

Transversus Abdominis Plane Block Research in Türkiye: An Evaluation of National and International Databases

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Cite as: Kulturoglu G, Töngü AE, Muratoglu DS, Altınsoy S. Transversus Abdominis Plane Block Research in Türkiye: An Evaluation of National and International Databases. J Cukurova Anesth Surg. 2026;9(3):817-826. doi: 10.36516/jocass.1965973

Received: 07.06.2026, Accepted: 17.09.2026, Published: 30.09.2026, CC BY-NC 4.0

Abstract

Aim/Objective: This study aimed to bibliometrically analyze scientific publications on transversus abdominis plane (TAP) block produced by Turkey-affiliated authors through Web of Science (WoS) and TR Dizin databases, and to characterize Turkey's national and international scientific contribution by examining temporal distribution, citation patterns, collaboration networks, and thematic trends. **Methods:** The WoS and TR Dizin were searched from inception through May 5, 2026. WoS was searched using the topic field with "transversus abdominis plane block" filtered by country ("Turkey" and "Türkiye"), while TR Dizin was searched using "transversus abdominis" as an exact phrase in the abstract field, restricted to original articles by Turkish researchers. **Results:** A total of 179 publications were identified — 143 from WoS and 36 from TR Dizin. WoS publications were predominantly indexed in SCIE (73.4%) and English was the dominant language (95.8%). Annual WoS output peaked at 22 publications in 2025, while TR Dizin peaked at nine in 2022. Citation analysis revealed a marked disparity: WoS articles accumulated 1,578 citations (mean: 11.03; H-index: 22) compared to 39 citations in TR Dizin (mean: 1.08; H-index: 4). Collaboration network analysis identified 17 authors, with Serkan Tulgar and Ali Ahiskalioglu as central nodes. The most frequent keywords were 'transversus abdominis plane block', 'postoperative pain', and 'laparoscopic cholecystectomy'. **Conclusion:** Turkey has demonstrated notable academic growth in TAP block research over the past decade. Developing multicenter collaborations, increasing high-quality prospective studies, and targeting higher-impact journals are recommended to further strengthen Turkey's international visibility in regional anesthesia literature.

Keywords: Abdominal Muscles; Bibliometrics; Nerve Block; Postoperative Pain

1. Introduction

Transversus Abdominis Plane Block, first described by Rafi in 2001, has become one of the cornerstone regional anesthesia techniques for abdominal wall analgesia.¹ Over the past two decades, its use has expanded considerably in both open and laparoscopic abdominal surgeries as part of multimodal postoperative pain management strategies.² The growing popularity of the TAP block is largely attributable to its technical simplicity,

opioid-sparing effects, and relatively favorable safety profile compared with neuraxial techniques.

Despite its widespread clinical adoption, the analgesic efficacy of the TAP block remains a matter of ongoing debate. Several limitations have been identified, including its limited effect on visceral pain, variability in local anesthetic spread within fascial planes, and the relatively short duration of analgesia associated with single-injection techniques.³ Recent randomized controlled trials investigating various local anesthetic agents, adjuvants, and TAP block techniques have yielded inconsistent results regarding postoperative pain control and opioid consumption, with reported benefits ranging from significant analgesic and opioid-sparing effects to minimal or clinically insignificant improvements.⁴⁻⁶ This inconsistency in the literature suggests that the true clinical effectiveness of TAP block may vary according to surgical procedure, patient population, and technical factors, and therefore has not yet been fully elucidated across different abdominal surgery settings.

The ongoing uncertainty regarding the clinical efficacy of TAP block highlights the need for a comprehensive evaluation of the scientific literature in this field. In this context, assessing the quantitative research output, thematic trends, and international visibility of studies originating from Türkiye is of particular importance. Bibliometric analysis has increasingly emerged as a powerful methodological approach for evaluating scientific productivity, research impact, and collaborative networks within a specific field of study.

The aim of this study was to perform a bibliometric analysis of scientific publications on Transversus Abdominis Plane Block authored by researchers affiliated with institutions in Türkiye using the WoS and TR Dizin databases. Specifically, the study sought to characterize the temporal distribution, citation patterns, collaboration networks, and thematic trends of these publications in order to comprehensively evaluate Türkiye's national and international scientific contribution to the field.

2. Materials and Methods

2.1. Ethical Statement

This study was designed as a bibliometric analysis using exclusively publicly available data; therefore, ethical approval was not required. No human participants or animal subjects were involved in the study.

2.2. Study Design

This retrospective observational study was conducted to perform a bibliometric analysis of scientific publications related to 'Transversus Abdominis Plane Block' authored by researchers affiliated with institutions in Türkiye. The analyses were performed using the Web of Science Core Collection (Clarivate Analytics, Philadelphia, PA, USA) and TR Dizin (TÜBİTAK ULAKBİM, Türkiye) databases.

2.3. Databases and Search Strategy

In the WoS database, the Advanced Search module was used to identify publications containing the keyword phrase "transversus abdominis plane block" within the topic (TS) field. Country filters were applied using both "Turkey" and "Türkiye" to retrieve publications affiliated with institutions in Türkiye.

In the TR Dizin database, the Advanced Search function was used to identify publications containing the exact phrase "transversus abdominis" within the abstract field. The document type was restricted to "article," and the author country was filtered as "Türkiye." Because the terminology used in TR Dizin publications may vary across studies and journals, including both English and Turkish expressions, the search strategy was intentionally broadened by using only the phrase "transversus abdominis" to maximize sensitivity and ensure comprehensive retrieval of relevant publications in the field.

No time restriction was applied in either database, and all publications indexed from database inception through May 5, 2026, were included in the search. Bibliometric data were collected for each study, including title, authors, publication year, journal, and citation count.

2.4. Inclusion and Exclusion Criteria

All publication types related to Transversus Abdominis Plane Block with at least one author affiliated with an institution in Türkiye were included in the analysis. No language restriction was applied during the study selection process. Studies unrelated to the fields of anesthesia and analgesia or not directly associated with the TAP block topic were excluded.

2.5. Data Extraction and Study Selection

Records retrieved from the WoS database were exported in both “Tab-delimited file” and “Microsoft Excel” formats and subsequently organized for analysis. Likewise, all records identified through the TR Dizin search were transferred to Microsoft Excel and prepared for bibliometric evaluation.

The selection of publications eligible for inclusion was independently performed at the title and abstract level by three anesthesiology and reanimation specialists (AET, DSM, and SA). Any disagreements between the reviewers were resolved through consensus.

2.6. Bibliometric Visualization and Network Analysis

Bibliometric network analyses and visualizations were performed using records retrieved from the WoS database with the aid of VOSviewer software (version 1.6.20; Leiden University, the Netherlands). Co-authorship, institutional collaboration, and keyword co-occurrence analyses were evaluated separately to identify scientific collaboration patterns and thematic research trends within the field.

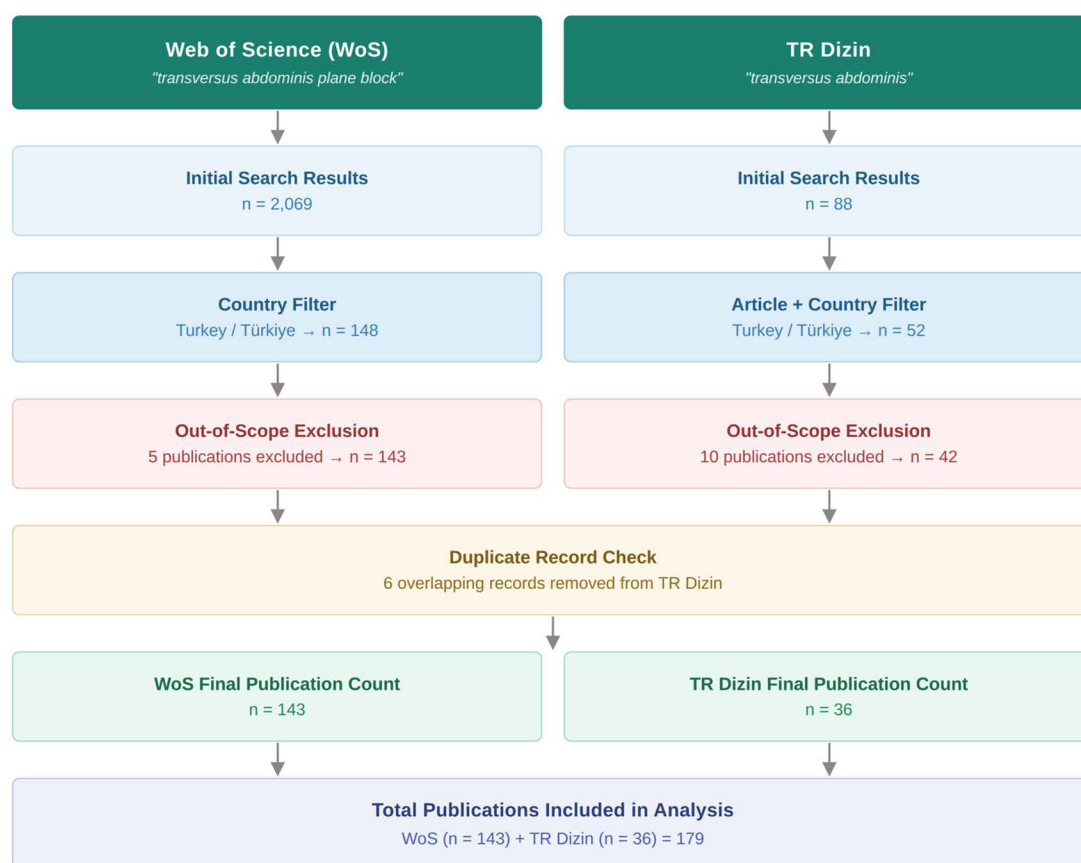


Figure 1. Bibliometric analysis workflow

3. Results

The initial search using the predefined keywords identified 2,069 records in the WoS database. After applying the country filter, 148 publications remained eligible for screening. In the TR Dizin database, 88 records were identified, which were subsequently reduced to 52 after applying document type and country filters. During the eligibility assessment, 5 publications from the WoS database and 10 publications from TR Dizin were excluded for not meeting the inclusion criteria. In addition, 6 duplicate records indexed in both databases were identified and removed from the TR Dizin dataset. Consequently, a total of 179 publications, including 143 from WoS and 36 from TR Dizin, were included in the final bibliometric analysis (Figure 1).

3.1. General Publication Profile

Analysis of the publications indexed in the WoS database demonstrated that the majority were published in journals indexed within the Science Citation Index Expanded (SCI-E) (73.4%; n=105), followed by the Emerging Sources Citation Index (ESCI) (26.6%; n=38). A limited number of publications were indexed in other WoS categories (2.1%; n=3).

With regard to publication language, WoS-indexed studies were published predominantly in English (95.8%; n=137), whereas the proportion of Turkish-language publications was notably low (1.4%; n=2). In contrast, publications indexed in TR Dizin demonstrated a more balanced language distribution, with comparable proportions of English-language (55.6%; n=20) and Turkish-language (44.4%; n=16) articles (Table 1).

Table 1. General Bibliometric Characteristics of the Web of Science WoS and TR Dizin Databases

	WoS (n=143)	TR Dizin (n=36)
First publication year	2009	2011
Year with the highest publication output	2025 (n=22)	2022 (n=12)
Total citation count	1,578	39
Mean citations per article	11,03	1,08
H-index	22	4
English-language publications, n (%)	137 (95,8)	20 (55,6)
Turkish-language publications, n (%)	2 (1,4)	16 (44,4)

WoS: Web of Science; n: number of publications. The table is based on search data obtained on May 5, 2026.

3.2. Publication and Citation Trends Over Time

Temporal trend analysis demonstrated that the first Türkiye-affiliated publications on TAP block indexed in the WoS database appeared in 2009. These early contributions included the case report entitled "Ultrasound-guided bilateral transversus abdominis plane block in a 2-month-old infant" and the commentary article "Is transversus abdominis plane block a real alternative to caudal anesthesia?" authored by Tekin M. and colleagues.^{7,8} In subsequent years, the annual number of WoS-indexed publications demonstrated a steady and sustained upward trend. Notably, annual publication counts reached double-digit values beginning in 2017, with the highest scientific output observed in 2025 (n=22). In contrast, data for 2026 provide only a partial representation because the year has not yet been completed; nevertheless, 9 publications had already been identified at the time of analysis (Figure 2-A).

Temporal analysis of the TR Dizin database demonstrated that the first publication in this field appeared in 2011 and consisted of the clinical study entitled "Postoperative analgesic efficacy of ultrasound-guided transversus abdominis plane block in total

abdominal hysterectomy cases” authored by Erdoğan N. and colleagues.⁹ Unlike the relatively consistent increase observed in the WoS dataset, publication activity in TR Dizin exhibited a more fluctuating pattern over time. Annual scientific output reached its highest level in 2022 with 9 publications, followed by a marked decline in 2023 (Figure 2-A).

According to the WoS data, citation counts began to demonstrate an upward trend after 2012. A particularly pronounced increase was observed during the 2017–2025 period, culminating in the highest citation count in 2025 with 279 citations. Citation data for 2026 remain limited because the year has not yet been completed. In contrast, citation counts in the TR Dizin database remained consistently low throughout the study period. The highest annual citation numbers were recorded in 2020 and 2021, with 11 and 7 citations, respectively (Figure 2-B).

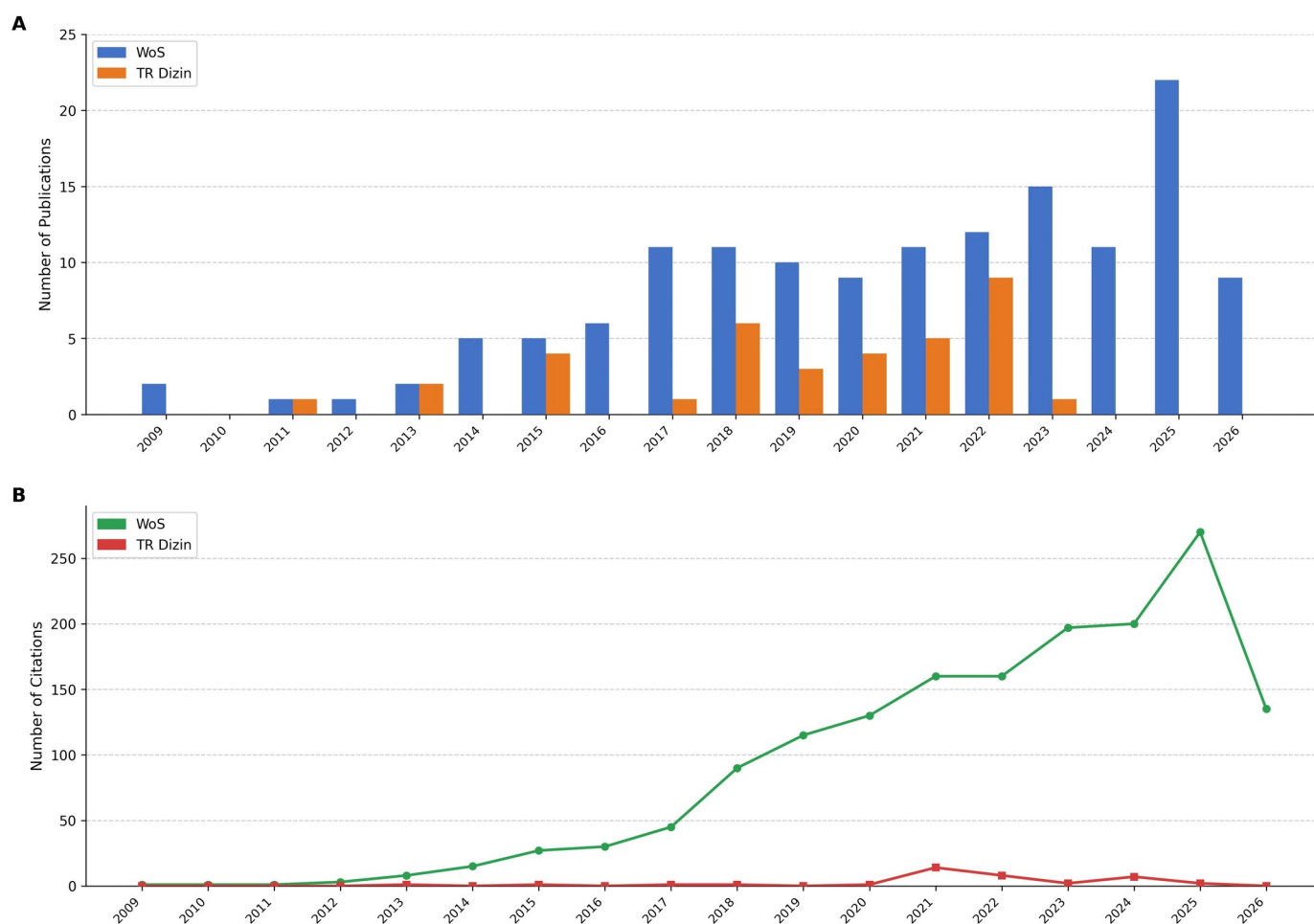


Figure 2. Annual publication and citation trends in WoS and TR Dizin databases. (A) Publication trends, (B) Citation trends.

3.3. Citation Analysis

The 143 publications included from the WoS database received a total of 1,578 citations, corresponding to a mean citation count of 11.03 citations per article (Table 1). The H-index of the dataset was calculated as 22.

The most highly cited publication was the article entitled “Quadratus Lumborum Block Versus Transversus Abdominis Plane Block in Children Undergoing Low Abdominal Surgery: A Randomized Controlled Trial” by Öksüz G. and colleagues, published in *Regional Anesthesia and Pain Medicine* in 2017, which received 144 citations.¹⁰ The second most cited study was “Ultrasound-guided erector spinae plane block versus oblique subcostal transversus abdominis plane block for postoperative analgesia of adult patients undergoing laparoscopic cholecystectomy: randomized, controlled trial” by

Altıparmak B. and colleagues, published in the Journal of Clinical Anesthesia in 2019, with 119 citations.¹¹ The five most cited publications indexed in the WoS database are summarized in Table 2.

Table 2. Top Five Most Cited Articles in the Web of Science WoS Database

	Authors	Year	Title	Citation Count
1	Öksüz G, Bilal B, Gürkan Y	2017	Quadratus Lumborum Block Versus Transversus Abdominis Plane Block in Children Undergoing Low Abdominal Surgery: A Randomized Controlled Trial ¹⁰	144
2	Altıparmak B, Toker MK, Uysal Aİ	2019	Ultrasound-guided erector spinae plane block versus oblique subcostal transversus abdominis plane block for postoperative analgesia of adult patients undergoing laparoscopic cholecystectomy: Randomized, controlled trial ¹¹	119
3	Şahin L, Şahin M, Gül R	2013	Ultrasound-guided transversus abdominis plane block in children: A randomised comparison with wound infiltration ¹²	58
4	İpek CB, Kara D, Yılmaz S	2019	Comparison of ultrasound-guided transversus abdominis plane block, quadratus lumborum block, and caudal epidural block for perioperative analgesia in pediatric lower abdominal surgery ¹³	55
5	Atım A, Bilgin F, Kılıçkaya O	2011	The efficacy of ultrasound-guided transversus abdominis plane block in patients undergoing hysterectomy ¹⁴	55

Citation counts are based on search data obtained on May 5, 2026. The first three authors of each article are presented in the table.

The 36 publications evaluated within the TR Dizin database received a total of 39 citations, corresponding to a mean citation count of 1.08 citations per article. The H-index of this dataset was calculated as 4 (Table 1). The most highly cited publication was a review article authored by Tekelioğlu UY. and colleagues, published in 2013, which provided a general overview of TAP block and received 7 citations.¹⁵

3.4. Most Productive Authors

Within the Web of Science (WoS) dataset, the most productive authors were Serkan Tulgar, Arzu Yıldırım Ar, and Ali Ahıskaloğlu, each contributing six publications. These authors were followed by Başak Altıparmak and Betül Kozanhan, each with five publications. In the TR Dizin database, scientific productivity was more evenly distributed among authors, with several researchers—including Hakan Akelma, Elif Oral Ahıskaloğlu, Gülay Ok, and Şafak Emre Erbabacan—each contributing two publications.

3.5. Co-authorship Network Analysis

The VOSviewer-based co-authorship network analysis performed using WoS data revealed a collaborative structure consisting of 17 authors, 3 clusters, and 62 inter-author links among Türkiye-affiliated researchers in the field of TAP block. The total link strength of the network was calculated as 109.

Evaluation of the network structure demonstrated that the first cluster was predominantly centered around *Serkan Tulgar* and exhibited a collaborative pattern that also included international partnerships. The second major cluster was organized primarily around *Ali Ahıskaloğlu*. Density map analysis further demonstrated that these two researchers represented highly connected nodes within the collaboration network and constituted the principal interaction hubs in the field.

3.6. Keyword Analysis

Keyword co-occurrence analysis based on the WoS dataset revealed a network structure comprising 73 keywords, 11 clusters, and 336 inter-keyword links, with a total link strength of 501. The analysis demonstrated that the term “transversus abdominis plane block” constituted the central node of the network.

The most frequently used keywords were “transversus abdominis plane block” (n=54), “postoperative pain” (n=27), and “laparoscopic cholecystectomy” (n=19). Evaluation of the density map indicated that research activity was primarily organized around two major thematic axes. The first axis was directly related to TAP block applications, whereas concepts associated with postoperative pain and analgesia emerged as secondary areas of thematic concentration (Figure 3).

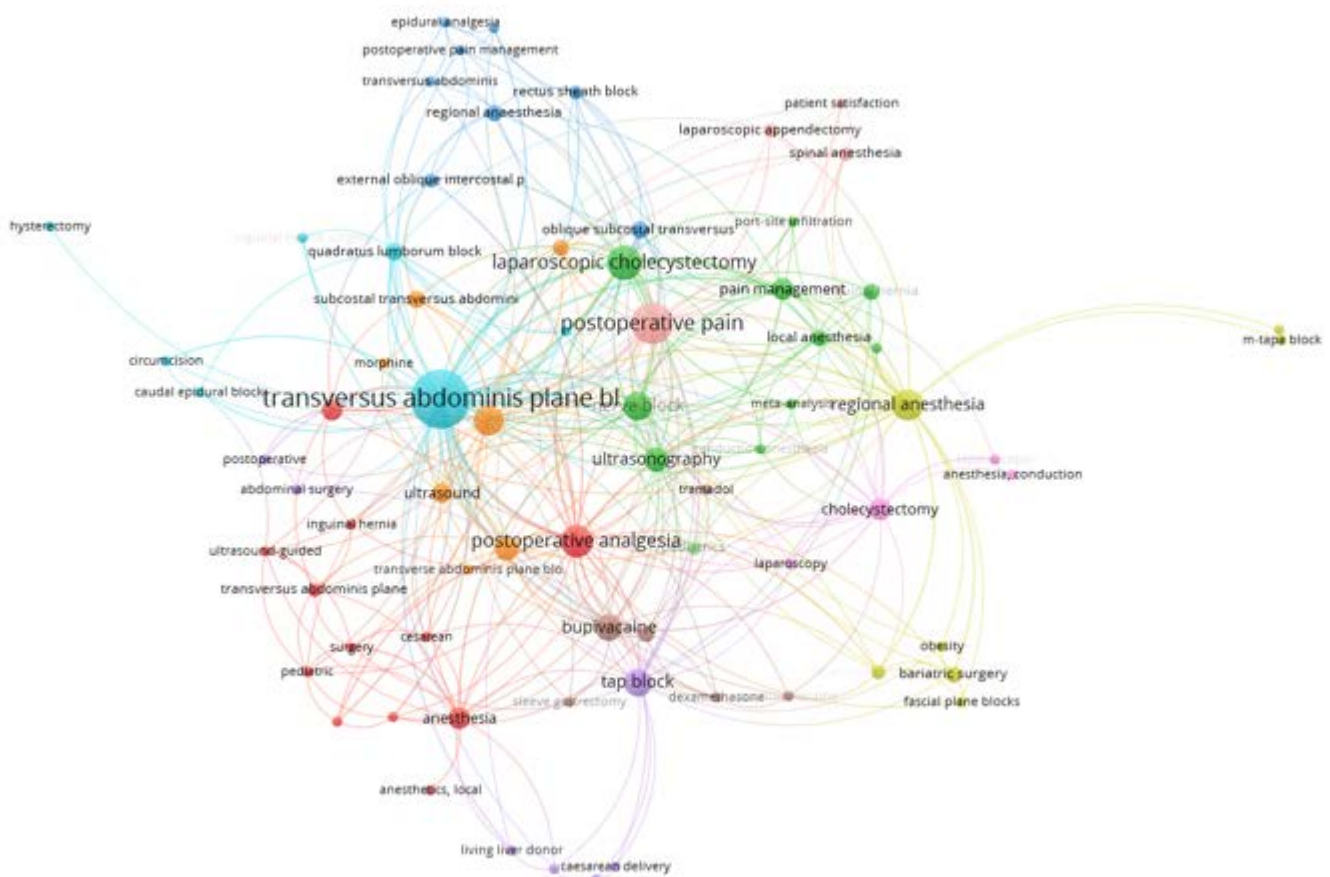


Figure 3. Keyword co-occurrence network

4. Discussion

In this study, Türkiye-based publications related to 'Transversus Abdominis Plane Block' and their bibliometric characteristics were comprehensively evaluated using the WoS and TR Dizin databases. The findings indicate that scientific interest and research productivity in this field have increased substantially over time, particularly within internationally indexed journals. Moreover, the analysis revealed notable differences between the two databases in terms of publication patterns, citation performance, language distribution, and research continuity. Collectively, these findings suggest that while Türkiye has established an increasingly visible scientific presence in TAP block research at the international level, national and international publication platforms exhibit distinct bibliometric characteristics.

International bibliometric analyses have demonstrated that research activity related to Transversus Abdominis Plane Block entered a phase of accelerated growth, particularly after 2010. In a comprehensive bibliometric analysis covering the 2007–2024 period, Cheng et al. reported a marked increase in TAP block publications after 2017, with global scientific output reaching its highest level in 2022.¹⁶ Similarly, Aladağ et al. identified a sustained upward trend in TAP block-related publications published between 2003 and 2023.¹⁷ Consistent with these international findings, the present study demonstrated that Türkiye-originated WoS-indexed publications increased substantially after 2017 and reached their highest productivity level in 2025. These findings suggest that Türkiye has progressed in parallel with the global expansion of the TAP block literature. The widespread adoption of ultrasound-guided regional anesthesia techniques, increasing integration of multimodal analgesia strategies into routine perioperative care, and broader implementation of Enhanced Recovery After Surgery (ERAS) protocols may have contributed to this upward trend.

In the present study, the marked decline in the number of TR Dizin publications after 2022 was particularly notable. This finding may reflect a growing tendency among researchers to preferentially publish in internationally indexed journals rather than national databases. Supporting this interpretation, the majority of WoS-indexed publications were published in SCI-E journals (73.4%), suggesting that TAP block research originating from Türkiye has increasingly gained international visibility in addition to its quantitative growth. The relatively low citation counts and limited H-index observed in the TR Dizin dataset further suggest that nationally indexed publications may have more limited international dissemination and academic impact. Differences in publication language may also contribute to this discrepancy, as WoS-indexed studies were published almost exclusively in English (95.8%), whereas Turkish-language articles still constituted a substantial proportion of publications in TR Dizin (44.4%) (Table 1).

International bibliometric analyses have identified the United States as the most productive country in the field of TAP block research, followed by China and India.^{16,17} Türkiye has also been recognized among the countries with visible participation in global collaboration networks.¹⁶ In the present study, the high publication productivity of researchers such as *Serkan Tulgar*, *Arzu Yıldırım Ar*, *Ali Ahıskalıoğlu*, and *Başak Altıparmak*, together with the strong collaborative clusters formed around *Serkan Tulgar* and *Ali Ahıskalıoğlu* in the co-authorship network analysis, suggests that TAP block research in Türkiye has developed around specific academic centers and research groups. Moreover, the presence of clusters involving international collaborations highlights the increasing integration of Turkish researchers into global scientific networks.

In the present study, it was noteworthy that most of the highly cited publications consisted of randomized controlled trials comparing TAP block with other interfascial plane blocks. In particular, the study by Öksüz G. and colleagues comparing quadratus lumborum block and TAP block in pediatric abdominal surgery was identified as the most highly cited publication in the dataset,¹⁰ suggesting that comparative evaluation of TAP block against alternative fascial plane techniques has become one of the major research themes in the literature. This observation is also consistent with findings from the international literature. In the bibliometric analysis by Cheng et al., the most highly cited publication was likewise reported to be a randomized controlled trial comparing quadratus lumborum block with TAP block.^{16,18} Furthermore, the high citation impact of the study by Altıparmak et al. comparing erector spinae plane block with oblique subcostal TAP block suggests that researchers from Türkiye have made important contributions not only to the TAP block literature itself but also to the expanding field of newer-generation interfascial plane blocks.

Keyword co-occurrence analysis identified “transversus abdominis plane block,” “postoperative pain,” and “laparoscopic cholecystectomy” as the dominant themes within the network. This distribution indicates that the literature has primarily focused on the role of TAP block in perioperative pain management for minimally invasive abdominal surgery. The prominence of laparoscopic cholecystectomy further suggests that this procedure has served as one of the principal clinical models for evaluating the analgesic efficacy of TAP block in Türkiye.

This study has several limitations. First, the analysis was restricted to the WoS and TR Dizin databases; therefore, publications indexed exclusively in other databases such as *Scopus*, *PubMed*, or *Embase* may not have been captured. Second, bibliometric analyses provide primarily quantitative evaluations and do not directly assess the methodological quality or clinical relevance of individual studies. Finally, because citation counts are inherently time-dependent, the scientific impact of recently published articles may not yet be fully reflected in the present analysis.

5. Conclusion

In conclusion, this bibliometric analysis demonstrates that Türkiye has exhibited substantial academic growth in Transversus Abdominis Plane Block research, particularly over the last decade. The international visibility of Türkiye-originated publications has progressively increased, with randomized controlled trials and comparative studies involving newer interfascial plane blocks emerging as prominent areas of scientific contribution. Nevertheless, further advancement in international scientific impact may depend on the expansion of multicenter collaborations, the conduct of methodologically robust prospective studies, and increased publication in high-impact journals. Taken together, these findings suggest that Türkiye is likely to assume a more influential position in the future literature on TAP block and contemporary regional anesthesia techniques.

Author Contributions: G.K.: Conceptualization, Formal Analysis, Investigation, Methodology, Project Administration, Supervision, Validation, Writing – Original Draft, Writing – Review & Editing. A.E.T.: Conceptualization, Data Curation, Formal Analysis, Investigation, Methodology, Software, Visualization, Writing – Original Draft, Writing – Review & Editing. D.S.M.: Data Curation, Formal Analysis, Investigation, Resources, Software, Validation, Visualization, Writing – Review & Editing. S.A.: Conceptualization, Funding Acquisition, Investigation, Project Administration, Resources, Supervision, Writing – Review & Editing. Both authors read and approved the final version of the manuscript.

Funding : This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest statement : The authors declare that they have no conflict of interest.

Statement of ethics: The present study was a bibliometric analysis and did not require ethics committee approval because it was conducted using publicly available data.

Availability of data and materials : The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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