



The Evolution of Ambulatory Anesthesia Publications: A Bibliometric Analysis (1980-2025)

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ABSTRACT

Objective: Ambulatory anesthesia has become a cornerstone of modern surgical care, yet its scientific literature has not previously been subjected to a comprehensive bibliometric evaluation. This study aimed to analyze global research output on ambulatory anesthesia between 1980 and 2025 and to identify publication trends, the most productive countries, institutions, authors, and journals, influential articles, and emerging research themes.

Methods: Documents published between 1980 and 2025 were retrieved from the Web of Science Core Collection using a structured Boolean search strategy. Only original articles and review articles were included. Bibliometric network visualizations were generated with VOSviewer, and statistical analyses, including cubic regression to future output, were performed.

Results: A total of 1,364 documents were retrieved; of these, 1,078 original articles and reviews were included. These publications received 32,104 citations in total, with an average of 29.78 citations per item and an h-index of 81. The United States was the most productive country, followed by England, Germany, Canada, and France; Türkiye ranked sixth. Anesthesia and Analgesia was the most productive journal, and White PF was the most prolific author. The most cited article addressed the etiology, treatment, and prevention of postoperative nausea and vomiting. Propofol, recovery, and short-acting volatile agents dominated the keyword landscape.

Conclusion: Research on ambulatory anesthesia has grown steadily over four decades and remains dominated by high-income countries. The findings underline the field's enduring focus on rapid recovery, antiemesis, and patient safety, providing a reference map for researchers, clinicians, and journals.

Keywords: Ambulatory anesthesia, day-case surgery, bibliometrics, scientometrics, publication trend analysis

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INTRODUCTION

Ambulatory anesthesia, also referred to as day-case or outpatient anesthesia, encompasses the anesthetic management of patients who are admitted, operated upon, and discharged on the same calendar day. Over the past four decades, driven by advances in short-acting anesthetic agents, minimally invasive surgical techniques, enhanced recovery pathways, and mounting economic pressure on hospital resources, an increasing proportion of surgical procedures worldwide has migrated to the ambulatory setting. The founding of the Society for Ambulatory Anesthesia in 1984 and the subsequent publication of dedicated consensus statements and day-case guidelines reflect the maturation of ambulatory anesthesia as a distinct subspecialty.

Bibliometrics is a scientific field that applies statistical and mathematical methods to the quantitative analysis of published

literature and describes publication patterns within a defined area. First proposed by Pritchard in 1969 as a term to replace the ambiguous expression “statistical bibliography”, bibliometrics enables objective measurement of the contributions of authors, institutions, and countries to a body of knowledge and the monitoring of the growth, development, and thematic evolution of scientific disciplines.¹ Scientometrics is defined as the quantitative study of the various aspects of science and technology.² Bibliometric indicators such as citation analysis, author and organization productivity, and keyword co-occurrence networks have become valuable tools for identifying influential works, leading contributors, and emerging research frontiers.

Although the volume of research on ambulatory anesthesia has increased substantially in recent decades, and bibliometric analyses have been published on several adjacent topics in



anesthesiology, including regional anesthesia and specific regional-block techniques, the literature currently lacks a holistic bibliometric evaluation devoted specifically to ambulatory anesthesia.^{3,4} To the best of our knowledge, the present study is the first to comprehensively analyze the scientometric features of the ambulatory anesthesia literature. The aim of this study was to perform a bibliometric analysis of documents published in the field of ambulatory anesthesia between 1980 and 2025 and thereby demonstrate publication trends; the most productive countries, institutions, authors, and journals; the most influential articles; and the principal research themes and their evolution over time.

METHODS

Data Source and Search Strategy

All data analyzed in this study were retrieved from the Web of Science Core Collection (WoSCC; Clarivate Analytics) on a single day (2 July 2026) to avoid bias arising from continuous database updates. All citation metrics reflect this date. The following topic (TS) search strategy, which combines the principal synonyms for ambulatory anesthesia, was used: TS = (“ambulatory an*esthesia” OR “ambulatory an*esthetic*” OR “day-case an*esthesia” OR “day case an*esthesia” OR “day-surgery an*esthesia” OR “day surgery an*esthesia” OR “outpatient an*esthesia” OR “outpatient an*esthetic*” OR “office-based an*esthesia” OR “ambulatory surgery an*esthesia” OR “ambulatory surgical an*esthesia” OR “day-case surgery an*esthesia” OR “an*esthesia for ambulatory surg*” OR “an*esthesia for day-case*” OR “an*esthesia for day surg*” OR “an*esthesia for outpatient*”).

The wildcard operator (an*esthesia) was used to capture both the American (anesthesia) and British (anaesthesia) spellings. All documents published between 1980 and 2025 were included. Papers published in 2026 were excluded to avoid bias introduced by an incomplete publication year. Publications from China, P.R.C., and the People’s Republic of China were collected under a single “China” heading. Only original articles and review articles were included in the bibliometric analysis; the full distribution of document types is reported in the Results. Records dually indexed as “Article; Proceedings Paper” or “Article; Book Chapter” were retained, as these represent substantive articles and reviews rather than stand-alone conference abstracts.

Bibliometric Analysis and Visualization

Bibliometric network visualizations, including co-authorship networks among countries, co-citation networks, and keyword co-occurrence maps, were created using VOSviewer (version 1.6.21).⁵ In the network maps, the more frequently occurring keywords, authors, and institutions formed larger nodes than those with lower frequency, and related or connected items were placed close to one another and colored according to cluster membership. Statistical analyses were performed using standard

statistical software. A productivity score was calculated for each country using the previously reported formula (total number of publications/population × 1,000,000), an approach that has been applied in comparable holistic bibliometric investigations of other medical fields.⁶⁻⁸ Cubic regression with curve fitting was used to model the cumulative growth of the literature because a third-order polynomial captured the non-linear S-shaped accumulation of publications more closely than linear or quadratic fits while avoiding overparameterization. The fitted model was then used to estimate the number of publications in the forthcoming year. A p value was considered statistically significant.

Ethics

This study was based exclusively on publicly available bibliographic data retrieved from the Web of Science Core Collection. The study did not involve the recruitment or interaction of human participants, access to individual-level patient or participant data, collection of human biological material, or the use of identifiable personal information. The bibliographic records analyzed in this study consisted of publication-level information, including article titles, authors, affiliations, publication years, journals, citation counts, and keywords. No interventions, clinical procedures, questionnaires, interviews, or other procedures involving human participants were performed. Accordingly, the study did not meet the definition of research involving human participants and did not require informed consent from individual participants. Furthermore, because the analysis involved only publicly available bibliographic records and did not involve human participants, human material, or animals, ethics committee approval was not required.

RESULTS

Total Number of Publications and Document Types

Our search of the ambulatory anesthesia literature retrieved 1,364 documents published between 1980 and 2025. Of these, 1,078 were original or review articles and were included in the bibliometric analysis. The vast majority of the analyzed documents were original articles (n=938), comprising 880 stand-

Table 1. Distribution of document types in the ambulatory anesthesia literature (1980-2025)		
Document type	Number	%
Article	880	81.6
Review	138	12.8
Article; proceedings paper	49	4.5
Article; book chapter	9	0.8
Retracted publication	2	0.2
Total	1,078	100
Items indexed under more than one category (e.g., proceedings papers, book chapters) are counted once under their combined Web of Science label		

alone articles, 49 items also indexed as proceedings papers, and 9 also indexed as book chapters; these were followed by review articles ($n=138$). Two of the included items (one article and one review) were subsequently retracted and are therefore flagged. Because certain records carry a combined Web of Science label (e.g., "Article; Proceedings Paper"), the subcategories in Table 1 are mutually exclusive and together sum to the analyzed total of 1,078.

By language, English was the dominant language of the ambulatory anesthesia literature, accounting for 991 documents (91.9%), followed by German (57, 5.3%), French (20, 1.9%), Turkish (4, 0.4%), Spanish (2), and Portuguese (2). The substantial German-language component reflects the historical contribution of the Central European anesthesia literature to the field.

Development of Publications and Citations

Figure 1 shows the distribution of publications and citations by year. An overall increasing trend in annual output was observed from 1980 onward, with the highest number of publications recorded in 2013 ($n=40$), followed by 2001 ($n=39$), 1997 and 2017 ($n=38$ each). The 1,078 analyzed publications were cited 32,104 times in total, with an average of 29.78 citations per item, and the h-index of the literature was calculated to be 81. The number of citations rose steeply in recent years, reaching its peak in 2025.

To model the growth of the field and estimate future output, a cubic curve was fitted to the cumulative number of publications (Figure 2). The model demonstrated an excellent fit ($R^2=0.9984$). Based on this model, the cumulative number of publications is estimated to reach 1,089 by the end of 2026—an increase of approximately 11 publications relative to the 1,078 publications recorded through 2025.

Productive Countries

Authors from more than 60 countries contributed to the ambulatory anesthesia literature. The United States was, by far, the most productive country with 442 publications, followed

by England (101), Germany (85), Canada (71), and France (47). Notably, Türkiye ranked sixth, with 40 publications, ahead of China, Sweden, Italy, and Australia, indicating a considerable contribution from a middle-income country relative to more established research economies. The geographical distribution of the literature is presented in Table 2.

A productivity score, defined as the number of publications per million inhabitants, was calculated for the leading countries to adjust for differences in population size. When countries were ranked by productivity rather than by absolute output, the order changed considerably: Sweden (2.86) became the most productive country, followed by Canada (1.82), England (1.79), the United States (1.32) and Germany (1.01). This pattern, in which smaller, high-income countries achieve the highest per-capita output while the United States dominates in absolute numbers, is consistent with observations reported in bibliometric analyses of other medical fields.⁹ Türkiye, despite its comparatively low gross domestic product per capita, achieved a productivity score (0.47) identical to that of Italy, again underscoring its notable contribution to the field. Productivity scores for the leading countries are presented in Table 3.

To examine international scientific collaboration, a country-level co-authorship network was constructed using VOSviewer (Figure 3). In this network, the size of each node reflects the number of publications, the thickness of the connecting lines represents the strength of collaboration, and the colors indicate clusters of countries that frequently published together. The United States formed by far the largest node and occupied a central position, connected to a wide range of partner countries. Canada and England emerged as two further major collaboration hubs, each anchoring its own cluster and linking, respectively, to partners such as Saudi Arabia and Thailand. Germany, France, Italy, Switzerland and China occupied intermediate positions, while Türkiye formed a distinct cluster of its own. The overall structure reveals a body of literature organized around a small number of predominantly

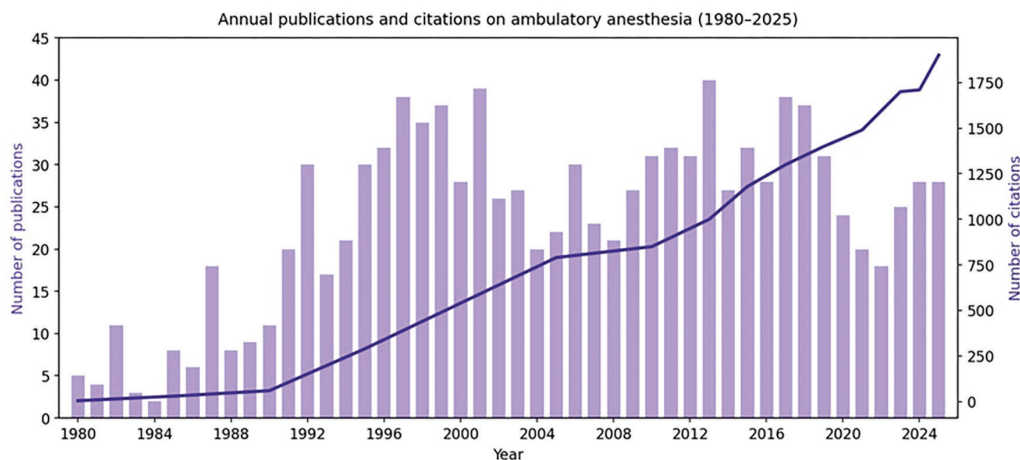


Figure 1. Number of publications (bars) and citations (line) on ambulatory anesthesia by year (1980-2025)

Table 2. The ten most productive countries in the ambulatory anesthesia literature	
Country	Record count
USA	442
England	101
Germany	85
Canada	71
France	47
Türkiye	40
China	30
Sweden	30
Italy	28
Australia	26

high-income, highly collaborative countries, with the United States serving as the principal international collaboration hub.

Active Institutions

The most productive institutions in the ambulatory anesthesia literature were concentrated in North America. Harvard University and its affiliated medical institutions produced the highest number of publications, followed by the University of Texas System, the University of Toronto, the University of Texas Southwestern Medical Center, and the University of British Columbia. The prominence of these institutions is consistent with the leading positions held by authors affiliated with them, particularly White PF (University of Texas Southwestern) and Chung F (University of Toronto). The most productive organizations are presented in Table 4.

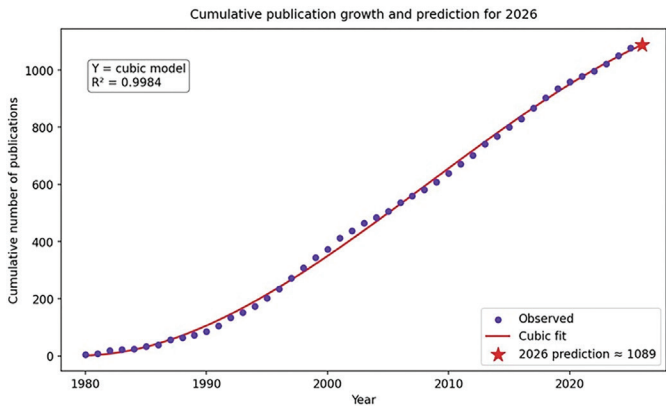


Figure 2. Cumulative number of ambulatory anesthesia publications by year, with cubic-curve fitting and prediction for 2026

Table 3. Productivity scores (publications per one million inhabitants) of the leading countries	
Country	Productivity score
Sweden	2.86
Canada	1.82
England	1.79
USA	1.32
Germany	1.01
Australia	1.00
France	0.69
Türkiye	0.47
Italy	0.47
China	0.02

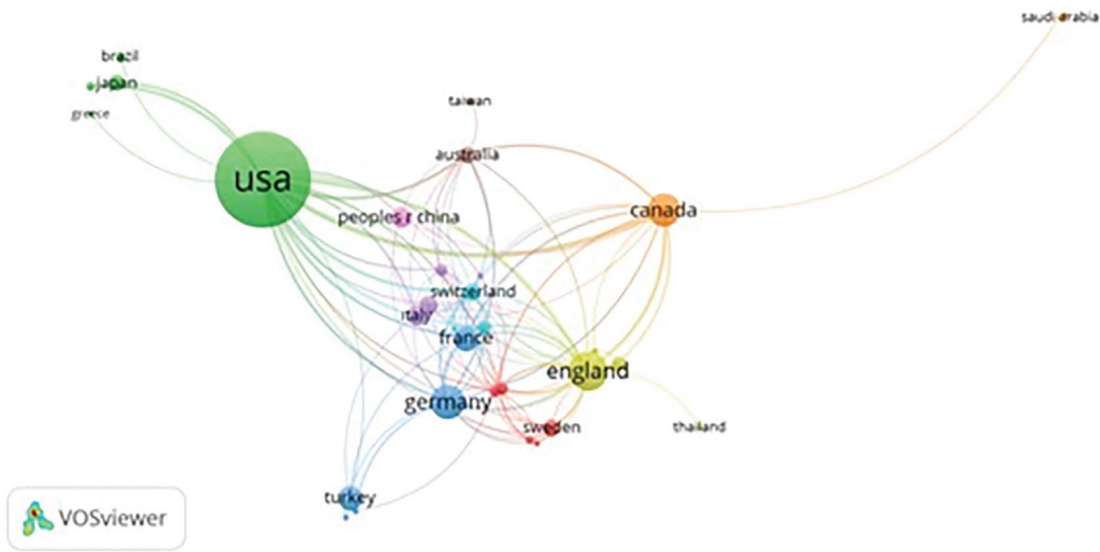


Figure 3. Co-authorship network of countries contributing to the ambulatory anesthesia literature. Node size reflects the number of publications; line thickness represents collaboration strength; colors indicate clusters

Active Authors

Based on the number of publications, White PF was by far the most prolific author in the ambulatory anesthesia literature (52 publications), reflecting his central role in the development of the field, particularly in research on recovery, fast-tracking and the pharmacology of short-acting anesthetics. He was followed by Chung F (24 publications), Smith I (20), Joshi GP (15), and Vaghadia H (13). Table 5 presents the leading authors.

Active Journals

A total of 1,078 articles were published across a large number of journals. Anesthesia and Analgesia was the leading journal with 109 publications, followed by Current Opinion in Anaesthesiology (86), Acta Anaesthesiologica Scandinavica (54), the Journal of Clinical Anesthesia (46), and the Journal of Oral and Maxillofacial Surgery (40). The prominence of the latter reflects the substantial body of ambulatory anesthesia research generated in office-based oral and maxillofacial surgery. The most productive journals are presented in Table 6.

Research Areas

As expected, anesthesiology was overwhelmingly the most frequent research area (733 publications), followed by general internal medicine (138), dentistry/oral surgery/medicine (80), surgery (71), and pediatrics (45). The strong representation of dentistry and oral surgery reflects the high volume of office-based and day-case procedures performed under sedation and general anesthesia in these disciplines. The leading research areas are presented in Table 7.

Most Cited Articles

The ten most frequently cited articles in the ambulatory anesthesia literature are presented in Table 8. The most cited document overall was the 1992 review by Watcha and White on the etiology, treatment, and prevention of postoperative nausea and vomiting (PONV) (1,241 citations); this topic recurs throughout the most influential works in the field, including

successive consensus guidelines on its management.¹⁰⁻¹² When ranked by average citations per year, the 2022 American Society of Anesthesiologists practice guidelines for the management of the difficult airway achieved the highest impact (232.0 citations

Table 5. The ten most productive authors in the ambulatory anesthesia literature

Author	Record count
White PF	52
Chung F	24
Smith I	20
Joshi GP	15
Vaghadia H	13
Shapiro FE	12
Urman RD	12
Gan TJ	11
Philip BK	11
Gupta A	9

Table 6. The ten most productive journals in the ambulatory anesthesia literature

Journal	Record count
Anesthesia and Analgesia	109
Current Opinion in Anaesthesiology	86
Acta Anaesthesiologica Scandinavica	54
Journal of Clinical Anesthesia	46
Journal of Oral and Maxillofacial Surgery	40
Anaesthesia	39
Anesthesiology	39
British Journal of Anaesthesia	37
Canadian Journal of Anaesthesia	35
European Journal of Anaesthesiology	33

Table 4. The most productive institutions in the ambulatory anesthesia literature

Institution	Record count
Harvard University	67
Harvard University Medical Affiliates	59
University of Texas System	57
University of Toronto	51
University of Texas Southwestern Medical Center	50
University of British Columbia	42
Harvard Medical School	40
University of Texas Dallas	35
University System of Ohio	35
University of California System	31

Table 7. The ten most frequent research areas in the ambulatory anesthesia literature

Research area	Record count
Anesthesiology	733
General internal medicine	138
Dentistry oral surgery medicine	80
Surgery	71
Pediatrics	45
Pharmacology pharmacy	30
Neurosciences neurology	18
Orthopedics	16
Health care sciences services	13
Research experimental medicine	11

Table 8. The ten most cited articles in the ambulatory anesthesia literature					
No	Article	First author	Year	TC	AC
1	Postoperative nausea and vomiting: its etiology, treatment, and prevention	Watcha MF	1992	1241	36.5
2	Consensus guidelines for the management of postoperative nausea and vomiting	Gan TJ	2014	1026	85.5
3	2022 American Society of Anesthesiologists practice guidelines for management of the difficult airway	Apfelbaum JL	2022	928	232.0
4	Fourth consensus guidelines for the management of postoperative nausea and vomiting	Gan TJ	2020	920	153.3
5	Society for Ambulatory Anesthesia guidelines for the management of postoperative nausea and vomiting	Gan TJ	2007	424	22.3
6	Can postoperative nausea and vomiting be predicted?	Sinclair DR	1999	418	15.5
7	Propofol: an update of its use in anesthesia and conscious sedation	Bryson HM	1995	293	9.4
8	A comparison of regional versus general anesthesia for ambulatory anesthesia: a meta-analysis of randomized controlled trials	Liu SS	2005	289	13.8
9	Titration of volatile anesthetics using bispectral index facilitates recovery after ambulatory anesthesia	Song DJ	1997	283	9.8
10	Comparison of recovery profile after ambulatory anesthesia with propofol, isoflurane, sevoflurane and desflurane: a systematic review	Gupta A	2004	268	12.2
TC: Total citations, AC: Average citations per year					

per year), reflecting both the topicality of airway management and the rapid uptake of recent consensus guidelines.¹³ PONV, consensus guidelines, recovery profiles of volatile agents, and regional versus general anesthesia emerged as the dominant themes among the most-cited articles.

Co-citation Analysis

A co-citation network was constructed to reveal the field's foundational knowledge base and internal structure (Figure 4). References that were frequently cited together were grouped into three principal clusters. A red cluster centered on the work of White PF, Gan TJ, Aldrete JA, and Gupta A, corresponding to the recovery, fast-tracking, and PONV axis that dominates modern literature; the widely cited modified Aldrete scoring reference and the Gan guideline references occupied central positions within this cluster. References concerning the recovery profiles of short-acting volatile and intravenous agents were grouped into a blue cluster (Song, Nathanson, Fredman, Tang). A green cluster comprised earlier, classic contributions to day-case anesthesia (Korttila, Doze, Tramer, Watcha, Mackenzie). The clear separation of these clusters illustrates the historical evolution of the field, from its foundational studies of anesthetic agents and recovery toward its current emphasis on standardized recovery assessment, antiemesis, and evidence-based guidelines.

Keyword Analysis and Research Themes

Keyword co-occurrence analysis was performed to reveal the principal research themes and their evolution (Figure 5). The most frequently used keywords were propofol (214 occurrences) and ambulatory anesthesia (214 occurrences), followed by surgery (186 occurrences), outpatient anesthesia (160 occurrences), anesthesia (158 occurrences,) and recovery (146 occurrences).

The prominence of the short-acting intravenous agent propofol, together with the volatile agents sevoflurane (108), desflurane (101) and isoflurane (88), highlights the central and enduring concern of the field: the pharmacological achievement of rapid, high-quality recovery that permits same-day discharge. Postoperative nausea (78), sedation (64), pain (53), and regional anesthesia (45) constituted further important thematic clusters, while children (79) reflected the substantial pediatric ambulatory literature. The thirty most frequent keywords are presented in Table 9.

Table 9. The thirty most frequently used keywords in the ambulatory anesthesia literature			
Keyword	Count	Keyword	Count
Propofol	214	Sedation	64
Ambulatory Anesthesia	214	Management	58
Surgery	186	Pain	53
Outpatient anesthesia	160	Complications	47
Anesthesia	158	Fentanyl	46
Recovery	146	Midazolam	45
General-anesthesia	123	Regional anesthesia	45
Sevoflurane	108	Maintenance	45
Ambulatory surgery	105	Bupivacaine	44
Desflurane	101	Alfentanil	43
Isoflurane	88	Remifentanil	41
Children	79	Safety	40
Postoperative nausea	78	Postoperative pain	37
Induction	68	Morbidity	37
Nitrous-oxide	68	Double-blind	37

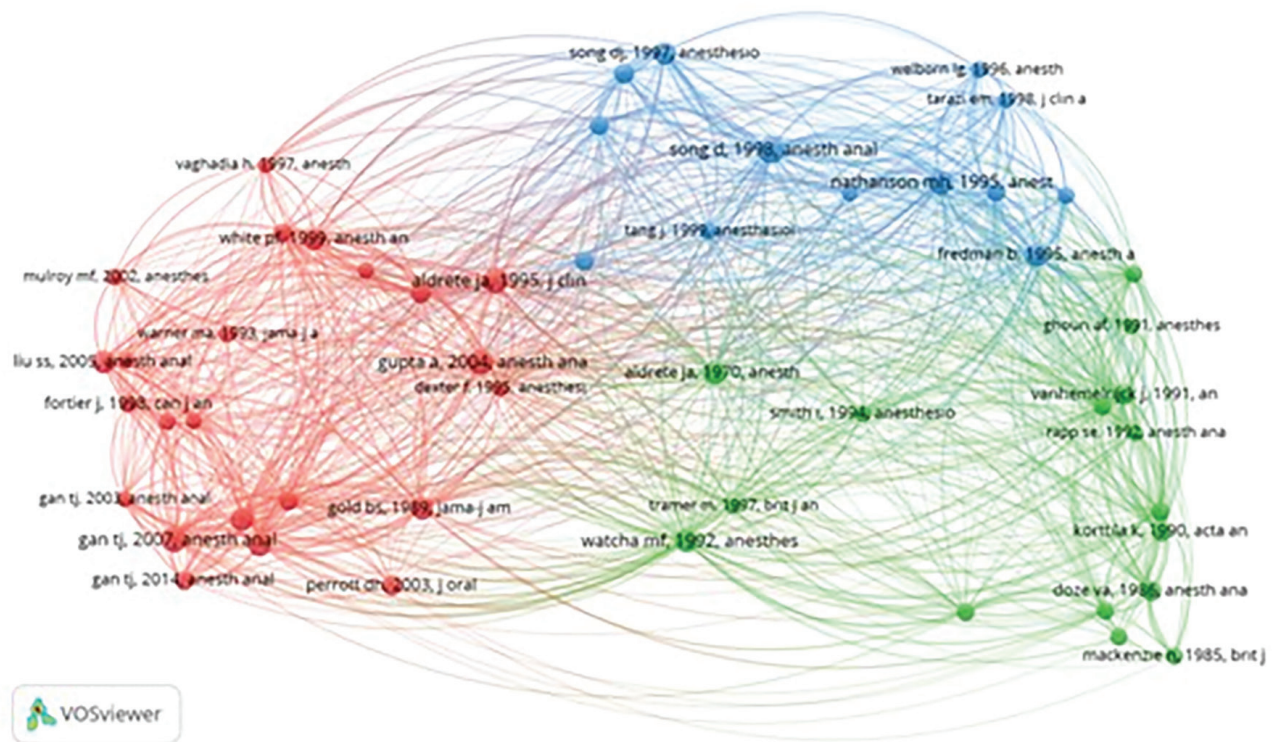


Figure 4. Co-citation network of cited references in the ambulatory anesthesia literature. Node size reflects co-citation frequency; colors indicate clusters of jointly cited references

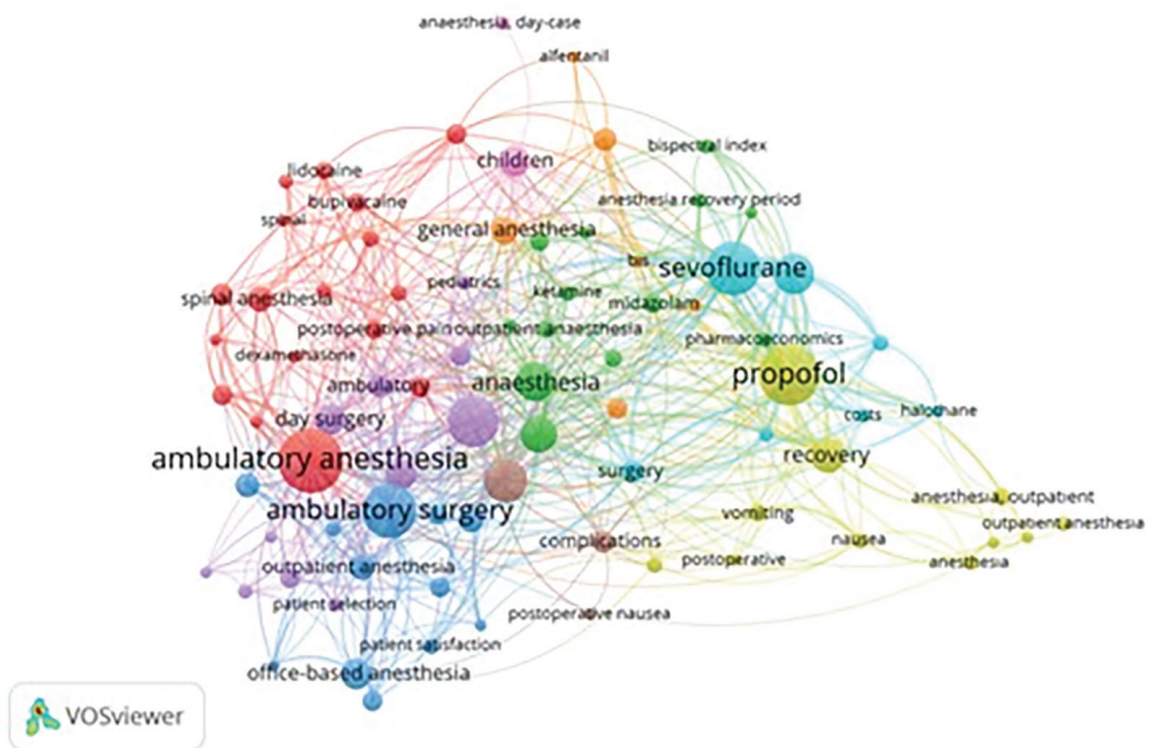


Figure 5. Keyword co-occurrence network of the ambulatory anesthesia literature. Node size reflects keyword frequency; colors indicate thematic clusters

DISCUSSION

Bibliometrics and scientometrics are established scientific methods that provide a quantitative, objective description of the publication and citation patterns within a defined field. Despite the growing clinical and economic importance of ambulatory surgery and the existence of bibliometric analyses on numerous related anesthesiology topics, the ambulatory anesthesia literature has not previously been evaluated holistically. To the best of our knowledge, the present study is the first comprehensive bibliometric analysis dedicated to this field.

The methodological approach adopted here—single-database extraction from the Web of Science Core Collection, calculation of population-adjusted productivity scores, network visualization with VOSviewer, and cubic-curve modeling of cumulative growth—follows a well-established tradition of holistic bibliometric evaluation that has been applied to a wide range of medical fields, including regional anesthesia, brain death, and legal medicine.^{3,7,8} This consistency also extends beyond regional anesthesia to other anesthesiology subfields: recent global bibliometric analyses of opioid-free anesthesia and sufentanil research similarly identified the United States as the most productive and central contributor, PONV as a recurring thematic focus, and *Anesthesia and Analgesia* as among the most influential journals.^{14,15} Positioning the present findings within this tradition allows comparison, in due course, of the ambulatory anesthesia literature with neighboring subspecialties. For example, a comparable bibliometric investigation of the regional anesthesia literature over a similar period also identified North American institutions and a small group of high-income countries as the principal contributors, suggesting that the concentration of research capacity observed here is characteristic of anesthesiology as a whole rather than specific to day-case practice.³

Our analysis of 1,078 original articles and reviews demonstrated that research output on ambulatory anesthesia grew steadily over the four decades studied, with an excellent fit to the cumulative growth curve and a projected continuation of this trend. The comparatively high average number of citations per item and an h-index of 81 indicate that, although this is a focused subspecialty, its literature exerts a substantial scientific impact that is concentrated in a relatively small number of highly cited guideline and review articles.

The United States dominated the ambulatory anesthesia literature in absolute terms, followed by England, Germany, Canada, and France. This distribution mirrors the general pattern observed across most medical bibliometric analyses, in which high-income, English-speaking countries lead the field.⁹ However, when output was adjusted for population size through a productivity score, smaller high-income countries most notably Sweden, followed by Canada and England rose to the top of the ranking, while the United States remained highly productive but no longer occupied first place. Such a divergence between absolute and per-capita

productivity has been repeatedly reported in the bibliometric literature, and it highlights the importance of complementing raw publication counts with population-adjusted measures.⁶ A particularly noteworthy finding was Türkiye's sixth-place ranking in absolute output, ahead of several larger and wealthier research economies. This finding is consistent with the growing contribution of Turkish anesthesiology to the international literature and reflects the prominent Turkish presence documented in other medical bibliometric studies.⁷

The most productive institutions, Harvard University, the University of Texas System, the University of Toronto, and the University of British Columbia, reflected the leading positions of the individual authors affiliated with them. White PF was by far the most prolific author, an unsurprising finding given his foundational contributions to the pharmacology of short-acting anesthetics, recovery assessment, and the concept of fast-tracking after ambulatory surgery.^{16,17} The most prolific authors after White PF, Chung F, Smith I, Joshi GP, and Vaghadia H have likewise sustained substantial programs of research in day-case anesthesia, ambulatory regional techniques, and recovery. Other influential contributors, including Gan TJ and Philip BK, are prominent for their work on PONV and the perioperative management of patients with obstructive sleep apnea, respectively.¹⁸

Anesthesia and Analgesia was the most productive journal, followed by *Current Opinion in Anesthesiology* and *Acta Anaesthesiologica Scandinavica*. The strong representation of the *Journal of Oral and Maxillofacial Surgery*, together with the prominence of dentistry and oral surgery as a leading research area, underscores an often-overlooked feature of the field: a large proportion of ambulatory anesthesia and sedation research is generated within office-based dental and oral-surgical practice. This observation may be of practical value to authors seeking suitable outlets for their work and to journals wishing to understand the disciplinary composition of their submissions.

The analysis of the most-cited articles, the co-citation network, and keyword co-occurrence produced a coherent picture of the intellectual structure of the field. The single most-cited document addressed PONV, and PONV-related consensus guidelines recurred among the most influential works, confirming that the prevention and treatment of PONV have been and remain one of the defining preoccupations of ambulatory anesthesia.¹⁰⁻¹² The co-citation analysis further clarified the historical architecture of the field, separating an earlier body of classic work on anesthetic agents and recovery from a more recent cluster organized around standardized recovery assessment, antiemesis, and evidence-based guidelines. In parallel, the dominance of propofol and the short-acting volatile agents sevoflurane, desflurane, and isoflurane among the most frequent keywords reflects the field's enduring central objective: to achieve anesthesia of a quality and rapidity of offset that permits safe same-day discharge.¹⁹⁻²¹ More

recent high-impact publications, such as the 2022 difficult-airway guidelines and the 2019 day-case surgery guidelines, indicate that patient safety, standardization of care, and the expansion of day-case eligibility have become increasingly prominent themes.^{13,22}

Several converging lines of inquiry emerge from these findings. The regional-versus-general debate, addressed by one of the most-cited meta-analyses in the field, continues to inform anesthetic choice for day-case surgery and points toward the expanding role of regional and plane-block techniques in the ambulatory setting.²³ Studies demonstrating that short-acting anesthetics can eliminate the need for intensive postoperative care and that fast-track eligibility can be predicted intraoperatively underpin the continued drive toward efficiency and same-day discharge.^{21,24} At the same time, the recurrent appearance of research on PONV prediction and prolonged stays signals a persistent concern with identifying and managing patients least suited to an uncomplicated ambulatory pathway.²⁵⁻²⁷ Future research is likely to continue with further refinement of opioid-sparing and multimodal analgesic strategies, expansion of regional techniques into the day-case setting, safe extension of ambulatory surgery to increasingly comorbid and elderly populations, and incorporation of enhanced-recovery and digital-health approaches. Researchers from middle- and lower-income countries should be encouraged and supported to contribute to this literature, so that the evidence base underpinning day-case anesthesia becomes more globally representative.

From a practical standpoint, this analysis offers several valuable insights. For researchers, it identifies the most influential works, the most active authors and institutions, and the journals most receptive to ambulatory anesthesia research, thereby assisting with literature review, collaboration, and manuscript placement. For journal editors, it clarifies the disciplinary composition of the field, most notably the substantial contribution of office-based dental and oral-surgical research, which may inform editorial strategy. For clinicians and trainees, the thematic map provides an accessible overview of the intellectual foundations of day-case anesthesia and the areas in which the evidence base is most and least developed.

Study Limitations

This study has certain limitations. First, we used only the Web of Science Core Collection and did not include other databases, such as Scopus, PubMed, or Google Scholar, which may index additional documents. We preferred the Web of Science because it is a highly reliable database that indexes journals with high impact factors and provides consistent, standardized bibliometric metadata. Second, as with all keyword-based bibliometric searches, the retrieved set is sensitive to the search strategy. Despite the use of a broad Boolean string combining the principal synonyms of ambulatory anesthesia, some relevant publications may not have been captured, and a small number of tangentially related documents may have been included. Third,

citation counts are dynamic and reflect the state of the database on the date of extraction. These limitations are common to bibliometric research and are unlikely to have materially altered the principal findings. Finally, the forward projection should be interpreted with caution: a single-year extrapolation, derived from a cubic fit to the cumulative curve, is sensitive to the most recent data points and therefore carries considerable uncertainty, particularly because citations and indexing for the most recent years remain incomplete. Because cumulative publication counts naturally increase over time, a high R^2 should not be interpreted as evidence of predictive superiority; the projected value for 2026 should be regarded as an exploratory estimate rather than a precise forecast.

CONCLUSION

The scientific literature on ambulatory anesthesia has grown steadily over the past four decades and is projected to continue expanding. The field remains dominated by high-income countries led in absolute terms by the United States and, on a per-capita basis, by smaller nations such as Sweden, Canada and England while Türkiye stands out as a notable middle-income contributor. Research output has been concentrated in a small number of leading institutions, authors, and journals and has consistently centered on achieving rapid, high-quality recovery, preventing PONV, and maintaining patient safety. As the first comprehensive bibliometric analysis of this field, the present study provides a reference map of its intellectual structure and may assist researchers, clinicians, and journals in identifying influential works, active contributors, and promising directions for future investigation.

Ethics

Ethics Committee Approval: This study was based exclusively on publicly available bibliographic data retrieved from an online citation database and did not involve human participants, human material, or animals. Therefore, ethics committee approval was not required.

Informed Consent: Not applicable. This study used only publicly available, publication-level bibliographic data and did not involve human participants, participant interaction, individual-level personal data, or human biological material. Therefore, informed consent was not required.

Footnotes

Authorship Contributions

Surgical and Medical Practices: S.K., Concept: S.K., Ş.K.Ö., Design: S.K., Ş.K.Ö., Data Collection or Processing: S.K., Analysis or Interpretation: S.K., Ş.K.Ö., Literature Search: S.K., Writing: S.K., Ş.K.Ö.

Conflict of Interest: No conflict of interest was declared by the authors.

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