



# The evolution of the regional anesthesia: a holistic investigation of global outputs with bibliometric analysis between 1980-2019

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**Background:** This study used bibliometric analysis of articles published about the topic of regional anesthesia from 1980-2019 with the aim of determining which countries, organizations, and authors were effective, engaged in international cooperation, and had the most cited articles and journals.

**Methods:** All articles published from 1980-2019 included in the Web of Science database and found using the keywords *regional anesthesia/anaesthesia, spinal anesthesia/anaesthesia, epidural anesthesia/anaesthesia, neuraxial anesthesia/anaesthesia, combined spinal-epidural, and peripheral nerve block* in the title section had bibliometric analysis performed. Correlations between the number of publications from a country with gross domestic product (GDP), gross domestic product (at purchasing power parity) per capita (GDP PPP), and human development index (HDI) values were investigated with the Spearman correlation coefficient. The number of articles that will be published in the future was estimated with linear regression analysis.

**Results:** Literature screening found 11,156 publications. Of these publications, 6,452 were articles. The top 4 countries producing articles were United States of America (n = 1,583), Germany (585), United Kingdom (510), and Turkey (386). There was a significant positive correlation found between the GDP, GDP PPP, and HDI markers for global countries with publication productivity ( $r = 0.644, P < 0.001$ ;  $r = 0.623, P < 0.001, r = 0.542, P < 0.001$ ). The most productive organizations were Harvard University and the University of Toronto.

**Conclusions:** This comprehensive study presenting a holistic summary and evaluation of 6,452 articles about this topic may direct anesthesiologists, doctors, academics, and students interested in this topic.

**Key Words:** Anesthesia, Conduction; Anesthesia, Epidural; Anesthesia, Spinal; Anesthesiologists; Bibliographies as Topic; Bibliometrics; Gross Domestic Product; Nerve Block; Publications.

## INTRODUCTION

Regional anesthesia is defined as a temporary removal of nerve conduction and pain senses in certain regions of

the body with local anesthetic medications without causing loss of consciousness [1]. When regional anesthesia is compared with general anesthesia, the frequency of use is increasing, due to early mobilization, high analgesia level,

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shortened hospital stay, and lower postoperative nausea and vomiting [2]. Additionally, due to the increase in the use of ultrasonography, currently, regional anesthesia techniques are performed more reliably and effectively [3]. Though it is commonly believed that regional anesthesia is more reliable than general anesthesia, especially among elderly patients, no significant difference has been demonstrated between the two anesthesia types in terms of mortality and morbidity [4].

Bibliometric analysis is a method used to analyze the effect of research outputs like articles and book using quantitative measurements [5-8]. Bibliometric analyses may determine potential research cooperation between countries, organizations or authors in new and developing research areas [9-11]. Citation analysis analyzes how many times articles belonging to an author, country or journal are cited by others and reveals the effect of a certain author, country or journal in a certain field [12,13]. With the increase in publication numbers in recent times, many bibliometric analyses have been performed in the health field [5-13]. Articles included in common bibliometric analyses in these unique studies in the literature generally are found using databases like Web of Science, but also PubMed and Scopus.

Though the frequency of use of regional anesthesia, instead of general anesthesia, has been increasing in recent years, there is still no comprehensive bibliometric research about this topic in the literature. This study aimed to perform bibliometric analysis of articles published from 1980-2019 about the topic of regional anesthesia, to determine which countries, organizations, and authors are effective, international cooperation and most cited articles and journals in this field. Additionally, correlation analyses aimed to reveal factors affecting publication productivity. Keywords analysis aimed to determine current research areas and trends in relation to this topic.

## MATERIALS AND METHODS

Literature scanning was performed with the Web of Science (WoS: by Clavariate Analytics) database (access date: 23.08.2020). All articles containing the search keywords in the 'Title' section, published from 1980-2019 in the WoS database, had bibliometric analysis performed. The search keywords used the following codes: "regional anesthesia" or "regional anaesthesia" or "spinal anesthesia" or "spinal anaesthesia" or "epidural anesthesia" or "epidural anaesthesia" or "neuraxial anesthesia" or "neuraxial anaesthesia" or "combined spinal epidural" or "combined spinal and epidural" or "peripheral nerve block" Timespan: 1980-2019. Indexes: SCI-Expanded, SSCI, A&HCI, CPCI-S, CPCI-

SSH, BKCI-S, BKCI-SSH, ESCI. For bibliometric network visualization, the VOSviewer (version 1.6.13) program was used [14].

Statistical analyses used the SPSS version 22.0 (IBM Co., Armonk, NY) program. Normal distribution of data was tested with the Shapiro-Wilk test. The correlation analyses between the number of articles produced by countries with economic and development markers of gross domestic product (GDP), gross domestic product purchasing power parity (GDP PPP), and human development index (HDI) used the Spearman correlation analysis suitable for data distribution. Linear regression analysis was used to predict the number of publications in future years.  $P < 0.05$  was accepted as statistically significant.

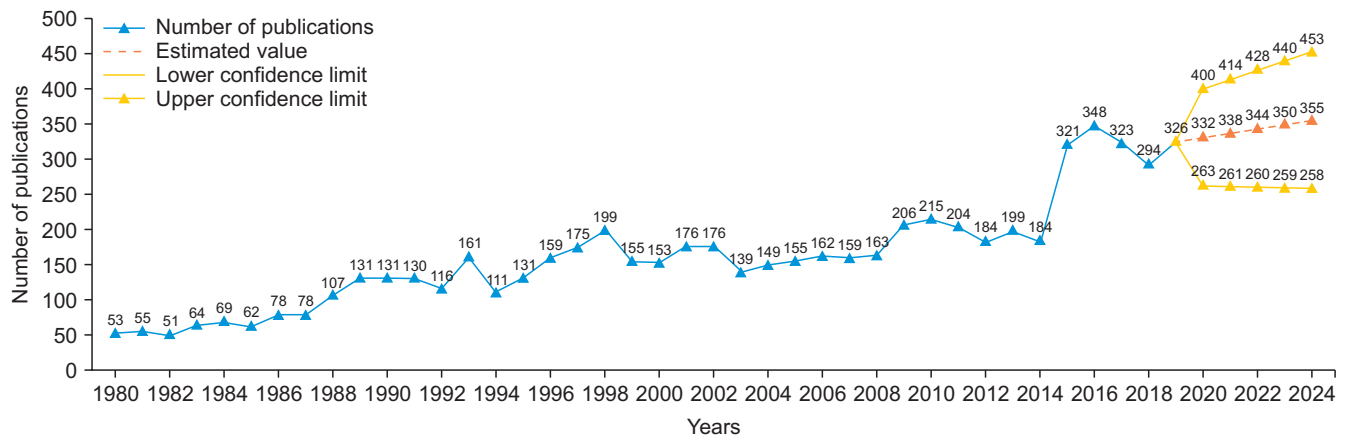
## RESULTS

Literature screening found a total of 11,156 published items. Of these items, 6,452 were articles, 1,947 were letters, 1,372 were meeting abstracts, 505 were proceedings papers, 490 were reviews, and the remaining were other types of publication (390 publications; editorial materials, notes, corrections, book chapters, early access, news items, biographical items, book reviews, correction additions, retracted publications, books, discussions, reprints, retractions, items about an individual, data papers, and software reviews).

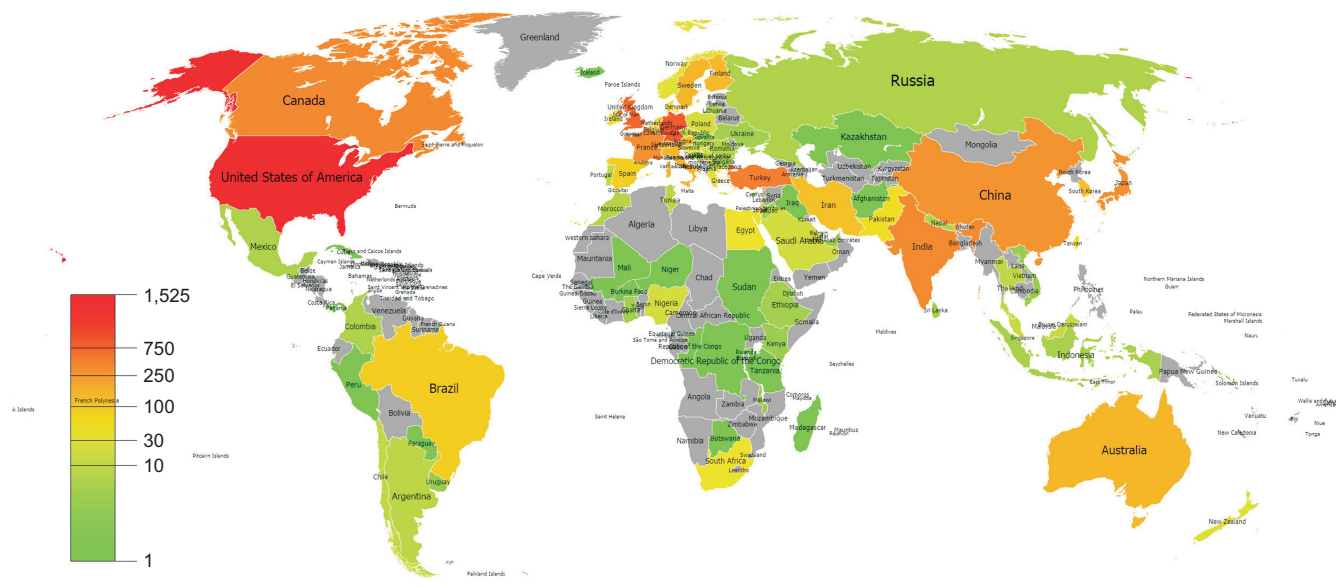
The research only performed bibliometric analysis of the 6,452 published articles. Of the 6,452 articles, there were a total of 107,533 citations (85,550 without self-citations), and the h-index of articles was 108, with average citations per item 16.67. Of the articles, 90% (5,815) were published in the English language. The remaining 10% were published in other languages (German [380], French [140], Portuguese [32], Russian [23], Spanish [21], Turkish [20], Czech [9], Korean [5], Dutch [2], Serbian [2], Chinese [1], Japanese [1], and Slovenian [1]).

### 1. Research areas

The top 15 research areas for the published articles were anesthesiology (4,120, 63.9%), general internal medicine (525, 8.1%), surgery (470, 7.3%), obstetrics and gynecology (380, 5.9%), critical care medicine (289, 4.5%), experimental medical research (177, 2.7%), veterinary sciences (176, 2.7%), orthopedics (166, 2.6%), clinical neurology (141, 2.2%), pediatrics (140, 2.2%), pharmacology/pharmacy (130, 2.0%), peripheral vascular disease (110, 1.7%), cardiac cardiovascular systems (97, 1.5%), urology nephrology (78, 1.2%), and neurosciences (74, 1.1%).



**Fig. 1.** Number of publications by years on regional anesthesia.



**Fig. 2.** World map for the publication productivity of worldwide countries on regional anesthesia.

## 2. Development of publications and citations

The distribution of articles, according to year, is shown in **Fig. 1**. Additionally, the number of published items in future years, estimated with regression analysis, is given in **Fig. 1**. The estimated number of published items was 332 (263-400) for 2020, and 355 (258-453) for 2024.

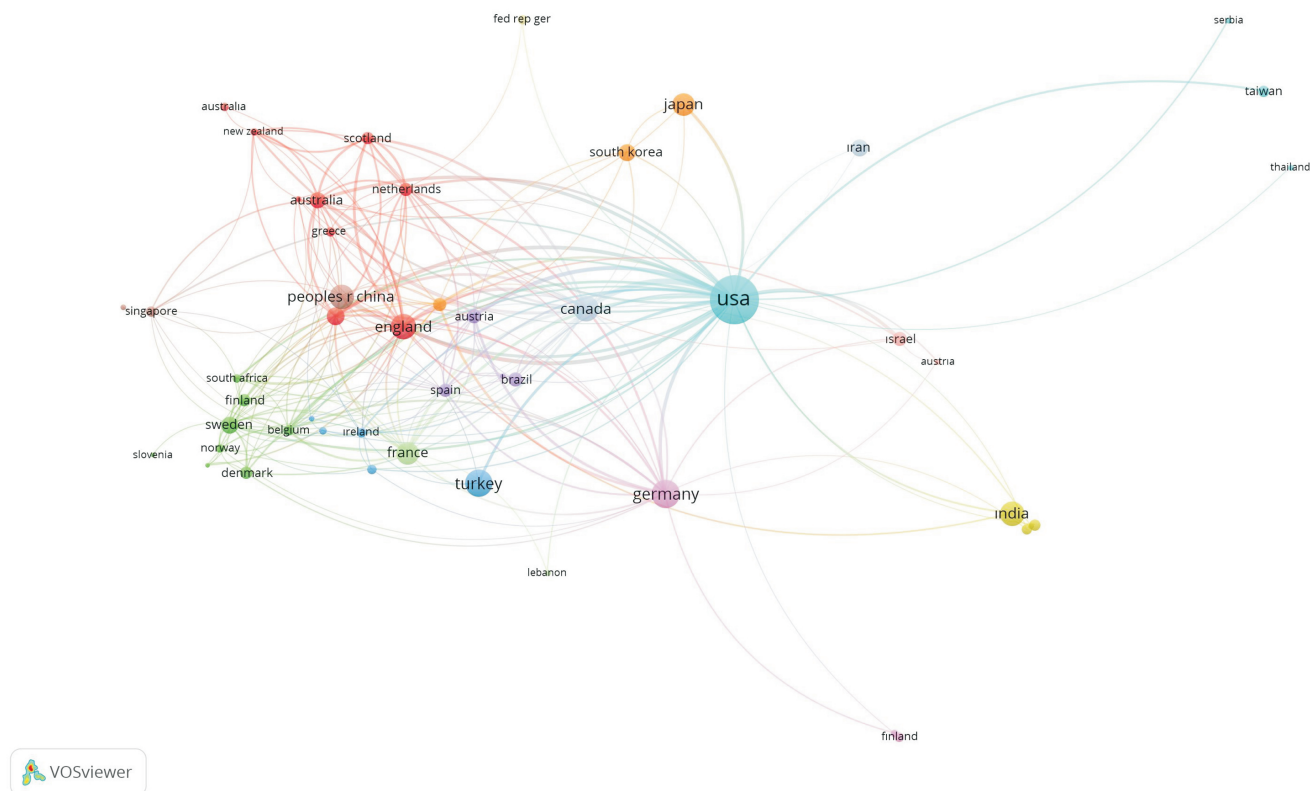
## 3. Active countries

The distribution of articles according to countries in the world is shown in **Fig. 2**. The active countries producing more than 100 articles were the United States of America (USA) (1,583), Germany (585), the United Kingdom (510), Turkey (386), Canada (338), India (315), Japan (307), France (298), China (289), Sweden (162), Australia (158), Italy (155),

Finland (143), South Korea (130), Switzerland (130), Iran (129), Austria (110), and the Netherlands (103), in order. A total of 119 countries produced 6,452 articles. Of these countries, the network map showing international cooperation between the 50 countries with at least 10 articles is shown in **Fig. 3**.

## 4. Correlation analysis

There were statistically significant level correlations found between the number of articles produced by countries on the topic of regional anesthesia with GDP, GDP PPP, and HDI ( $r = 0.644, P < 0.001$ ;  $r = 0.623, P < 0.001$ ,  $r = 0.542, P = 0.001$ ).



**Fig. 3.** Network visualization map for international collaboration of worldwide countries on regional anesthesia.

## 5. Active journals

The 6,452 articles were published in a total of 1,015 journals. Among these journals, there were 50 with at least 15 articles about the topic. The top 50 journals produced most of the articles shown in **Table 1**. Additionally, the final column of the table shows the total citation numbers received by the journals and the mean citation number per article. The citation density map between these journals is shown in **Fig. 4**.

## 6. Active organizations

The top 25 organizations and enhanced organizations producing articles are shown in **Table 2**.

## 7. Active authors

The top 16 authors producing most articles were Rosenberg PH (49), Wulf H (29), Chan VWS (28), Neal JM (28), Horlocker TT (27), Sessler DI (25), Van Aken H (25), Kee WDN (23), Sharrock NE (23), Datta S (22), Hebl JR (22), Khaw KS (22), Nolte H (22), Saito Y (22), Standl T (22), and Tuominen M (22), in descending order.

## 8. Citation analysis

According to total citation numbers, the top 20 articles receiving most citations from past to present are presented in **Table 3**. The final column of the table additionally gives the number of citations per year for the article.

## 9. Co-citation analysis

The reference sections of 6,452 articles cited 69,813 publications. Among these publications there are 8 with more than 100 citations. These publications receiving most citations are, in order, Rodgers et al. (2000) (Number of citations: 168), Auroy et al. (1997) (160), Carpenter et al. (1992) (124), Bromage (1965) (110), Rigler et al. (1991) (110), Moen et al. (2004) (108), Vandermeulen et al. (1994) (105), and Greene (1985) (104) [15-22].

## 10. Trend topics

In the 6,452 articles, a total of 6,551 different keywords were used. The network map related to the results of cluster analysis of 88 of these keywords, used in at least 20 different articles, is shown in **Fig. 5**, with the network map, related to trend word analysis, shown in **Fig. 6**. The most used medication in articles published about the topic of

**Table 1.** Active journals on regional anesthesia

Journals	RC	C	AC	Journals	RC	C	AC
Anesthesia and Analgesia	654	22,176	33.9	Anesthesiologie & Intensivmedizin	36	262	7.3
Acta Anaesthesiologica Scandinavica	303	5,039	16.6	Canadian Journal of Anesthesia-Journal Canadien D Anesthesie	29	386	13.3
Anesthesiology	295	14,621	49.6	Journal of Clinical and Diagnostic Research	29	45	1.6
Regional Anesthesia and Pain Medicine	267	7,223	27.1	Medicine	29	122	4.2
British Journal of Anaesthesia	262	8,599	32.8	American Journal of Obstetrics and Gynecology	28	889	31.8
Anaesthesist	221	1,112	5.0	Journal of International Medical Research	28	159	5.7
Anaesthesia	210	4,276	20.4	International Journal of Clinical and Experimental Medicine	27	55	2.0
Canadian Journal of Anaesthesia-Journal Canadien D Anesthesie	173	3,509	20.3	Paediatric Anaesthesia	26	328	12.6
International Journal of Obstetric Anesthesia	172	2,212	12.9	Turkish Journal of Anaesthesiology and Reanimation	25	45	1.8
Regional Anesthesia	157	2,670	17.0	Canadian Anaesthetists Society Journal	23	337	14.7
Journal of Clinical Anesthesia	144	1,943	13.5	Indian Journal of Anaesthesia	23	51	2.2
European Journal of Anaesthesiology	120	1,738	14.5	Egyptian Journal of Anaesthesia	21	15	0.7
Anaesthesia and Intensive Care	99	1,151	11.6	Journal of Arthroplasty	21	265	12.6
Annales Francaises D Anesthesie Et De Reanimation	88	535	6.1	Medical Science Monitor	21	106	5.0
Journal of Evolution of Medical And Dental Sciences-Jemds	77	10	0.1	Pakistan Journal of Medical & Health Sciences	21	8	0.4
Journal of Anesthesia	66	448	6.8	Obstetrics and Gynecology	19	687	36.2
Revista Brasileira De Anesthesiologia	62	250	4.0	Saudi Journal of Anaesthesia	18	43	2.4
Anesthesiologie Intensivmedizin Notfallmedizin Schmerztherapie	60	153	2.6	Ja Clinical Reports	17	7	0.4
Journal of Cardiothoracic and Vascular Anesthesia	47	574	12.2	Korean Journal of Anaesthesiology	17	51	3.0
Bmc Anesthesiology	46	174	3.8	Pain Medicine	17	195	11.5
Current Opinion in Anesthesiology	43	1,012	23.5	International Anesthesiology Clinics	17	212	12.5
Minerva Anesthesiologica	38	376	9.9	Vestnik Khirurgii Imeni I I Grekova	16	6	0.4
Pediatric Anesthesia	38	717	18.9	International Journal of Scientific Study	16	5	0.3
Periodicum Biologorum	38	30	0.8	Journal of Clinical Monitoring and Computing	15	106	7.1
Anaesthesia Pain & Intensive Care	36	13	0.4	Essentials of Regional Anesthesia	15	7	0.5

RC: record count, C: number of citation, AC: average citation per document.

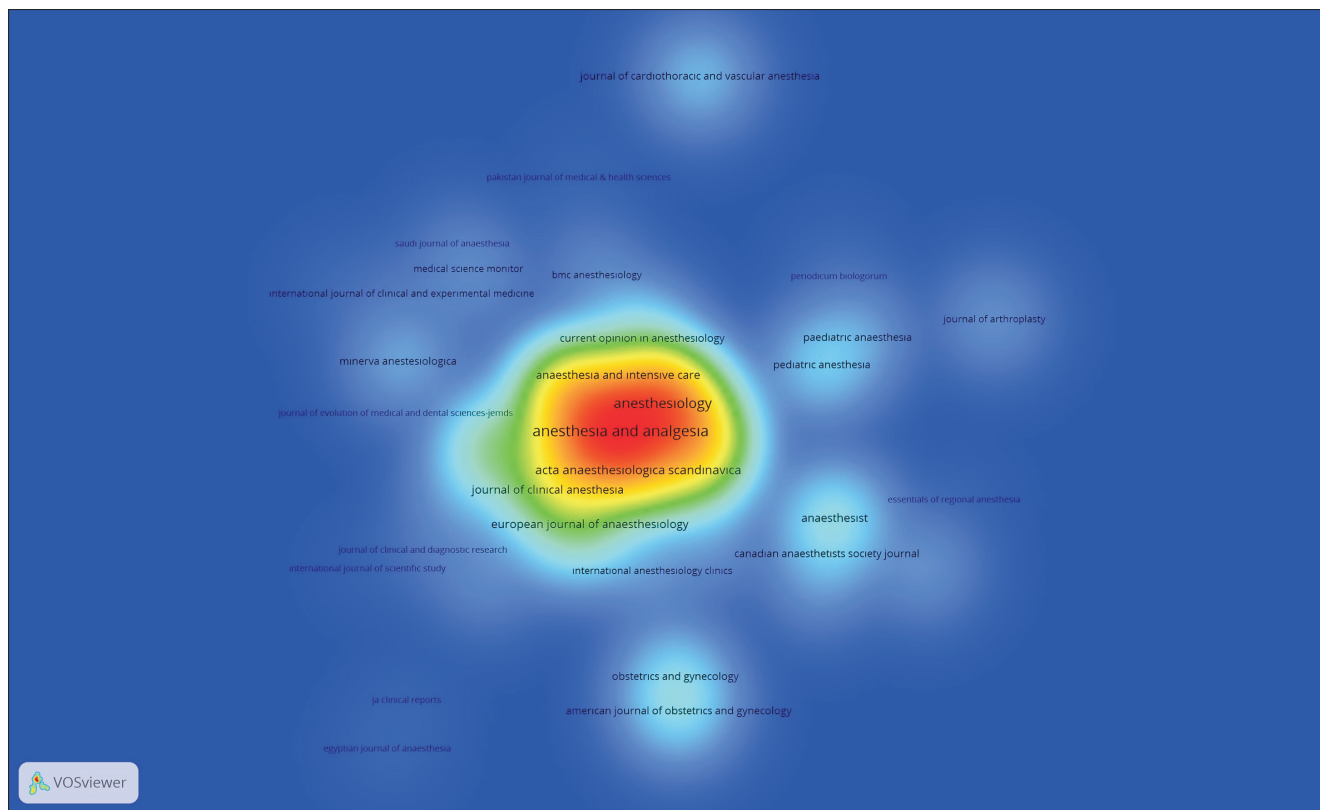


Fig. 4. Density map for citation analysis of active journals on regional anesthesia.

regional anesthesia were bupivacaine (199), dexmedetomidine (108), lidocaine (100), ropivacaine (91), fentanyl (69), levobupivacaine (56), clonidine (51), propofol (41), ketamine (34), and phenylephrine (33) (Table 4).

## DISCUSSION

According to our research findings, a significant increasing trend was found for the number of articles about the topic of regional anesthesia. Initially there were low numbers of articles (a mean of 50 articles per year), with the annual mean rising to 107-215 articles from 1988-2015, before reaching over 300 articles annually from 2015 to the present date. When regression analysis results are assessed, it appears the increasing trend for articles will continue.

When the article distribution by country was investigated, it was observed that developed countries [23] had effective article production (the USA, Germany, the United Kingdom, Canada, Japan, France, Sweden, Australia, Italy, Finland, South Korea, Switzerland, Austria, and the Netherlands). However, developing countries, led by Turkey, such as India, China, and Iran had a notable effect on article productivity. Some bibliometric research in the literature determined that the economic size of a country, or development level, had a significant effect on academic

publication productivity [5,13-22,24]. In our study, the significant correlation results found between the number of articles produced by countries and certain development indicators confirm the results of the literature. When the common authorship cooperation of countries is evaluated, clusters like Denmark-Sweden-Finland, or Germany-Switzerland, or Australia-New Zealand show that neighboring geographic region was the most important factor for cooperation.

When the analyzed articles were assessed according to total citation numbers received, the study with the most citations in total was determined to be the study published in the *Journal of Pain* in 2016 by Chou et al. [25]. After this study, the study with most total citations was the study published in *Anesthesiology* in 1997 by Auroy et al. [16]. In third place for citations was a study by Yeager et al. (1987) published in *Anesthesiology* [26]. When evaluated according to annual mean citation numbers, the most effective article was the study by Chou et al. (2016) in the *Journal of Pain*, with a mean of 111.4 citations [25]. The next most effective study after this was by Davidson et al. (2016) published in the *Lancet* [27]. According to co-citation analysis findings, all articles commonly cited studies by Rodgers et al. (2000), Auroy et al. (1997), Carpenter et al. (1992), Bromage (1965), Rigler et al. (1991), Moen et al. (2004), Vandermeulen et al. (1994), and Greene (1985) [15-22]. It is recom-

**Table 2.** Active organization and organizations-enhanced on regional anesthesia

Organizations	RC	Organizations-enhanced	RC
Harvard University	97	Harvard University	147
University Toronto	96	University of Toronto	129
Stanford University	63	Assistance Publique Hopitaux Paris Aphp	99
Virginia Mason Med Ctr	62	University of California System	98
Duke University	51	Brigham Women S Hospital	84
University Calif San Francisco	47	University of Helsinki	82
University Washington	47	Mayo Clinic	75
Mayo Clinic	45	Helsinki University Central Hospital	74
Brigham Womens Hospital	44	University Health Network Toronto	70
University Helsinki	44	Virginia Mason Medical Center	66
Northwestern University	43	Stanford University	64
Hospital Special Surgery	42	Cornell University	61
Chinese University Hong Kong	41	University of Munster	59
Cornell University	39	Duke University	55
University Pittsburgh	38	University of Texas System	55
University Texas	38	University of Copenhagen	52
University British Columbia	36	Pennsylvania Commonwealth System of Higher Education Pcshe	50
Mcgill University	35	Ruhr University Bochum	49
Wake Forest University	32	University of California San Francisco	47
Tel Aviv University	30	University of Washington	47
University Melbourne	30	University of Washington Seattle	46
University Tsukuba	30	University of London	45
Yale University	30	Northwestern University	44
Klinikum Minden	28	University of British Columbia	43
Seoul Natl University	26	Chinese University of Hong Kong	42

RC: record count.

mended that researchers interested in this topic initially read the studies determined by citation and co-citation analyses in this study.

The most active journals producing more than 200 articles were *Anesthesia and Analgesia*, *Acta Anaesthesiologica Scandinavica*, *Anesthesiology*, *Regional Anesthesia and Pain Medicine*, the *British Journal of Anaesthesia*, *Anaesthesist*, and *Anaesthesia*. Authors wishing to produce articles about this topic may initially pay attention to these journals. When the top 50 journals producing the most articles are assessed according to citation numbers per article, the results according to analysis of the citation network map found the journals *Anesthesiology*, *Obstetrics and Gynecology*, *Anesthesia and Analgesia*, *British Journal of Anaesthesia*, the *American Journal of Obstetrics and Gynecology*, and *Regional Anesthesia and Pain Medicine* received the most citations. Researchers wishing to gain more citations for their articles on this topic may submit to these journals.

When keyword analysis results are assessed, according to trend analysis results in the early years, topics like shivering, anxiety, and caesarean section were followed by dexmedetomidine in order of frequency. In later years, trends in topics studied were determined to be dexamethasone, postoperative analgesia, ketamine, hemodynamics,

spinal anesthesia, bupivacaine, and hypotension.

As a result of literature screening, we encountered only 1 study similar to the bibliometric study of our research. Fathi et al. (2015) performed bibliometric research for epidural anesthesia [28]. Firstly, our study is more comprehensive in terms of topic, year interval, and article numbers than this study. The study determined the top 10 authors, organizations, and countries in the distribution of publications about the topic of epidural anesthesia from 1990 to 2013. Our study includes keywords not included in that study, and we also performed citation analysis for journals and articles, and determined international cooperation. Our study is the most comprehensive research analyzing the highest number of articles about this topic.

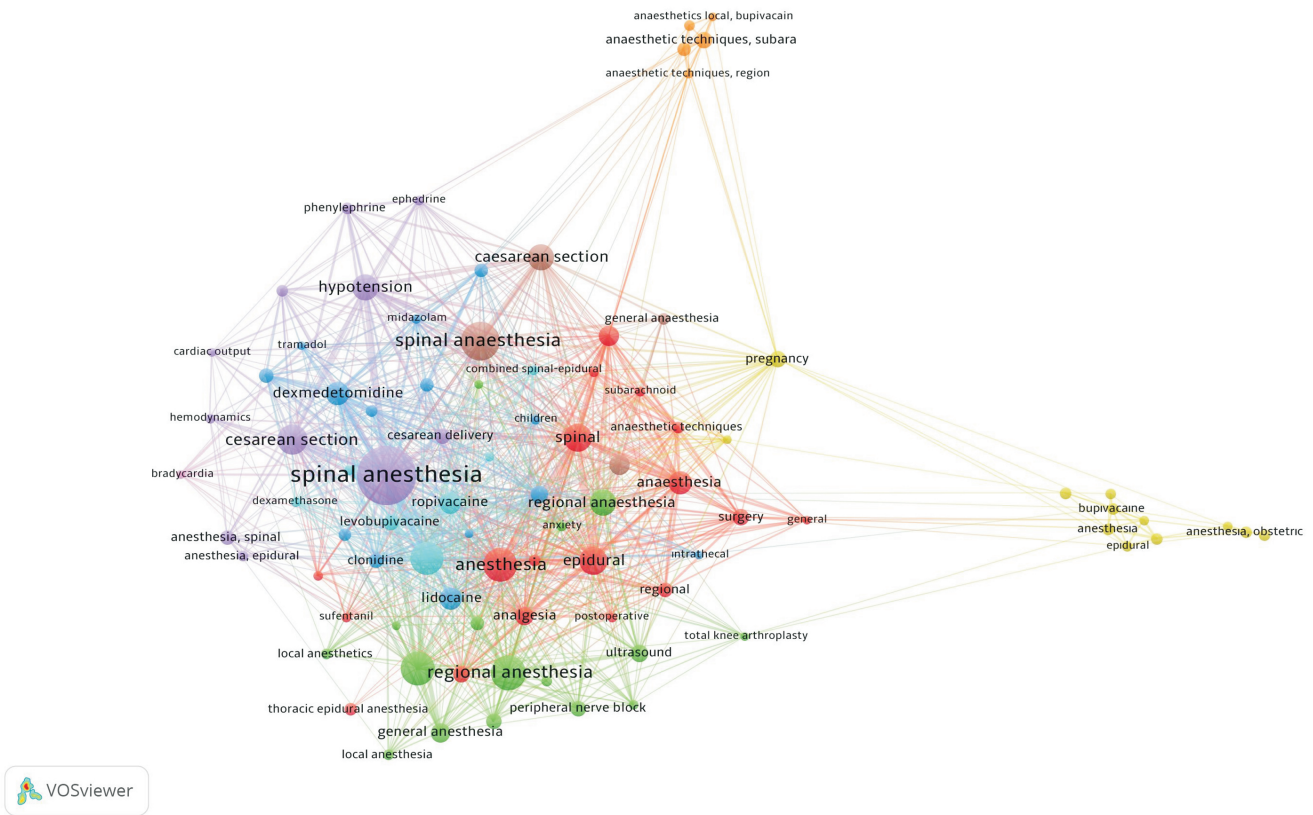
A limitation of our study is that only the WoS database was used for literature scanning. Databases like PubMed, Google Scholar, and Scopus were not used, because the WoS database indexes articles published in journals with a higher impact factor compared to the other databases [5,24]. Additionally, in situations where more than one database is used for bibliometric studies analyzing large numbers of articles, the inclusion of the same article more than once in the analysis may affect the reliability of the results. Another limitation is; it may be that while using the “peripheral nerve block” as a search word, we did not

**Table 3.** The 15 most cited manuscripts on regional anesthesia

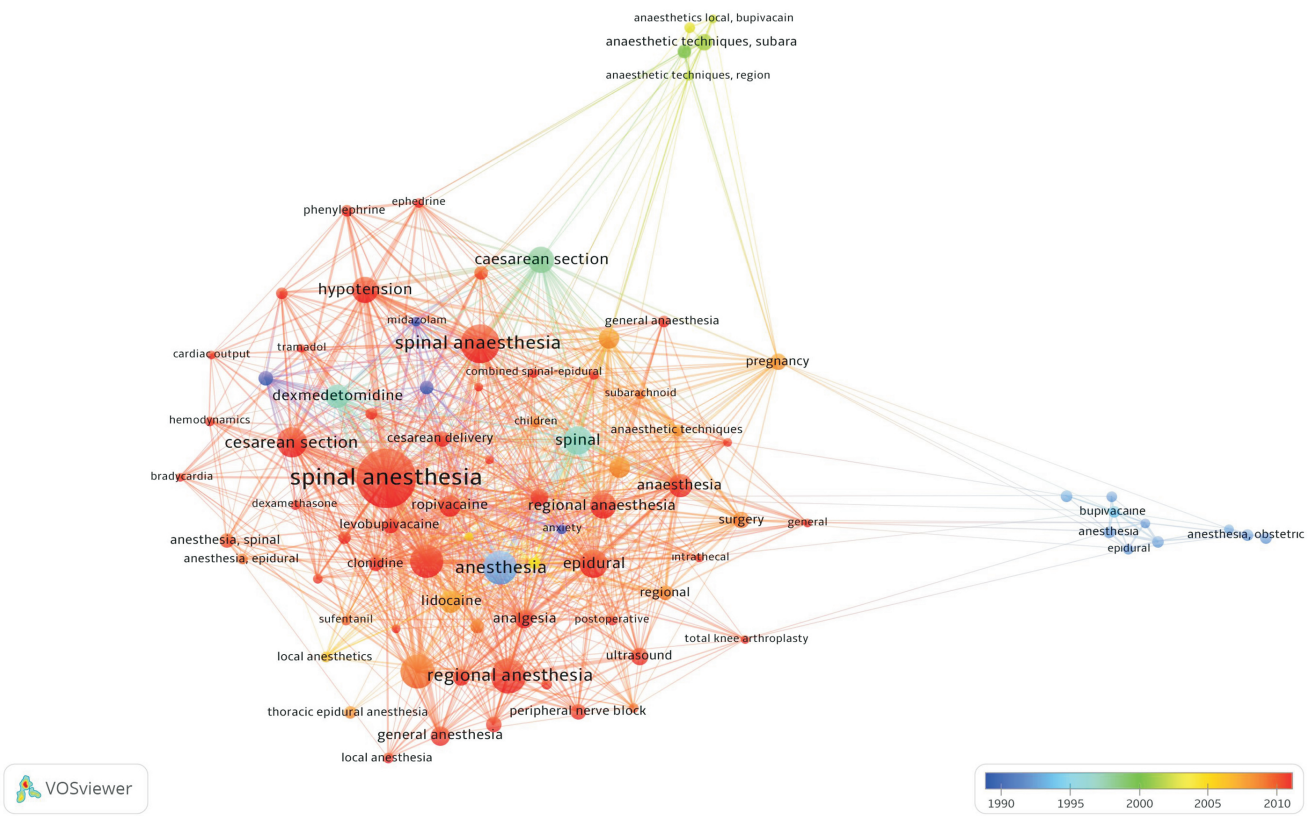
No.	Article	Author	Journal	PY	TC	AC
1	Management of postoperative pain: a clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council	Chou et al.	Journal of Pain	2016	699	139.8
2	Serious complications related to regional anesthesia: results of a prospective survey in France	Auroy et al.	Anesthesiology	1997	649	27.04
3	Epidural anesthesia and analgesia in high-risk surgical patients	Yeager et al.	Anesthesiology	1987	635	18.68
4	Epidural anaesthesia and analgesia and outcome of major surgery: a randomised trial	Rigg et al.	Lancet	2002	598	31.47
5	Major complications of regional anesthesia in France: the SOS regional anesthesia hotline service	Auroy et al.	Anesthesiology	2002	559	29.42
6	Cauda equina syndrome after continuous spinal anesthesia	Rigler et al.	Anesthesia and Analgesia	1991	434	14.47
7	Effects of epidural anesthesia and analgesia on coagulation and outcome after major vascular surgery	Tuman et al.	Anesthesia and Analgesia	1991	398	13.27
8	Neurodevelopmental outcome at 2 years of age after general anaesthesia and awake-regional anaesthesia in infancy (GAS): an international multicentre, randomised controlled trial	Davidson et al.	Lancet	2016	394	78.80
9	Epidemiology and morbidity of regional anesthesia in children: a one-year prospective survey of the French-Language Society of Pediatric Anesthesiologists	Giauffré et al.	Anesthesia and Analgesia	1996	375	15
10	Neurological complications after regional anesthesia: contemporary estimates of risk	Brull et al.	Anesthesia and Analgesia	2007	346	24.71
11	Does continuous peripheral nerve block provide superior pain control to opioids? A meta-analysis	Richman et al.	Anesthesia and Analgesia	2006	329	21.93
12	Tumescent technique for regional anesthesia permits lidocaine doses of 35 mg/kg for liposuction	Klein	Journal of Dermatologic Surgery and Oncology	1990	315	10.16
13	Effects of regional anesthesia on phantom limb pain are mirrored in changes in cortical reorganization	Birbaumer et al.	Journal of Neuroscience	1997	307	12.79
14	Incidence and risk factors for side effects of spinal anesthesia	Carpenter et al.	Anesthesiology	1992	284	9.79
15	Unexpected cardiac arrest during spinal anesthesia: a closed claims analysis of predisposing factors	Caplan et al.	Anesthesiology	1988	282	8.55
16	Effect of epidural anesthesia and analgesia on perioperative outcome: a randomized, controlled Veterans Affairs cooperative study	Park et al.	Annals of Surgery	2001	273	13.65
17	Regional anaesthesia and antithrombotic agents: recommendations of the European Society of Anaesthesiology	Gogarten et al.	European Journal of Anaesthesiology	2010	261	23.73
18	Ultrasound guidance compared with electrical neurostimulation for peripheral nerve block: a systematic review and meta-analysis of randomized controlled trials	Abrahams et al.	British Journal of Anaesthesia	2009	244	20.33
19	Ultrasound-guided supraclavicular approach for regional anesthesia of the brachial plexus	Kapral et al.	Anesthesia and Analgesia	1994	219	8.11
20	A quantitative, systematic review of randomized controlled trials of ephedrine versus phenylephrine for the management of hypotension during spinal anesthesia for cesarean delivery	Lee et al.	Anesthesia and Analgesia	2002	217	11.42

PY: publication year, TC: total citation, AC: average citations per year.





**Fig. 5.** Network visualization cluster map for keyword analysis on regional anesthesia.



**Fig. 6.** Network visualization map for trends based on keyword analysis on regional anesthesia.

**Table 4.** The first trend keywords on regional anesthesia

Keyword	O	Keyword	O	Keyword	O	Keyword	O
spinal anesthesia	574	pain	63	phenylephrine	33	complication	24
spinal anaesthesia	265	anaesthetic techniques, subarachnoid	60	spinal	33	subarachnoid	24
regional anesthesia	227	surgery	58	bupivacaine	32	anesthetic techniques	23
epidural anesthesia	214	pregnancy	58	spinal anesthesia	32	anxiety	23
anesthesia	214	levobupivacaine	56	anesthesia, obstetric	31	dexamethasone	23
bupivacaine	199	cesarean delivery	54	anesthetic techniques, spinal	31	hemodynamics	23
cesarean section	173	nerve block	53	anesthetic techniques	31	intrathecal	23
epidural	154	peripheral nerve block	53	ondansetron	31	obstetric	23
spinal	152	clonidine	51	anesthesia, epidural	30	postoperative	23
caesarean section	137	shivering	51	neuraxial anesthesia	30	anaesthetic techniques, regional	22
hypotension	133	anesthesia, spinal	49	local anesthetics	29	caesarean delivery	22
regional anaesthesia	131	regional	49	anaesthetic techniques, epidural	28	postoperative analgesia	22
anaesthesia	113	anaesthesia, obstetric	43	epidural anesthesia	28	tramadol	22
dexmedetomidine	108	sedation	43	local anesthesia	28	bradycardia	21
lidocaine	100	epidural analgesia	42	epidural	27	general	21
ropivacaine	91	propofol	41	anesthetic techniques, epidural	26	intravenous regional anesthesia	21
complications	89	thoracic epidural anesthesia	38	children	26	anaesthetics local, bupivacaine	20
epidural anaesthesia	89	postoperative pain	37	combined spinal-epidural	26	blood pressure	20
general anesthesia	79	anaesthetic techniques	35	midazolam	26	cardiac output	20
analgesia	74	general anaesthesia	34	ephedrine	25	labor analgesia	20
fentanyl	69	ketamine	34	meta-analysis	25	total knee arthroplasty	20
ultrasound	65	anesthesia	33	sufentanil	25	intrathecal	20

O: number of occurrences.

include variations of this technique for example, brachial plexus block, femoral nerve block, sciatic nerve block, etc.

In conclusion, we presented a summary of 6,452 studies that were in the article category among the studies on regional anesthesia between 1980-2019. This summary will allow an anesthesiologist or other researcher to see the most effective articles, most cited articles, and perhaps the articles that should initially be read in relation to this topic. Observing which journals which produce the most articles in this field, and which journals contain articles receiving most citations, will allow easy assessment of current data. This study may provide an idea about which topics were studied according to year, an investigation of the trending topics, and an identification of new research topics. Additionally, researchers can see the impact level of countries and organizations in relation to this topic. This article will be a beneficial guide for clinicians and scientists about the global output in the field of regional anesthesia.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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