities are listed in Table 3.

The most commonly cited publication was published in 2010 in the journal *Anaesthesia and Analgesia* by Esmaoğlu et al., named *Dexmedetomidine added to levobupivacaine prolongs axillary brachial plexus block*. The detailed information and citation numbers of the eight most cited articles are given in Table 4.

Discussion

As the higher education institutions and universities started to use the international publication number as an important parameter in academic promotion, the importance given to it and the number of international scientific publications in-

creased rapidly. However, in assessing the academic performance of institutions and individuals, the characteristics of the journal in which the publication is published as well as the number of citations are also important in determining the quality of the publication. Studies over the years have shown that despite the rapid increase in the number of publications, the same increase cannot be seen in the evaluation of publication quality (8, 9). This situation is associated with the lack of motivation for scientific activity due to economic (performance anxiety) and personnel shortcomings, lack of international scholarship programmes, dependence of objectives on individuals, deficiencies in institutional goals, disorganised and fragmented institutions and the difficulties of the late arrival of technology (10). In addition, due to the economic difficulties in the pharmaceutical sector in recent years, the lack of support in research projects, the lack of revision of the indications in drug prospectuses and the ethical difficulties in drug studies, unfortunately, difficulties are encountered as early as in the starting phase of a study.

Table 4. Most cited eight publications and the total number of citations

Publication	Times Cited
1. Esmaoğlu A, Yegenoglu F, Turk CY. Dexmedetomidine added to levobupivacaine prolongs axillary brachial plexus block. <i>Anesthesia and Analgesia</i> . 2010 Dec;111(6):1548–51	134
2. Apfel CC, Heidrich FM, Jukar-Rao S, Jalota L, Hornuss C, Whelan RP, Zhang K, Cakmakkaya OS. Evidence-based analysis of risk factors for postoperative nausea and vomiting. <i>British Journal of Anesthesia</i> . 2012 Oct; 109(5):742–53.	133
3. Hadimioglu N1, Saadawy I, Saglam T, Ertug Z, Dinckan A. The effect of different crystalloid solutions on acid-base balance and early kidney function after kidney transplantation. <i>Anesthesia and Analgesia</i> . 2008 Jul; 107(1):264–9.	95
4. Erdine S, Bilir A, Cosman ER, Cosman ER Jr. Ultrastructural changes in axons following exposure to pulsed radiofrequency fields. <i>Pain Practice</i> . 2009 Nov; 9(6):407–17.	91
5. Tasdogan M, Memis D, Sut N, Yuksel M. Results of a pilot study on the effects of propofol and dexmedetomidine on inflammatory responses and intraabdominal pressure in severe sepsis. <i>Journal of clinical anesthesia</i> . 2009 Sep; 21(6):394–400.	75
6. Konakci S, Adanir T, Yilmaz G, Rezanko T. The efficacy and neurotoxicity of dexmedetomidine administered via the epidural route. <i>European journal of anaesthesiology</i> . 2008 May; 25(5):403–9.	70
7. Sen H, Sizlan A, Yanarates O, Emirkadi H, Ozkan S, Dagli G, Turan A. A comparison of gabapentin and ketamine in acute and chronic pain after hysterectomy. <i>Anesthesia & Analgesia</i> . 2009 Nov; 109(5):1645–50.	63
8. Can M, Gul S, Bektas S, Hanci V, Acikgoz S. Effects of dexmedetomidine or methylprednisolone on inflammatory responses in spinal cord injury. <i>Acta Anaesthesiologica Scandinavica</i> . 2009 Sep; 53(8):1068–72.	60

We determined that there were a total of 65,594 publications from around the world published in the journals we selected and that Turkey constituted 563 of them. Of these, 129 were published in the *Journal of Clinical Anaesthesia* and 84 were published in the *Journal of Anaesthesia* and it was seen that especially in recent years, the increase in the *Journal of Clinical Anaesthesia* was remarkable. We had no Turkey-based publications in the journals *Anästhesiologie & Intensivmedizin*, *Anaesthetist*, *European Journal of Pain*, *Pain and Schmerz*. It is noteworthy that the number of publications in high impact factor journals such as *Anaesthesia & Analgesia*, *Anaesthesia*, *European Journal of Anaesthesiology* and *British Journal of Anaesthesiology* has been decreasing since 2008 and even approaching zero.

When the distribution of publications was examined by years, it was seen that the number of publications went into a very serious decline after 2008 (11.5%) and reached to the lowest level in 2015 (5.5%), but went on to increase again, decreasing yet again in 2017, even though not low at all times and increasing with a large momentum from 2018 (14.7%) to the present and beyond. Similarly, Ozbilgin and Yilmaz found in their study that the number of publications started to decrease in 2011 and the highest decrease was between 2011 and 2012 (6, 7).

When the number of publications was examined according to the types of publication, 98 (17.4%) of all publications were letters to the editor, 54 (9.6%) were observational studies and 41 were case series or case reports. Although 298 (53%) of the publications were randomised controlled studies, the number gradually decreased after 2008 and accounted for 15.4% of

the publications in 2008, followed by a further decrease in number and accounting for only 7%–8% of the publications in 2011. However, the course of letters to the editor and observational publications increased significantly over the years, even to the point that letters to the editor accounted for 50.6% of the publications in 2018 while observational publications were at 13.2%. Swaminathan et al. (11) evaluated the clinical studies of anaesthesia departments in 2007 and reported that Turkey was the country with the highest randomised clinical researches produced with a rate of 88%. Yilmaz et al. (6) stated that this rate decreased with the fact that clinical researches started to be audited more, but they emphasised that they were still at a level that could be considered successful. Ozbilgin and Hanci (7), however, did not specify the courses in years according to the types of publications in their publication. In our study, we observed that the progress of randomised clinical studies was not promising because of the difficulties in the regulations and instead, we observed that the number of observational publications, case reports and letters to the editor increased. However, for the cause, as in other studies, we have associated this with the difficulties in obtaining the approval of the ethics committee after the ‘Regulation on Clinical Researches no. 28030,’ which came into force in 2011. Moreover, we believe that the increasing difficulties in the procedures and the deterioration in economic conditions caused the number of randomised controlled studies to not increase.

In our study, when the top 10 Turkey-based studies with the highest number of citations in WoS since 2008 were examined, it was seen that most of these studies were randomised

clinical trials and were published in high quality journals and it was also observed that these studies were carried out by universities or ERHs. In addition, we believe that international multicentric studies can be cited more, even if they are published later, which can facilitate publication in high impact factor journals and increase their number of citations. Again, we believe that with regulating the studies on increasing randomised controlled studies or experimental studies, the likelihood of publication of the researches in high impact factor journals will increase together with the number of citations. We consider that education is very important in the master-apprentice relationship, the number of multicentre clinical studies will increase with the increase in doctoral programmes in the anaesthesia branch abroad and the knowledge and skills acquired by individuals will have a positive effect on the scientific performances of their institutions.

It was determined that 452 (80.3%) of our high impact factor publications were based on university hospitals, 99 (17.6%) on ERHs and 12 (2.1%) on others (private and public hospitals). It is noteworthy that some universities and research hospitals, whose main task is to produce science, had no publications or that some institutions only produced publications within certain years by certain individuals. Yilmaz et al. (6) mentioned the same subject in their studies and argued that after meeting the minimum requirements for the transition to a possible faculty membership, academicians could change their institution and city, which would affect the effectiveness of scientific research in the institutions where they were separated and they emphasised that scientific research and scientific writing culture of publications should be made independent of individuals and institutionalised. In addition to these, based on the findings we obtained, we believe that in addition to determining the short-term or long-term scientific objectives of institutions, studies should be planned on these objectives and the results will not change even if the individuals change. In addition, we think that providing physicians working in state hospitals with higher numbers and different potentials of patients with easier access to scientific databases throughout the country, making national multicentre joint studies together with university hospitals or ERHs when necessary and providing scientific publication writing and statistical support will increase efficiency.

Examining the course of publications according to subjects, it was observed that over the years, 88% of the publications were made in the area of anaesthesia and publications in the fields of pain and intensive care constituted 12% of the total amount. Yilmaz et al. obtained similar results in their study and associated this with these branches of science being newly established (6). We are in the opinion that more experience is needed to publish in these few journals with high impact factor and that this can be achieved through international multicentre collaborations if necessary.

The ranking tables of anaesthesia clinics in universities according to the number of publications in the field of anaesthesiology and the number of citations between the years 2008 and 2018 were found to be different from each other. This shows once again that the increase in the number of publications is not the same as the number of citations. In addition, we think that the name confusions of institutions damage the identity of the institutions. For example, in WoS, Cerrahpasa, Istanbul and Capa medical faculties come under the name of Istanbul University and are the first in the total number of citations, but it is obvious that changing their names will reduce the number of citations and cause confusion. We can explain this argument also with the Baskent universities that have separate campuses in different cities. In WoS, the publications of all medical faculties come up as Baskent University under a common identity and it is seen that they are at the top of the rankings in both numbers and citations. Gurbuz et al. mentioned a similar issue in their bibliometric study on the field of orthopaedics and emphasised that the names of authors and institutions should always be written in the same way and that this is important in the follow-up of scientific activities. As a recommendation, they stated that 'The Ministry of Health and the Turkish Orthopaedic and Traumatology Society' could play an effective role in developing infrastructure (5).

While Turkey has the 16th largest economy and the 16th largest population in the world, it was shown that Ulakbim ranked Turkey 19th in producing scientific papers in the report announced in 2015. In the top five rankings are the United States of America, Germany, the United Kingdom, Canada and Japan, respectively, with their advanced economies in proportion to their level of development (12). It is difficult to understand that it has such a great impact on the economy, but does not have the same effect in the production of information and technology. In addition, the medical sciences report of Ulakbim in the field of medical sciences in 2016 ranks Turkey 20th among the countries and in the category of medical topics, anaesthesiology could not enter the top 10 subject categories within the first rankings of biochemistry, molecular biology and neuroscience (13). However, unfortunately, no Turkey-based journals are found indexed in SCI or SCI-E and the number of journals indexed in SCI or SCI-E is only 31. For this reason, anaesthetists sometimes tend to publish their scientific articles related to the anaesthesia field, in which they are interested, in the high impact factor journals of different branches. For example, a publication about transplantation anaesthesia can be published in a journal of transplantation. Therefore, we believe that rankings performed in this way may not reflect the truth very well.

Onat (4) stated that despite the increase in the number of publications, the same increase did not reflect in the publication quality. More recently, Ozbilgin and Hanci (7) have also

emphasised that an adequate publication quality was not obtained in the results of their analysis (6). In our study, as in the studies of Yilmaz and Ozbilgin, we think that countries like China (7th), India (13th) and South Korea (14th), which show rapid growth in their economies, are probably adopting the scientific publication policy as a country policy, they are able to obtain new technology with their increasing economies nowadays and scientific articles are transformed into scientific production and technology.

In our study, both WoS and PubMed databases were included. However, since WoS included poster presentations of the congresses that they are associated with, we used the PubMed database, which does not include posters and is frequently updated when creating the publication list.

In addition, in our study, we aimed at presenting the progress of publications and types of publication from Turkey in years, unlike the previous bibliometric studies. Our aim here is to show how the current socioeconomic status of countries and state policies on science can be effective on quality publications and state that institutions and countries should determine their long-term science and research policies.

The facts that Turkey-based annual publication averages are not given and the number of publications per faculty member in institutions is not mentioned are the limitations in our publication. Since 2008, there have been serious changes in the structure of some institutions in our country, some institutions have been opened while some have been closed or the names of the institutions have been changed. We are of the opinion that the number of publications and the number of citations will not be fair for some newly established institutions. In addition, publication subjects and subject headings were created while the study was being planned but could not be divided into subheadings. The reason for this was that some of the subjects were much intertwined and could not be collected under a single title (e.g. ultrasound, regional anaesthesia, obstetric anaesthesia and postoperative pain subheadings).

We believe that our study will be guiding all the authors who are at the stage of writing or sending a publication when evaluated with the current catalogue information of journals and the number of Turkey-based publications within the years.

Conclusion

Although the number of publications in the field of anaesthesia in our country seems to be increasing, scientific studies are mostly carried out for academic advancement and the aim of the research is put into the second plan. The number of multicentric and randomised controlled trials with a high number of citations needs to increase. Written and verbal platforms

where the difficulties of scientific publication are discussed, solutions are presented and experiences are shared should be updated with more and new data every year.

Ethics Committee Approval: Authors declared that the research was conducted according to the principles of the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects”, (amended in October 2013).

Informed Consent: N/A.

Peer-review: Externally peer-reviewed.

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