



Bibliometric Analysis of Anesthesiology and Reanimation Residency Theses in Turkey (2016–2025)

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Abstract

Background: Bibliometric analyses provide valuable tools for identifying topic distributions, research trends, and academic productivity dynamics in medical specialization theses. In the field of Anesthesiology and Reanimation, comprehensive and up-to-date bibliometric data on specialization theses covering the period after 2016 are limited. This study aimed to evaluate the bibliometric characteristics of medical specialization theses prepared in Departments of Anesthesiology and Reanimation in Türkiye between 2016 and 2025.

Materials and Methods: This study is a retrospective, descriptive, and cross-sectional bibliometric analysis. Data were obtained from the open-access database of the National Thesis Center of the Council of Higher Education (YÖK). Specialization theses in Anesthesiology and Reanimation completed within the specified period were systematically reviewed, and their distribution by year, research topics, study designs, academic titles of advisors, training institutions, and average number of pages were evaluated.

Results: A total of 2,758 Anesthesiology and Reanimation specialization theses were analyzed. A marked increasing trend in thesis production was observed over the years. Of these theses, 74.7% were designed prospectively, and 89.6% had a clinical study design. Advisory roles were primarily undertaken by academicians with the titles of professor (46.6%) and associate professor (34.9%). When the distribution by training institutions was examined, the proportion of theses prepared in university hospitals decreased from 86.8% in 2016 to 65.1% in 2025. In contrast, the proportion of theses prepared in Training and Research Hospitals increased from 9.2% in 2016 to 32.3% in 2025. The proportion of theses conducted in foundation and private hospitals remained within the range of 1.2% to 4.0% throughout the study period. Research topics were most frequently focused on regional/peripheral nerve blocks, intensive care, and pain management. Theses related to artificial intelligence began to appear among thesis subjects starting from 2021.

Conclusion: This study demonstrates that specialization theses in the field of Anesthesiology and Reanimation between 2016 and 2025 exhibited a clinically oriented, prospective, and institutionally structured academic production profile. The findings provide an up-to-date and informative framework for future thesis planning, educational strategies, and research policy development.

Keywords: Bibliometric analysis, Medical specialization thesis, Anesthesiology, Reanimation.



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Introduction

Anesthesiology and Reanimation is a fundamental medical discipline encompassing a broad range of clinical responsibilities, from ensuring the safe conduct of surgical procedures to perioperative hemodynamic management and analgesia, as well as airway control, intensive care monitoring, and the management of critically ill patients. This multidimensional structure promotes scientific production across various themes such as regional anesthesia techniques, pain management approaches, intensive care prognostic markers, and respiratory and hemodynamic monitoring parameters, thereby fostering diversity in research areas. In this context, bibliometric analyses serve as important tools for identifying topic distributions, research trends, and academic areas of interest within the field of anesthesiology [1].

In recent years, the evaluation of medical specialization theses through bibliometric methods has become an increasingly common approach across various medical disciplines. Studies conducted in different specialties, such as cardiovascular surgery, radiology, and emergency medicine, have demonstrated that examining the topic distributions, research designs, and publication characteristics of specialization theses provides valuable insights into the dynamics of scientific productivity [2–4]. These studies reveal that specialization theses are not merely individual academic requirements but also significant academic outputs that reflect the clinical priorities and research orientations of their respective periods.

Bibliometric studies focusing on specialization theses in the field of Anesthesiology and Reanimation are limited in number. In one of the most comprehensive studies to date, Güç et al. retrospectively examined specialization theses prepared in the Departments of Anesthesiology and Reanimation in Türkiye between 1970 and 2016, evaluating their research topics, publication rates, and levels of evidence [5]. However, that study did not include the period after 2016, which reflects rapid changes in clinical practice, technological advancements, and transformations in medical education. Therefore, there is a need for an up-to-date and comprehensive evaluation of

the bibliometric characteristics of specialization theses in Anesthesiology and Reanimation covering the post-2016 period.

The aim of this study is to conduct a bibliometric analysis of medical specialization theses prepared in the Departments of Anesthesiology and Reanimation in Türkiye between 2016 and 2025. The study evaluates the distribution of theses by year, research topics, study designs, academic titles of advisors, types of training institutions, and average number of pages. The findings are intended to provide an up-to-date framework reflecting the quantitative and structural characteristics of academic production in anesthesiology and reanimation after 2016 and to serve as a guide for future scientific studies and educational policy development in the field.

Materials and Methods

This study is a cross-sectional research based on a retrospective, descriptive, and bibliometric analysis of medical specialization theses prepared in the Departments of Anesthesiology and Reanimation in Türkiye between 2016 and 2025. The data were obtained from the open-access database of the National Thesis Center of the Council of Higher Education (YÖK) [6]. The thesis screening was conducted manually and systematically using the advanced search interface of the National Thesis Center (YÖK), covering the period between January 1, 2016, and November 30, 2025. The study included theses classified as “Medical Specialization” and completed within the specified time frame in the Departments of Anesthesiology and Reanimation. During the search process, the filters “Department of Anesthesiology and Reanimation,” “Medical Specialization” thesis type, and the relevant year range were applied (Figure 1).

In cases where the same thesis was listed more than once, duplicate records were excluded. Additionally, studies that were not related to the department, had incomplete bibliographic information, were not accessible, or did not qualify as medical specialization theses were excluded from the analysis. For the theses included in the study, bibliometric variables such as thesis year, number of theses, academic title of the advisor, study design (prospective, retrospective, experimental, or survey), research topic,

Figure 1. Detailed Search Interface and Search Criteria Used in the National Thesis Center (YÖK) for Anesthesiology and Reanimation Specialization Theses

type of training institution (university hospital, training and research hospital, foundation/private hospital), and average number of pages were recorded. The collected data were organized electronically using Microsoft Excel software and prepared for analysis.

Statistical Analysis

The statistical evaluation of the data was performed using descriptive statistical methods. Continuous variables were expressed as mean values, while categorical variables were presented as numbers (n) and percentages (%). The distribution of specialization theses by year was visualized using tables and graphical representations. To demonstrate the temporal distribution of bibliometric parameters, data related to the number of theses, average number of pages, types of training institutions, academic titles of advisors, study designs, and research topics were analyzed separately.

Results

In this study, bibliometric data from a total of 2,758 medical specialization theses completed between 2016 and 2025 in the Departments of Anesthesiology and Reanimation in Türkiye were analyzed. The findings were presented based on key bibliometric parameters, including the distribution of theses by year, academic titles of advisors, study designs, research topics, types of training institutions, number of pages, and accessibility status. The annual distribution of specialization theses completed in the Departments of Anesthesiology and

Reanimation between 2016 and 2025 is presented in Figure 2. During the study period, the number of theses varied by year but showed an overall increasing trend over time. Thesis production, which was relatively low in the early years, rose significantly in the following years and reached higher levels from the mid-period onward. The highest number of theses was recorded in 2023 and 2024, representing the peak period of thesis production within the study timeframe. In contrast, a lower number of theses was observed in the final year, 2025 (Figure 2).

The distribution of academic titles of advisors for the 2,758 specialization theses analyzed in this study is presented in Figure 3. Accordingly, 46.6% (n=1,286) of the theses were supervised by professors. Associate professors ranked second with 34.9% (n=962), followed by assistant professors/lecturers with 12.3% (n=338). Theses supervised by specialist physicians accounted for 6.2% (n=172) of the total. No records of theses supervised by chief assistants or advisors with unspecified titles were identified.

When examining the distribution of advisor titles by year, it was observed that professors and associate professors consistently had the highest numbers each year. The number of professor advisors increased from 95 in 2016 to 140 in 2025, while the number of associate professor advisors rose from 44 to 103 during the same period (Figure 3).

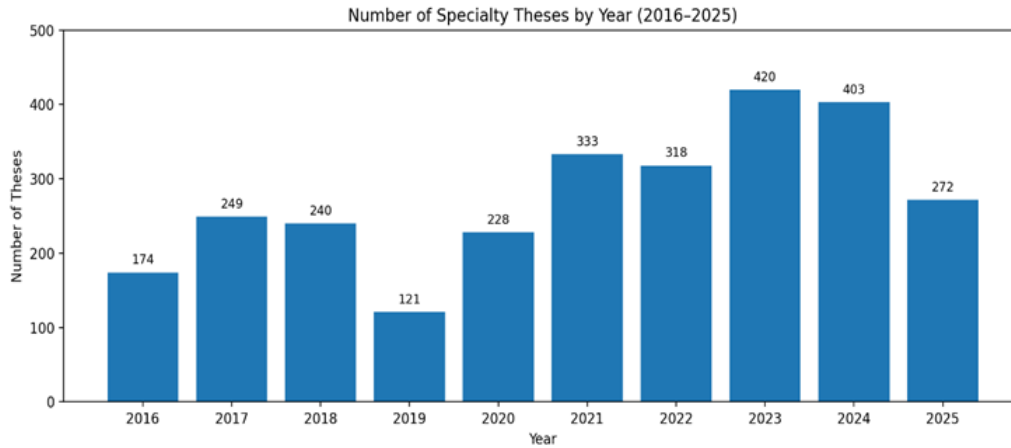


Figure 2. Number of Theses Between 2016 and 2025

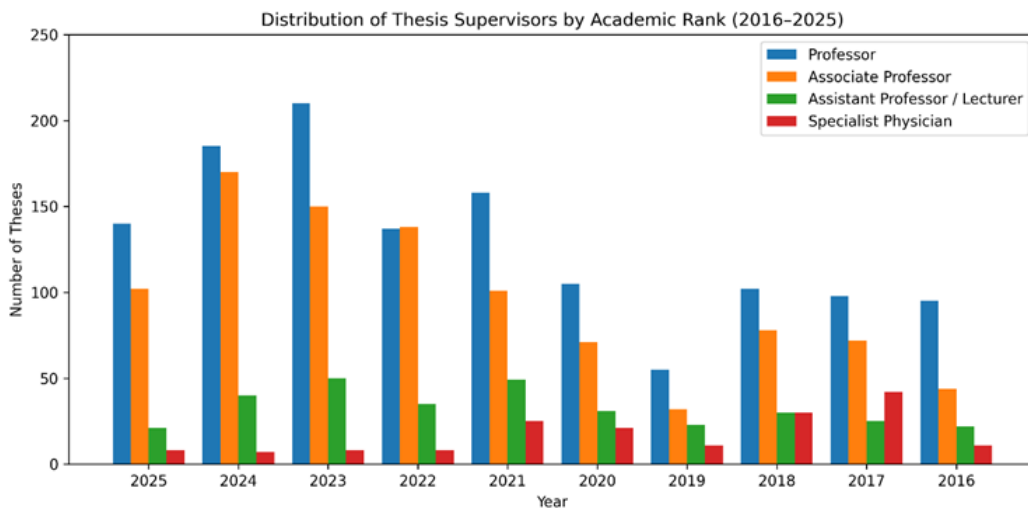


Figure 3. Distribution of Academic Titles of Thesis Advisors by Year

When the distribution of the 2,758 specialization theses by study design was examined, 74.7% were prospective, 15.7% were retrospective, 6.2% were experimental, and 3.4% were survey-based. Additionally, 89.6% of the theses were found to have a clinical study design (Figure 4).

When examining the average number of pages of specialization theses between 2016 and 2025, a general increasing trend was observed over the years. The average number of pages was relatively low in 2016 and 2017, at 69.59 and 68.57 pages, respectively, but showed a gradual rise in subsequent years. The average reached

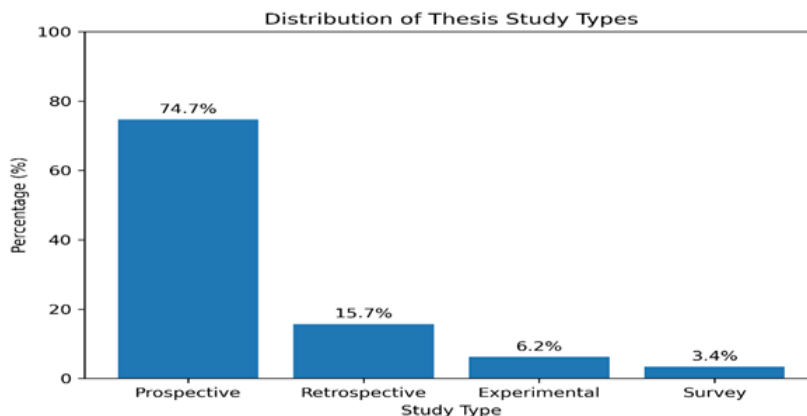


Figure 4. Distribution of Theses by Study Type and Design

75.88 pages in 2020 and peaked at 77.63 pages in 2025, marking the highest value during the study period (Table 1). When the distribution of specialization theses by type of training institution and year was examined, it was observed that the majority of theses throughout the study period were prepared in university hospitals. In 2016, theses from university hospitals accounted for 86.8% (n=151) of all theses, while this rate decreased to 65.1% (n=177) in 2025. Conversely, the proportion of theses prepared in Training and Research Hospitals increased from 9.2% (n=16) in 2016 to 32.3% (n=88) in 2025. The proportion of theses prepared in foundation and private

hospitals remained between 1.2% and 4.0% during the study period, recorded as 4.0% (n=7) in 2016 and 2.6% (n=7) in 2025 (Table 1).

The distribution of thesis topics by year is presented in Table 1. The proportion of theses focusing on general anesthesia ranged from 3.1% to 9.2%, with the highest rate observed in 2016 (9.2%). Theses on regional/peripheral nerve blocks accounted for 12.6%–22.4% throughout the study period, reaching their peak in 2025 (22.4%). The proportion of theses related to intensive care varied between 11.4% and 20.8%, with the highest rate

Table 1. Distribution of Thesis Topics, Training Institutions, and Average Page Counts of Anesthesiology and Reanimation Specialization Theses by Year (2016–2025)

Parameters	2016 n=174	2017 n=249	2018 n=240	2019 n=121	2020 n=228	2021 n=333	2022 n=318	2023 n=420	2024 n=403	2025 n=272
Page Count, mean	69.59	68.57	72.72	72.82	75.88	72.63	74.18	73.67	74.95	77.63
Distribution of Training Institutions by Year										
University Hospital n (%)	151 (86.8)	162 (66.4)	144 (60.0)	79 (65.3)	147 (64.5)	217 (65.2)	203 (63.8)	277 (66.0)	274 (67.9)	177 (65.1)
EAH n (%)	16 (9.2)	84 (34.4)	91 (37.9)	38 (31.4)	75 (32.9)	105 (31.5)	106 (33.3)	131 (31.2)	116 (28.9)	88 (32.3)
Foundation / Private Hospital n (%)	7 (4.0)	3 (1.2)	5 (2.1)	4 (3.3)	6 (2.6)	11 (3.3)	9 (2.8)	12 (2.9)	13 (3.22)	7 (2.6)
Distribution of Thesis Topics by Year										
General Anesthesia n (%)	16 (9.2)	22 (8.8)	17 (7.1)	4 (3.3)	19 (8.4)	30 (9)	10 (3.1)	32 (7.6)	33 (8.2)	20 (7.3)
Regional / Peripheral Block n (%)	22 (12.6)	32 (12.9)	32 (13.3)	17 (14.1)	42 (18.4)	49 (14.7)	54 (17)	69 (16.4)	72 (17.9)	61 (22.4)
ICU n (%)	24 (13.8)	45 (18.1)	38 (15.8)	18 (14.9)	26 (11.4)	49 (14.7)	66 (20.8)	50 (11.9)	61 (15.1)	34 (12.5)
Pain n (%)	18 (10.3)	27 (10.8)	21 (8.8)	21 (17.3)	25 (10.9)	38 (11.4)	34 (10.7)	49 (11.7)	52 (12.9)	24 (8.8)
Sedoanalgesia n (%)	5 (2.9)	4 (1.6)	2 (0.8)	3 (2.5)	6 (2.6)	10 (3)	9 (2.8)	18 (4.3)	10 (2.5)	6 (2.2)
Score / Scale / Measurement Tool n (%)	12 (6.9)	12 (4.8)	12 (5)	4 (3.3)	6 (2.6)	23 (6.9)	14 (4.4)	22 (5.3)	24 (6)	11 (4.1)
Airway n (%)	19 (10.9)	18 (7.2)	16 (6.7)	15 (12.4)	14 (6.1)	16 (4.8)	17 (5.4)	16 (3.8)	15 (3.7)	20 (7.3)
Hemodynamics n (%)	13 (7.5)	31 (12.5)	23 (9.6)	16 (13.2)	23 (10.1)	28 (8.4)	23 (7.2)	45 (10.7)	22 (5.5)	29 (10.7)
Respiratory Functions n (%)	4 (2.3)	9 (3.6)	5 (2.1)	8 (6.6)	13 (5.7)	16 (4.8)	17 (5.4)	28 (6.7)	14 (3.5)	8 (2.9)
Artificial Intelligence n (%)	0	0	0	0	0	1 (0.3)	1 (0.3)	1 (0.2)	3 (0.7)	2 (0.8)
Transplantation n (%)	2 (1.2)	3 (1.2)	0	4 (3.3)	2 (1)	4 (1.2)	1 (0.3)	3 (0.7)	4 (0.9)	1 (0.4)
Others n (%)	39 (22.4)	46 (18.5)	74 (30.8)	11 (9.1)	52 (22.8)	69 (20.7)	72 (22.6)	87 (20.7)	93 (23.1)	56 (20.6)
<i>n: Number; EAH: Training and Research Hospital; ICU: Intensive Care Unit.</i>										

recorded in 2022 (20.8%). Theses on pain management

ranged from 8.8% to 17.3%, peaking in 2019 (17.3%). Sedoanalgesia-related theses constituted 0.8%–4.3% of all theses, with the highest rate observed in 2023 (4.3%). Theses classified under the “Score/Scale” category varied between 2.6% and 6.9%, with the highest proportions observed in 2016 and 2021 (6.9%). Airway management topics accounted for 3.7%–12.4% of theses, while those related to hemodynamics ranged from 5.5% to 13.2%, peaking in 2019 (13.2%). Theses addressing respiratory functions ranged between 2.1% and 6.7%, with the highest rates in 2019 (6.6%) and 2023 (6.7%). Transplantation-related theses remained between 0% and 3.3%, with the highest rate in 2019 (3.3%). Theses related to artificial intelligence did not appear in the early years of the study period; the first such thesis emerged in 2021 (0.3%), followed by limited representation between 0.2% and 0.8% in subsequent years. The category labeled “Other” included 9.1%–30.8% of all theses.

Discussion

Bibliometric analyses are analytical tools that enable the evaluation of a discipline’s academic output not only in quantitative terms but also through the temporal evolution of research topics and shifts in priority areas. Recent bibliometric studies in the field of anesthesiology have demonstrated a notable increase in scientific productivity, accompanied by a meaningful diversification of research themes. Global bibliometric evaluations emphasize that anesthesiology research is not solely concentrated on topics directly related to clinical practice but is increasingly expanding toward new technological and methodological approaches [7].

In a long-term evaluation of specialization theses in the field of Anesthesiology and Reanimation in Türkiye, Güç et al. reported an increasing trend in thesis production over the years, along with a concentration in certain research topics [5]. The upward trend observed in our study (Figure 2) aligns with the findings of that national study as well as global bibliometric evaluations, suggesting that academic productivity in anesthesiology and reanimation has strengthened both quantitatively and structurally in the post-2016 period.

In this study, it was observed that the supervision of

specialization theses was predominantly carried out by academicians holding the titles of professor and associate professor. Examination of the annual distribution of advisor titles revealed that professors and associate professors consistently represented the largest proportion throughout the study period, demonstrating a notable continuity over time (Figure 3). Similarly, the long-term study by Güç et al., which evaluated specialization theses in Anesthesiology and Reanimation in Türkiye, also reported that thesis supervision was largely undertaken by senior academics with professor and associate professor titles [5]. Likewise, Rahman et al., in their analysis of cardiovascular surgery specialization theses, found that thesis supervision was predominantly conducted by senior academicians [2]. The findings of the present study align with these observations across different specialties in the literature, suggesting that academic seniority serves as a key determinant in thesis supervision. This indicates that, in the field of anesthesiology and reanimation, thesis supervision is a process closely associated with academic experience and educational responsibility.

In the long-term evaluation conducted by Güç [8] on specialization theses in the field of Anesthesiology and Reanimation up to 2016, it was reported that the majority of theses were designed prospectively, while retrospective and experimental studies were represented at lower rates. A similar pattern was observed in the present study covering the post-2016 period. Most of the analyzed specialization theses were prospectively designed, whereas retrospective, experimental, and survey-based studies constituted a smaller proportion (Figure 4). Furthermore, the predominance of clinically designed theses suggests that specialization training in anesthesiology and reanimation is primarily shaped around patient-based clinical research. This finding aligns with the inherently clinical and practice-oriented nature of anesthesiology as a medical discipline.

From 2016 to the present, an upward trend has been observed in the average number of pages of specialization theses in the field of Anesthesiology and Reanimation (Table 1). This increase likely reflects a methodological shift toward more detailed data presentation and a more structured approach to academic reporting. Such a trend may be associated with the expanding scope of clinical

research in anesthesiology and reanimation, as well as a growing emphasis on comprehensive documentation in thesis writing processes.

When the distribution of specialization theses by training institutions is examined, it is evident that the majority of theses prepared since 2016 have been conducted in university hospitals (Table 1). The dominant role of university hospitals in thesis production throughout the study period can be attributed to their established academic infrastructure, advanced research facilities, and central role in specialization training programs.

On the other hand, the increasing proportion of theses prepared in Training and Research Hospitals over the years suggests that these institutions have been playing an increasingly significant role in specialization training and academic production. This distribution indicates that, in addition to university hospitals, Training and Research Hospitals also make substantial contributions to academic output in the field of anesthesiology and reanimation (Table 1).

The consistently low proportion of theses prepared in foundation and private hospitals throughout the study period may reflect the more limited structural role of these institutions in specialization training and research activities.

When examining the distribution of thesis topics by year, it is evident that subjects directly related to clinical practice and patient care have maintained a predominant focus throughout the study period (Table 1). In particular, areas such as regional/peripheral nerve blocks, intensive care, pain management, and hemodynamic monitoring consistently remained prominent in thesis production despite annual variations in their proportions. This finding indicates that the core clinical practice domains of anesthesiology and reanimation continue to serve as dominant focal points in the selection of thesis topics within the specialty.

However, alongside this clinical predominance in topic distribution, another noteworthy finding is the gradual diversification of thesis subjects over time. In addition to clinical applications, recent advancements in diagnostic and therapeutic approaches, technological innovations, and new methodological opportunities have influenced the content and scope of thesis topics, contributing to a more diverse and multidimensional research landscape within the discipline. This trend suggests that specialization theses in anesthesiology and reanimation are no longer confined to traditional clinical themes but are evolving in parallel with the dynamic and expanding nature of the field.

In recent years, with the widespread integration of ultrasonography into clinical practice, a marked increase in studies focusing on regional anesthesia and peripheral nerve blocks has been reported. The advantages of ultrasound-guided techniques in terms of efficacy, safety, and patient comfort have contributed to the growing prominence of this field in both clinical applications and academic research [9,10]. The observed increase in intensive care-related theses over time is consistent with the growing emphasis on prognostic markers and ventilation strategies in the management of critically ill patients [11].

In the field of pain medicine, clinical strategies aiming to promote multimodal analgesia and reduce opioid use have increasingly become subjects of research, particularly within the framework of Enhanced Recovery After Surgery (ERAS) protocols [12]. This trend indicates that pain management has evolved beyond a symptom-control discipline to become a key clinical priority that holistically influences patient outcomes.

In addition to traditional clinical topics, the emergence of newer and evolving research areas within specialization theses is noteworthy. Although theses related to artificial intelligence (AI) were absent in the early years of the study period, the appearance of such works beginning in 2021, albeit in limited numbers, reflects the growing academic interest in AI applications in healthcare. The increasing use of AI in data processing, clinical decision support systems, diagnostic procedures, and patient monitoring aligns with broader bibliometric trends in medical

research [13,14]. The still limited representation of AI-focused theses suggests that this field is an emerging area within the discipline—one that is expected to gain greater prominence in future research.

Overall, the concentration of theses within this study on clinically oriented topics—such as intensive care, regional anesthesia techniques, and pain management—demonstrates that the core areas of interest and responsibility in anesthesiology and reanimation are strongly reflected in academic output. In addition, the emergence of new and evolving fields such as artificial intelligence among thesis topics indicates a broadening of the discipline's research spectrum and suggests that more technology-oriented approaches may become increasingly prominent in the future.

Limitations

This study has several limitations. First, the analysis was limited to medical specialization theses that were openly accessible in the National Thesis Center of the Council of Higher Education (YÖK); the exclusion of non-accessible theses may have restricted the comprehensiveness of the dataset. Due to the bibliometric and descriptive nature of the study, factors such as methodological quality, scientific impact, or subsequent publication status of the theses were not evaluated. Additionally, during topic classification, some theses may have fit into multiple categories, potentially resulting in minor overlaps. Nevertheless, by focusing on the 2016–2025 period, this study provides a comprehensive and up-to-date overview of current trends and bibliometric characteristics of specialization theses in the field of Anesthesiology and Reanimation.

Conclusion

This study presents the production dynamics of medical specialization theses prepared in the Departments of Anesthesiology and Reanimation in Türkiye between 2016 and 2025 from a bibliometric perspective. The findings indicate a marked upward trend in thesis production over the years, with the majority of theses focusing on clinical and prospective study designs. Research topics were predominantly concentrated in core clinical areas such as regional anesthesia, intensive care, and pain management.

The finding that thesis supervision was predominantly conducted by academicians holding the titles of professor and associate professor, and that a large proportion of theses were prepared in university hospitals, underscores the decisive role of institutional infrastructure and academic seniority in academic production. However, the increasing contribution of Training and Research Hospitals to thesis output over time indicates the growing importance of these institutions in specialization training and academic research processes.

Overall, the findings reflect the clinical priorities, research trends, and academic production structure of specialization training in the field of anesthesiology and reanimation within a comprehensive framework. This study serves as a guiding reference for the selection of research topics, study designs, and institutional distribution of future specialization theses, while also providing a current and systematic dataset that may contribute to the development of educational policies and research strategies.

Ethics / Informed Consent

This study was conducted using data obtained from openly accessible medical specialization theses available in the National Thesis Center of the Council of Higher Education (YÖK). No personal data, identifiable information, or sensitive content related to individuals were collected; only publicly available academic records were analyzed. Therefore, ethical committee approval was not required for this research.

Data Availability Statement

The data used in this study were obtained from medical specialization theses publicly available in the National Thesis Center of the Council of Higher Education (YÖK). All analyzed data are open-access and can be directly retrieved from the respective platform. No additional datasets were created or analyzed beyond these publicly accessible sources.

Disclosure

The authors declare that there are no conflicts of interest regarding the design, conduct, or publication of this study.

Financial Disclosure

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