A bibliometric analysis of the field of anesthesia during 2009–2018

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Abstract
Objective: The limited number of bibliometric studies in the literature have generally focused on the top-cited studies in the field of anesthesia, however, there is a lack of studies that made a holistic bibliometric evaluation of these works. The purpose of this study is to make a contemporary summary of the articles published in the field of anesthesia within the last 10 years through detailed bibliometric methods.

Methods: The articles published between the years 2009 and 2018 were downloaded from the Web of Science (WoS) database and analyzed using bibliometric methods. The literature review was conducted using the keyword “Anesthesiology” in the “Research Area” category via the advanced search option available in WoS. The relation between the number of publications of the countries and the Gross Domestic Products and Human Development Index values were analyzed using Spearman’s correlation coefficient. The number of articles between the years 2019 and 2021 was estimated through linear regression analysis.

Results: A review of the literature indicated 41,003 articles in the Web of Science database. Estimations included 4,910 (3,971–5,849) articles for the year 2019. There was a high-level positive significant correlation between the number of publications and Gross Domestic Product (r = 0.776, p < 0.001).

Conclusion: The findings show that countries with high income are effective in the field of anesthesia, which indicates a strong association between research productivity and economic development. Undeveloped and developing countries should be encouraged to conduct research in the field of anesthesia.

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Introduction

Evaluation of the knowledge in literature is becoming more and more difficult for researchers every day because there are an increasing number of scientific publications and the access to medical literature has become easier. Although the review of the literature has become easier with the development of internet-based search engines, making a holistic evaluation and accessing important publications about a topic or field is not always that easy in searches performed with keywords.\(^1,2\) Bibliometric analyses enable the measurements of the quality and quantity of the publications conducted by individuals, institutions, and countries.\(^3,4\) Such analysis reveals various types of information such as contemporary research, effective journals, the collaboration between countries, institutions, and authors and citation and co-citation networks.\(^5-7\)

The science of Anesthesiology is a scientific field that considers patient safety before, during and after any surgical intervention and focuses on the whole care, including the elimination of pain. The first written document in the field of anesthesia was written in 1847 by John Snow.\(^8\) Since that day, Anesthesia has become a rather wide discipline with its various research areas, which increases the number of studies every day. The limited number of bibliometric studies in the literature have generally focused on the top-cited studies in the field of anesthesia, clinical studies in anesthesia departments, anesthetic medicine and the contribution of some countries to anesthesia research.\(^9-13\) However, there is a lack of studies that made a holistic bibliometric evaluation of the works in the field of anesthesia. The purpose of this study is to make a contemporary summary of the articles published in the field of anesthesia within the last 10 years through detailed bibliometric methods, identify the top-cited publications in the field, and to identify the most influential journals, especially trend topics.

Methods

Bibliometric analyses were performed using the VOSviewer (Version 1.6.10) package program.\(^14\) The articles published between the years 2009 and 2018 were downloaded from the Web of Science database (Web of Science Core Collection database maintained by Clarivate Analytics. Access date: 29.3.2019) and were analyzed using bibliometric methods. The literature review was conducted using the keyword “Anesthesiology” in the “Research Area” category using the advanced search option available in WoS [code: SU = (Anesthesiology) Refined by: Document Types: (Article) Indexes = SCI-EXPANDED, SSCI, A&HCI, CPCI-S, CPCI-SSH, ESCI Timespan = 2009–2018]. Statistical analyses were conducted with SPSS (Version 22.0, SPSS Inc., Chicago, IL, USA, License: Hitit University). The relation between the number of publications of the countries and the Gross Domestic Product (GDP), Gross Domestic Product per capita (at purchasing power parity; GDP PPP), and Human Development Index (HDI) values was analyzed using the Spearman’s correlation coefficient. A correlation coefficient of 0.90 to 1.00 was considered very high, 0.70 to 0.89 was considered high, 0.50 to 0.69 was considerate moderate and 0.26 to
0.49 was low. The number of articles to be published in the field of anesthesia between the years 2019 and 2021 was estimated through linear regression analysis. Statistical significance was taken \( p < 0.05 \).

Results

A review of the literature indicated 84,290 publications in the WoS (Web of Science) database, and those publications were retrieved for statistical analysis purposes. Distribution of these publications according to document type was found as article 41,003 (48.6%), letter 14,195 (16.8%), meeting abstract 12,121 (14.4%), editorial material 8,651 (10.3%), review 6,498 (7.7%), correction 995 (1.2%), proceedings paper 751 (0.9%), news item 208 (0.2%), biographical item 203 (0.2%), book chapter 48 (0.1%) and other (retracted publication, retraction, reprint, bibliography: 48; 0.1%). Bibliometric analyses were performed with 41,003 publications in the article category. Of these publications, 36,799 (89.7%) were in English, which was followed by Czech 2697 (6.6%), French 981 (2.4%), Spanish 280 (0.7%), Portuguese 208 (0.5%), Turkish 25 (0.1%), and other (Slovak, Dutch, Italian, Polish) 10 (< 0.1%) languages.

Development of publications and citations

Fig. 1 demonstrates the distribution of the publications between 2009 and 2018. In addition, it displays publication estimations for the years between 2018 and 2021 with the confidence interval obtained through regression analysis. Estimations included 4,910 (3,971–5,849) articles for the year 2019, 5,090 (3,826–6,354) articles for the year 2020, and 5,271 (3,749–6,792) articles for the year 2021. Regression analysis results indicate that the number of articles in the field of anesthesia will exceed 5000 in 2021.

Active countries

Fig. 2 displays the publication distributions of the world countries in the field of anesthesia. The USA 11,835 (28.9%) was the country that made the top contribution to the field of anesthesia. The USA was followed by Germany 4,853 (11.8%), England 2,745 (6.7%), Canada 2,652 (6.5%), France 2,568 (6.3%), Japan 2,176 (5.3%), Australia 1,984 (4.8%), China 1,875 (4.6%), India 1,782 (4.3%), Netherlands 1,436 (3.5%), South Korea 1,432 (3.5%), Italy 1,391 (3.4%), Denmark 1,086 (2.6%), Switzerland 1,048 (2.6%), Spain 1,021 (2.5%), Turkey 953 (2.3%), Sweden 877 (2.1%), Belgium 831;
A total of 159 countries produced publications in the field of Anesthesia. Fig. 3 displays the international collaboration analysis performed among the 79 countries that had at least 5 publications.

Active journals

There were 64 journals where these articles were published. Table 1 demonstrates the average number of citations calculated according to the proportion of number of citations and number of publications. Among these, 62 journals had at least 20 publications. The citations among these are given in the visualization map in Fig. 4.

Active organization

Table 2 demonstrates the top 15 Organizations and Organizations-Enhanced that produced the highest number of publications in the field of anesthesia. There were a total of 19,317 organizations that produced articles. Fig. 5 demonstrates the international collaboration cluster analysis of 66 organizations that had at least 150 publications.

Active authors

Table 3 demonstrates the authors that produced the highest number of articles in the field of anesthesia. Sessler DI, who published 231 articles, was the top author.

Citation analysis

Table 4 shows the top 15 documents according to the number of citations.

Trending topics

A total number of 38,790 words were used in the keywords sections of all articles. Table 5 demonstrates the frequency of these words use. In addition, a bibliometric analysis was performed with 134 keywords that were used at least 100 times, and Fig. 6 demonstrates the clusters and relations between these words. Fig. 7 shows the network visualization map of keywords by year. Fig. 8 displays the network visualization map of the keywords used in the top-cited articles.

Correlation analysis

There was a high-level, positive, and statistically significant correlation between the number of publications and GDP and GDP PPP \( (r = 0.776, p < 0.001; r = 0.737, p < 0.001, \text{ respectively}) \). In addition, there was a moderate-level statistically significant correlation between the number of publications and HDI \( (r = 0.649, p < 0.001) \).

Discussion

This bibliometric analysis study has obtained important results that provide researchers in the field of anesthesia with a comprehensive analysis of the articles published in the field of anesthesia within the last decade.

As expected, the USA was the country that contributed to the field of anesthesia the most. The Fig. 2 demonstrating the publication productivity of the countries also indicates that the economic power of the countries is associated with their publication productivity. The correlation analysis also showed that there was a high correlation between the number of articles and GDP and GDP PPP, which confirmed this hypothesis. Thus, low income level of the countries has important effects on the low number of publications. Although the level of economic development is seen as an important factor in the number of publications, it was remarkable that countries such as China, India, Turkey,
Table 1  Active journals in the field of Anesthesia.

| Journals                                      | RC    | C      | AC    | Journals                                      | RC    | C      | AC    |
|-----------------------------------------------|-------|--------|-------|-----------------------------------------------|-------|--------|-------|
| Anesthesiology                               | 2106  | 61078  | 29.00 | Korean Journal of Anesthesiology              | 290   | 655    | 2.26  |
| Pain                                          | 2515  | 72586  | 28.86 | Seminars in Cardiothoracic and Vascular Anesthesia | 111   | 207    | 1.86  |
| British Journal of Anaesthesia                | 1953  | 44637  | 22.86 | Anaesthesiology Intensive Therapy             | 126   | 233    | 1.85  |
| Chronic Pain and Addiction                    | 8     | 176    | 22.00 | Annals of Cardiac Anesthesia                   | 300   | 552    | 1.84  |
| Current Opinion in Anesthesiology            | 342   | 7305   | 21.36 | Anesthesiologie Intensivmedizin Schmerztherapie | 739   | 1180   | 1.60  |
| Anesthesia and Analgesia                      | 3310  | 53972  | 16.31 | Indian Journal of Anaesthesia                  | 460   | 713    | 1.55  |
| Regional Anesthesia and Pain Medicine         | 819   | 13070  | 15.96 | A & A Case Reports                             | 461   | 688    | 1.49  |
| Anaesthesia                                   | 1264  | 18915  | 14.96 | Journal of Pain & Palliative Care Pharmacotherapy | 84    | 123    | 1.46  |
| Clinical Journal of Pain                      | 1118  | 16497  | 14.76 | Anesthesiologie & Intensivmedizin             | 341   | 481    | 1.41  |
| European Journal of Pain                      | 1402  | 20590  | 14.69 | BJA Education                                 | 192   | 265    | 1.38  |
| European Journal of Anaesthesiology          | 886   | 11405  | 12.87 | Anesthesiology Research and Practice          | 76    | 95     | 1.25  |
| Pain Medicine                                 | 1792  | 21807  | 12.17 | Revista Española de Anestesiología y Reanimación | 289   | 321    | 1.11  |
| Journal of Neurosurgical Anesthesiology       | 402   | 4492   | 11.17 | International Anesthesiology Clinics          | 56    | 57     | 1.02  |
| Acta Anaesthesiologica Scandinavica          | 1382  | 15417  | 11.16 | Turkish Journal of Anaesthesiology and Reanimation | 243   | 240    | 0.99  |
| Canadian Journal of Anesthesia/Journal canadien d’anesthesie | 848   | 9350   | 11.02 | Trends in Anaesthesia and Critical Care       | 44    | 43     | 0.98  |
| Pain Physician                                | 856   | 9362   | 10.94 | Local and Regional Anesthesia                 | 40    | 38     | 0.95  |
| Minerva Anaesthesiologica                     | 912   | 8322   | 9.13  | Acta Anaesthesiologica Belgica               | 74    | 59     | 0.80  |
| Pediatric Anesthesia                          | 1255  | 11425  | 9.10  | Egyptian Journal of Anaesthesia               | 230   | 173    | 0.75  |
| Pain Practice                                 | 727   | 6308   | 8.68  | Douleur et analgesie                          | 101   | 51     | 0.50  |
| International Journal of Obstetric Anesthesia | 501   | 4056   | 8.10  | Anaesthesia and Intensive Care Medicine       | 276   | 123    | 0.45  |
| Anaesthesia and Intensive Care                | 960   | 6377   | 6.64  | Southern African Journal of Anaesthesia and Analgesia | 132   | 57     | 0.43  |
| Journal of Clinical Anesthesia                | 1032  | 6562   | 6.36  |                                              |       |        |       |
Table 1 (Continued)

| Journals                                           | RC  | C    | AC  | Journals                                           | RC  | C    | AC  |
|----------------------------------------------------|-----|------|-----|----------------------------------------------------|-----|------|-----|
| Journal of Cardiothoracic and Vascular Anesthesia  | 1979| 11889| 6.01| Ja clinical reports                                | 199 | 57   | 0.29|
| Journal of Clinical Monitoring and Computing       | 798 | 4354 | 5.46| Anaesthesia Pain & Intensive Care                 | 302 | 82   | 0.27|
| Journal of anesthesia                              | 1366| 7439 | 5.45| Anaesthesie & reanimation                         | 226 | 58   | 0.26|
| BMC Anesthesiology                                 | 894 | 4232 | 4.73| A & A Practice                                     | 188 | 34   | 0.18|
| Schmerz                                            | 515 | 2380 | 4.62| Anestesiologi a Intenzivni Medicina                | 156 | 25   | 0.16|
| Anaesthesist                                        | 1040| 4090 | 3.93| Pediatric Anesthesia and Critical Care Journal    | 73  | 10   | 0.14|
| Annales francaises d anesthesie et de reanimation  | 716 | 2626 | 3.67| Sri Lankan Journal of Anaesthesiology             | 95  | 8    | 0.08|
| Anaesthesia Critical Care & Pain Medicine          | 201 | 681  | 3.39| Indian anaesthetists forum                         | 65  | 4    | 0.06|
| Best Practice & Research-Clinical Anaesthesiology  | 58  | 174  | 3.00| Ain Shams Journal of Anesthesiology               | 11  | 0    | 0.00|
| Brazilian Journal of Anesthesiology/Revista Brasilera de Anesthesiologia | 719 | 2156 | 3.00|                                                   |     |      |     |

RC, Record Count; C, Number of Citation; AC, Average Citation.
Brazil and Egypt had notable contributions to publication productivity.

A similar result was found in the study conducted by Swaminathan et al. (2007). In addition, similar to the results in the present study, the top three countries that made the biggest contribution to the literature were the USA, Germany, and Japan in this order. According to the international collaboration analysis results between countries, Belgium-Netherlands, England-Ireland-Wales-Northern Ireland, Finland-Norway-Denmark-Sweden-Poland, for instance, were in the same cluster, which indicates that geographical location is one of the biggest factors for collaboration in the field of anesthesia.
Table 4  The 15 most cited manuscripts in the field of Anesthesia.

| N° | Article                                                                                           | Author                                         | Journal                          | PY  | TC  | AC  |
|----|---------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------|-----|-----|-----|
| 1  | Early exposure to anesthesia and learning disabilities in a population-based birth cohort         | Wilder RT, Flick RP, Sprung J, et al.          | Anesthesiology                   | 2009| 699 | 63.55|
| 2  | Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: Anaesthesia | Cook TM, Woodall N, Frerk C.                  | British Journal of Anaesthesia   | 2011| 652 | 72.67|
| 3  | Practice guidelines for management of the difficult airway: an updated report by the American Society of Anesthesiologists Task Force on management of the difficult airway | Group author(s): Amer Soc Anesthesiologists    | Anesthesiology                   | 2013| 547 | 78.57|
| 4  | The evidence for pharmacological treatment of neuropathic pain                                     | Finnerup NB, Sindrup SH, Jensen, TS           | Pain                             | 2010| 543 | 54.40|
| 5  | Quantitative sensory testing in the German Research Network on Neuropathic Pain (DFNS): somatosensory abnormalities in 1,236 patients with different neuropathic pain syndromes | Maier C, Baron R, Toelle TR, et al.            | Pain                             | 2010| 466 | 46.70|
| 6  | Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults | Frerk C, Mitchell VS, McNarry AF, et al.      | British Journal of Anaesthesia   | 2015| 443 | 88.80|
| 7  | Management of severe perioperative bleeding Guidelines from the European Society of Anaesthesiology | Kozek-Langenecker SA, Afshari A, Albaladejo P, et al. | European Journal of Anaesthesiology | 2013| 442 | 63.14|
| 8  | Sensitization in patients with painful knee osteoarthritis                                         | Arendt-Nielsen L, Nie H, Laursen, MB, et al.   | Pain                             | 2010| 434 | 43.60|
| 9  | Validity of four pain intensity rating scales                                                       | Ferreira-Valente, MA, Pais-Ribeiro, JL, Jensen MP | Pain                             | 2011| 415 | 46.33|
| 10 | Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 2: intensive care and emergency departments | Cook TM, Woodall N, Harper J, et al.          | British Journal of Anaesthesia   | 2011| 385 | 42.89|
| N  | Article                                                                 | Author                                                                                           | Journal                  | PY  | TC  | AC  |
|----|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------|-----|-----|-----|
| 11 | Consensus guidelines for the management of postoperative nausea and vomiting | Gan, TJ, Diemunsch, P, Habib, AS, et al.                                                        | Anesthesia and Analgesia | 2014| 384 | 64.00 |
| 12 | Major complications of central neuraxial block: report on the Third National Audit Project of the Royal College of Anaesthetists | Cook TM, Counsell D, Wildsmith JAW. Group author(s): Royal Coll Anaesthetists Third Nat          | British Journal of Anaesthesia | 2009| 383 | 34.82 |
| 13 | Long-term consequences of postoperative cognitive dysfunction           | Steinmetz J, Christensen, KB, Lund T, et al. Group author(s): ISPOCD Grp                          | Anesthesiology           | 2009| 364 | 33.18 |
| 14 | Practice guidelines for acute pain management in the perioperative setting: an updated report by the American Society of Anesthesiologists Task Force on acute pain management | Ashburn MA, Caplan RA, Carr, DB, et al.                                                         | Anesthesiology           | 2012| 362 | 45.13 |
| 15 | Relationship between intraoperative mean arterial pressure and clinical outcomes after noncardiac surgery: toward an empirical definition of hypotension | Walsh M, Devereaux PJ, Garg, AX, et al.                                                         | Anesthesiology           | 2013| 362 | 51.86 |

PY, Publication Year; TC, Total Citation; AC, Average Citations per Year.
Table 5  The first 134 trend keywords in the field of Anesthesia.

| Keyword | O | Keyword | O | Keyword | O | Keyword | O |
|---------|---|---------|---|---------|---|---------|---|
| Pain    | 1656 | Fibromyalgia | 248 | Rocuronium | 153 | Headache | 116 |
| Chronic pain | 1208 | Hyperalgesia | 243 | Ventilation | 149 | Meta-analysis | 116 |
| Anesthesia | 949 | Sedation | 243 | Congenital heart disease | 146 | Spinal cord stimulation | 116 |
| Anaesthesia | 682 | Depression | 227 | Hemodynamics | 143 | Anesthesiology | 115 |
| Neuropathic pain | 662 | Critical care | 218 | Quantitative sensory testing | 142 | Pain assessment | 115 |
| Opioid | 661 | Bupivacaine | 212 | Sugammadex | 142 | Thoracic surgery | 115 |
| Cardiac surgery | 652 | Ultrasonography | 209 | Complex regional pain syndrome | 114 | Laryngoscopy | 114 |
| Analgesia | 623 | Fentanyl | 207 | Morphine | 205 | Analgesics | 134 |
| Propofol | 579 | Postoperative | 206 | Transfusion | 135 | Allosthenia | 113 |
| Complication | 571 | Morphine | 205 | Analgesics | 134 | Bispectral index | 113 |
| Dexametomidine | 566 | Spinal anesthesia | 204 | Postoperative analgesia | 133 | Elderly | 113 |
| Pediatric | 502 | Postoperative complications | 198 | Epidemiology | 132 | Liver transplantation | 113 |
| Children | 488 | Acute pain | 196 | Migraine | 131 | Perioperative care | 113 |
| Postoperative pain | 445 | Airway | 195 | General anaesthesia | 130 | Resuscitation | 112 |
| Surgery | 430 | Anxiety | 195 | Intensive care unit | 129 | Assessment | 111 |
| Cardiopulmonary bypass | 401 | Sepsis | 195 | Randomized controlled trial | 129 | Back pain | 111 |
| Sevoflurane | 388 | Acute kidney injury | 188 | Pediatric anaesthesia | 128 | Laryngeal mask airway | 111 |
| Ultrasound | 373 | Regional anesthesia | 188 | Spinal anaesthesia | 127 | Pain measurement | 109 |
| Intubation | 368 | Nerve block | 187 | Dexamethasone | 126 | Bleeding | 108 |
| General anesthesia | 349 | Cesarean section | 186 | Disability | 125 | Levobupivacaine | 108 |
| Airway management | 340 | Cesarean section | 186 | Infant | 125 | Nociception | 107 |
| Pain management | 322 | Echocardiography | 185 | Midazolam | 125 | Pregabalin | 106 |
| Intensive care | 315 | Lidocaine | 183 | Regional anaesthesia | 125 | Survey | 106 |
| Monitoring | 312 | Pharmacokinetics | 181 | Spinal cord | 123 | Spinal | 105 |
| Low back pain | 294 | Risk factors | 178 | Trauma | 123 | Blood pressure | 104 |
| Outcome | 287 | Education | 169 | Cancer pain | 122 | Blood transfusion | 104 |
| Mortality | 286 | Ropivacaine | 165 | Cardiac arrest | 121 | General | 104 |
| Transesophageal echocardiography | 274 | Safety | 165 | Epidural analgesia | 121 | Cancer | 103 |
| Cardiac output | 272 | Quality of life | 162 | One-lung ventilation | 120 | Central sensitization | 103 |
| Remifentanil | 266 | Difficult airway | 161 | Postoperative nausea and vomiting | 120 | Clonidine | 103 |
| Ketamine | 263 | Hypotension | 160 | Chronic low back pain | 118 | Regional | 102 |
| Child | 262 | Obesity | 156 | Delirium | 118 | Hypothermia | 100 |
| Pregnancy | 256 | Mechanical ventilation | 155 | Extracorporeal membrane oxygenation | 118 | Equipment | 117 |
| Epidural | 248 | Patient safety | 154 | | | |

O, Number of occurrences.
The top five journals that produced the highest number of publications in the field of anesthesia within the last decade were Anesthesia and Analgesia, Pain, Anesthesiology, Journal of Cardiothoracic, Vascular Anesthesia and British Journal of Anaesthesia respectively. The five top-cited journals according to the number of total citations were Pain, Anesthesiology, Anesthesia and Analgesia, British Journal of Anaesthesia and Pain Medicine. Anesthesiology, Pain, British Journal of Anaesthesia, Chronic Pain and Addiction, Current Opinion in Anesthesiology, Anesthesia and Analgesia, Regional Anesthesia and Pain Medicine, Anaesthesia, Clinical Journal of Pain and European Journal of Pain were found to be the most influential journals according to the number of citations per publication. Researches could consider these journals in order to receive more citations and increase the visibility of their studies.

The institutions that made the highest contributions to the literature were the University of Toronto, Harvard University, University of Washington, Cleveland Clinic, and Stanford University. Collaboration between universities also demonstrated the effect of geographical region. Sessler DI, Anonymous Lee JH, Dexter F, Arendt-Nielsen L, Wulf H, Weiss M, and Pagel PS were the authors who made more than 100 article contributions within the last decade.

The article entitled “Early exposure to anesthesia and learning disabilities in a population-based birth cohort”, published in the Journal of Anesthesiology and written by Wilder et al. (2009) was most cited article. It was followed by the study entitled “Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: Anaesthesia”, written by Cook et al. (2011) and published in the Journal of British Journal of Anaesthesia. According to the average number of citations per year, the top effective study was the article entitled “Difficult Airway Society 2015 guidelines for management of unanticipated difficult intubation in adults” in the British Journal of Anaesthesia, written by Frerk et al. (2015).
According to the keyword analysis results, the trend keywords were found as dexmedetomidine, dexamethasone, ultrasonography, critical care, delirium, acute kidney injury, patient safety, airway management, and difficult airway. Dexmedetomidine, a relatively new medicine whose use has been increasing, is an α2-adrenergic receptor agonist and wide-spectrum sedative; the medicine is widely used in intensive care units and delirium treatment. Through the trials using ischemic and inflammatory response models, dexmedetomidine was reported to have an anti-inflammatory effect with protective properties against ischemia/reperfusion injury. With its increasing use in the field of anesthesia, there was an increase in the number of publications about dexmedetomidine what led it to take place among the keywords that were trends in critical care and delirium.

Due to its anti-inflammatory, anti-allergic, immunosuppressive functions and effects on almost every organ, dexamethasone is a frequently used medicine group. Corticosteroids have numerous known and proven effects on all systems. The fact that they take an important place as the trend keywords in the field of anesthesia is considered a result from its wide effect mechanism as well as its wide use in regional anesthesia practices that became even more practical with Ultrasonography (USG).

Decreasing the loss in health sector caused by medical errors to minimum and monitoring and recording the cases that threaten patient and worker safety and enhancing patient safety is an issue that recently became increasingly important. This case has also been approved by the number of articles published. Patient safety will always maintain its popularity, as long as medicine and patient exist.

The keywords found in the top-cited articles were: neuropathic pain, fibromyalgia, hyperalgesia, allodynia, complex regional pain syndrome and regional. The majority of the cited topics were about pain. It is important to have good knowledge about pain mechanisms so that it could be possible to manage pain, which has a wide definition and affects a large section of the community. Although the wide use of USG accelerated the studies about regional anesthesia and pain, what is known about the pain and its physiopathology is still less than what is not known. Therefore, studies on pain seem to increase.

Conclusion
The findings show that countries with high income are effective in the field of anesthesia, which indicates a strong association between research productivity and economic development. In other words, strong economy seems to increase scientific outcomes in the field of anesthesia. Underdeveloped and developing countries should be encouraged to conduct research in the field of anesthesia. Parallel to the increasing importance of anesthesia, this study is the first one to investigate the scientific productivity performance and make a holistic evaluation in the field of anesthesia. We believe that such studies conducted at certain intervals are beneficial in terms of improving expertise and identifying the goals. This study provides doctors, academics and students in the field of anesthesia with important information about the last decade of anesthesia.

Ethical approval
This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent
For this type of study formal consent is not required.

Conflicts of interest
The authors declare no conflicts of interest.

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