



A bibliometric analysis in venous thromboembolism nursing (1999–2022): Current status and future prospects

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ABSTRACT

Research on venous thromboembolism (VTE) in nursing has garnered significant attention. This study aimed to examine the characteristics of VTE nursing publications, offering valuable insights into the current state of the field and forecasting future trends. A comprehensive screening of global publications up to 2022 was conducted using the Web of Science Core Collection database to investigate VTE nursing. The search incorporated keywords such as 'venous thromboembolism', 'deep vein thrombosis', and 'pulmonary embolism' to identify relevant studies. A bibliometric analysis of these publications was performed using various visualisation tools such as VOSviewer and R software. A total of 675 papers on VTE nursing were identified, with the earliest publication dating back to 1999. The research involved 971 institutions from 43 countries, with the United States leading by contributing to 261 articles. Harvard University emerged as the most productive institution, and Heit, with 17 publications, was the most cited author. The journal *Thrombosis Research* published the highest number of papers (11). The frontiers of VTE nursing research are anticipated to continue focusing on topics such as epidemiology, risk factors, and VTE prevention and management.

1. Introduction

Lower limb deep vein thrombosis (DVT) is characterised by the abnormal formation of blood clots in the deep veins of the lower extremities, leading to symptoms including pain, swelling, and impaired movement. This venous reflux disorder significantly impacts the quality of life for affected individuals. Recognized as a frequent complication of hospitalisation, DVT has emerged as a global public health concern [1]. The potential dislodgment of the thrombus, with subsequent travel to the lungs, poses as a severe threat known as pulmonary embolism (PE), a condition with life-threatening consequences [2]. DVT and PE represent distinct manifestations of venous thromboembolism (VTE), occurring in different body parts and stages. VTE stands as the third most common cardiovascular disorder, affecting up to 5 % of the population [3]. Alarming, approximately 20 % of individuals experiencing a VTE event succumb within 1 year [4]. Clinical studies underscore the pivotal role of appropriate nursing plans and patient guidance in reducing VTEW incidence [5]. The implementation of effective nursing measures during hospitalisation emerges as a critical strategy for preventing and treating VTE in patients [6]. Utilising bibliometric analysis facilitates the evaluation of prominent research areas within a specific topic and the identification of unexplored directions yet to be thoroughly examined [7,8]. Such academic assessments of research trends provide researchers with insights for selecting research topics. Despite the substantial volume of original articles and comments on VTE nursing, a comprehensive statistical and intuitive analysis of this literature remains absent. This study addresses this gap, offering a

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thorough understanding of VTE in the nursing field. Leveraging the capabilities of the bibliometric analysis software VOSviewer, we conducted a statistical analysis of publications focused on VTE in nursing. Our objectives were to uncover primary research, track the evolution of hotspots, and identify future development trends in this research area. Our study encompassed an assessment of annual publication growth, international collaborations, author productivity, source journals, and keyword co-occurrence analysis within the context of VTE nursing studies.

2. Materials and methods

2.1. Data source and search strategy

The bibliometric analysis utilised data from the Web of Science Core Collection (WoSCC) database, accessible at <https://www.webofknowledge.com>. The search criteria were defined as follows: (ALL = ['nurs*']) AND (ALL = ['deep vein thrombo*'] OR ALL=('deep venous thrombo*') OR ALL=('pulmonary embolism') OR ALL=('venous thromboembolism') OR ALL=('VTE')). The search was confined to English language documents published between the inception and 31 December 2022.

2.2. Inclusion and exclusion criteria and screening strategy

The inclusion criteria were as follows: (a) literature published before 2023; (b) research on VTE nursing; and (c) literature published in English. Duplicate publications not involving human subjects were excluded. To ensure the reliability of the included literature, only sources from the WoS Core Collection database were considered for efficient subsequent data processing. Retrieved articles were exported to EndNote X9 (Thomson Reuters [Scientific] LLC, Philadelphia, PA United States of America [USA]) for further categorisation. Two researchers independently screened the literature by reading the titles and abstracts, and full texts were viewed when necessary so that as much eligible literature on VTE nursing as possible was included. After independent screening, two researchers cross-checked and resolved disagreements with a third researcher, ultimately reaching a consensus on whether suspected articles should be included.

2.3. Data analysis

Two authors thoroughly examined the literature on VTE nursing and extracted the following data: author names, publication titles,

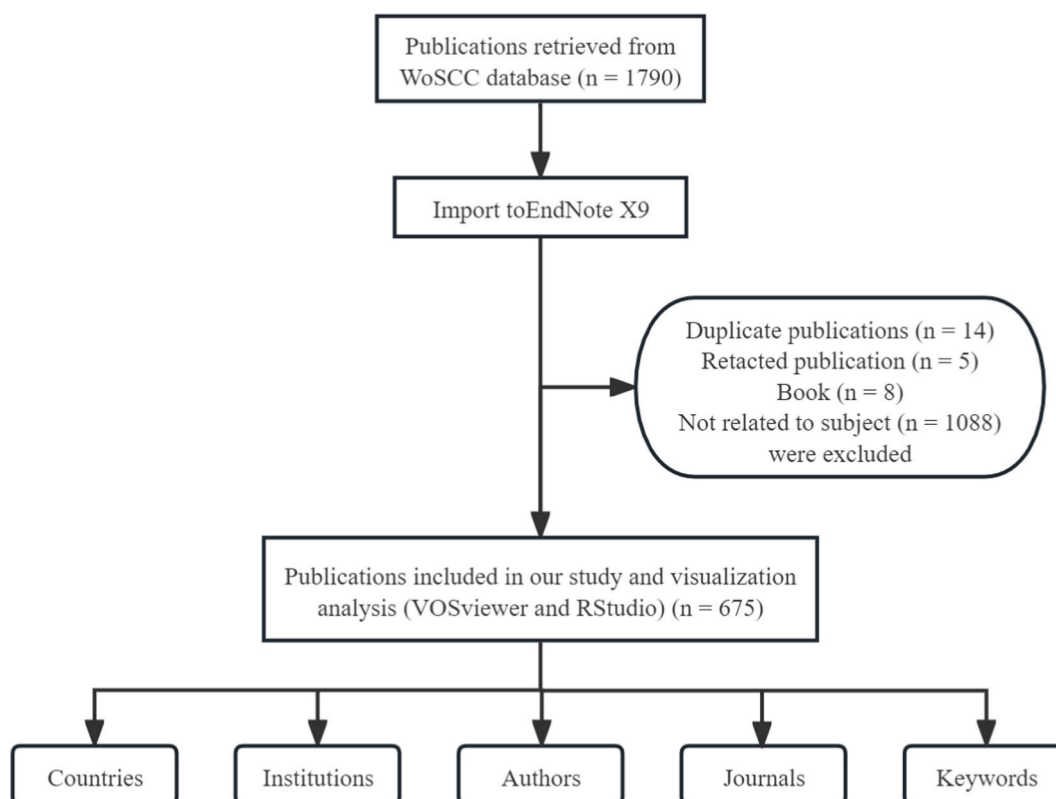


Fig. 1. A flow chart depicting the selection process for publications included in the final analysis.

publication years, journal sources, journal impact factors (IFs), citation counts, reference lists, author institutions, author countries, co-citation authors, co-citation journals, and keywords. Disagreements were resolved through discussions with a third author. Publication details, including publication year, author, and country/region, were standardised and harmonised for analysis using the bibliometric package in R [9] version 4.3.0. Journal IFs were sourced from the 2022 Journal Citation Reports published by Clarivate Analytics on 28 June 2022. VOSviewer [10] version 1.6.18 was employed to determine the relationships and network connections among various elements.

3. Results

3.1. General data

A total of 1790 publications were retrieved from the WoSCC database. After the screening process (Fig. 1), 675 articles were identified as relevant. This included 515 original articles, 65 reviews, 27 meeting abstracts, 4 Letters, and 64 Editorial materials (Fig. 2A).

3.2. Annual publications analysis

The number of publications serves as a general indicator of the interest of the scientific community in a particular field, providing insights into the developmental trends and research scope in the field. Fig. 2B illustrates the yearly changes in published articles, revealing a slight fluctuating trend from 1997 to 2007, which we define as the early research period in the VTE nursing field. From 2008 to 2017, the field entered the initial stages of the study and exhibited steady growth. Since 2018, a significant acceleration in the growth rate has been observed, indicating the expanding scale of nursing research on VTE.

3.3. Country collaboration

VTE nursing was implemented across 43 countries, indicating an extensive geographical coverage. Table 1 lists the top 10 countries based on publications and citations. The USA made the highest contribution with 261 articles, accounting for 38.67 % of the total. China followed with 100 articles (14.81 %), and the United Kingdom (UK) contributed 32 articles (4.74 %). In terms of citation analysis, the USA received the highest number of citations, with 11,339 (58.37 %), followed by China with 2581 (13.29 %), and Australia with 1078 (5.55 %). Country distribution reflects the level of collaboration and interconnectedness among influential countries in this field.

Furthermore, the frequency of article citations serves as an indicator of the influence of a country within a specific domain, with a higher citation count indicating greater impact. VOSviewer was employed to analyse international collaborations among the countries. Fig. 3 shows a visualisation map illustrating the collaboration between different countries. The map displays 43 countries divided into eight distinct clusters, each represented by a unique colour signifying a close-knit working group. The thicknesses of the lines connecting the countries indicate the strength of their collaboration. Notably, the USA exhibited the strongest collaboration network, with a link strength of 190. Canada secured the second position with a total link strength of 118, followed by the UK at 109, and Australia at 70.

3.4. Institution collaboration

An analysis of the number of papers published by 971 institutions indicated that 644 institutions (66.43 %) contributed to only one article, whereas 266 institutions (27.39 %) published 2–5 to articles. Additionally, 41 institutions (4.22 %) published 6–10 articles, and

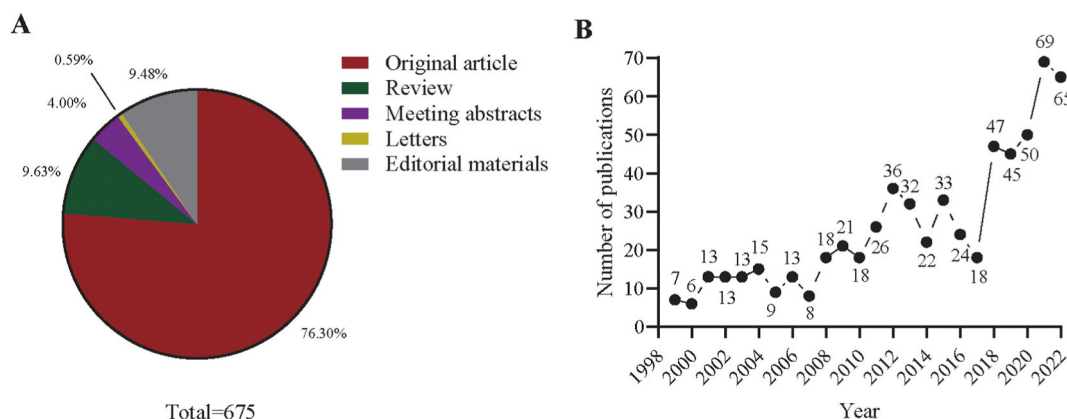


Fig. 2. A, The distribution of research article types in VTE nursing; B, The annual number of publications in VTE nursing (1999–2022).

Table 1
Top 10 productive and cited countries on VTE in nursing research.

Rank	Country	Papers (%)	Rank	Country	Citations (%)	Citations per paper
1	USA	261 (38.67 %)	1	USA	11339 (58.37 %)	43.44
2	China	100 (14.81 %)	2	China	2581 (13.29 %)	25.81
3	UK	32 (4.74 %)	3	Australia	1078 (5.55 %)	43.12
4	Australia	25 (3.70 %)	4	UK	1039 (5.35 %)	32.47
5	Brazil	18 (2.67 %)	5	Italy	557 (2.87 %)	30.94
6	Canada	17 (2.52 %)	6	Canada	474 (2.44 %)	27.88
7–8	Germany Netherlands	14 (2.07 %)	7	Netherlands	469 (2.41 %)	33.50
9–10	France Italy	12 (1.78 %)	8	France	338 (1.74 %)	28.17
			9	Germany	299 (1.54 %)	21.36
			10	Sweden	196 (1.01 %)	28.00

Categorical variables are expressed as numbers (percentages).
VTE: venous thromboembolism; USA: the United States of America; UK: the United Kingdom.

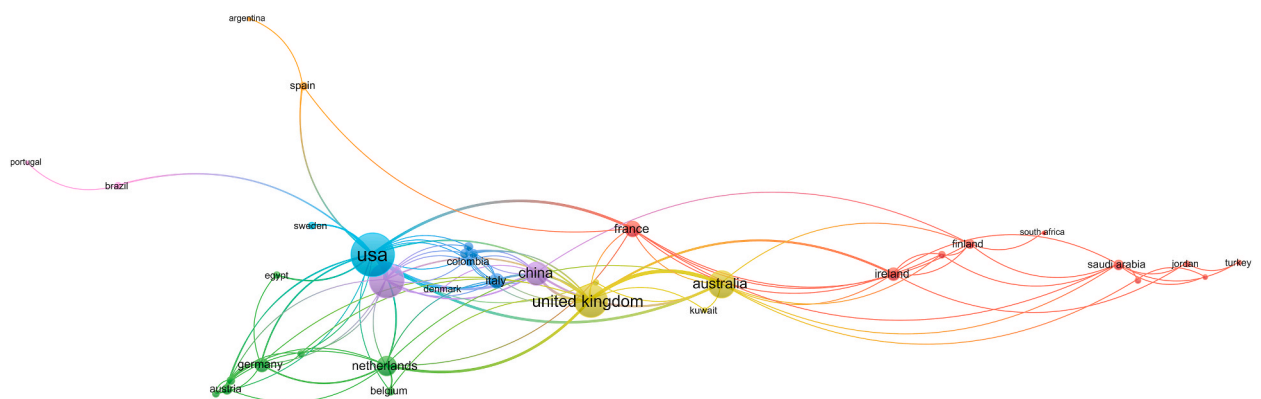


Fig. 3. A network map illustrating cooperation between countries in the VTE nursing field.

20 institutions (2.06 %) published more than 10 articles. **Table 2** presents the top ten most productive institutions in this field. Harvard University in the USA emerged as the most prolific institution, publishing 67 papers (9.93 %), followed by Johns Hopkins University (n = 33) and the Mayo Clinic (n = 20).

A network cooperation analysis of the 168 institutions requiring a minimum of three papers is shown in **Fig. 4**. The analysis revealed the presence of 12 cooperative groups, which are represented by distinct colour clusters in the network mapping. Institutions with a significant number of publications exhibited extensive collaboration with others, as evidenced by nodes with large-diameter circles and strong connecting lines in the cluster analysis visualisation. Harvard University (green), Peking Union Medical College (pink), and Johns Hopkins University (yellow) demonstrated strong betweenness centrality, indicating their prominent roles in facilitating connections within the network.

Table 2
The top 10 productive institutions on VTE in nursing research.

Rank	Institutions	Country	Papers (%)	Citations
1	Harvard University	USA	67 (9.93 %)	2426
2	Johns Hopkins University	USA	33 (4.89 %)	562
3	Mayo Clinic	USA	20 (2.96 %)	146.95
4	University of Michigan	USA	18 (2.67 %)	2939
5–6	Maastricht University Massachusetts General Hospital	Netherlands USA	16 (2.37 %)	121 361
7	Columbia University	USA	15 (2.22 %)	320
8	University of Toronto	Canada	14 (2.07 %)	362
9–10	Brigham and Women’s Hospital University of Pennsylvania	USA USA	13 (1.93 %)	363 234

Categorical variables are expressed as numbers (percentages).
VTE: venous thromboembolism; USA: the United States of America; UK: the United Kingdom.

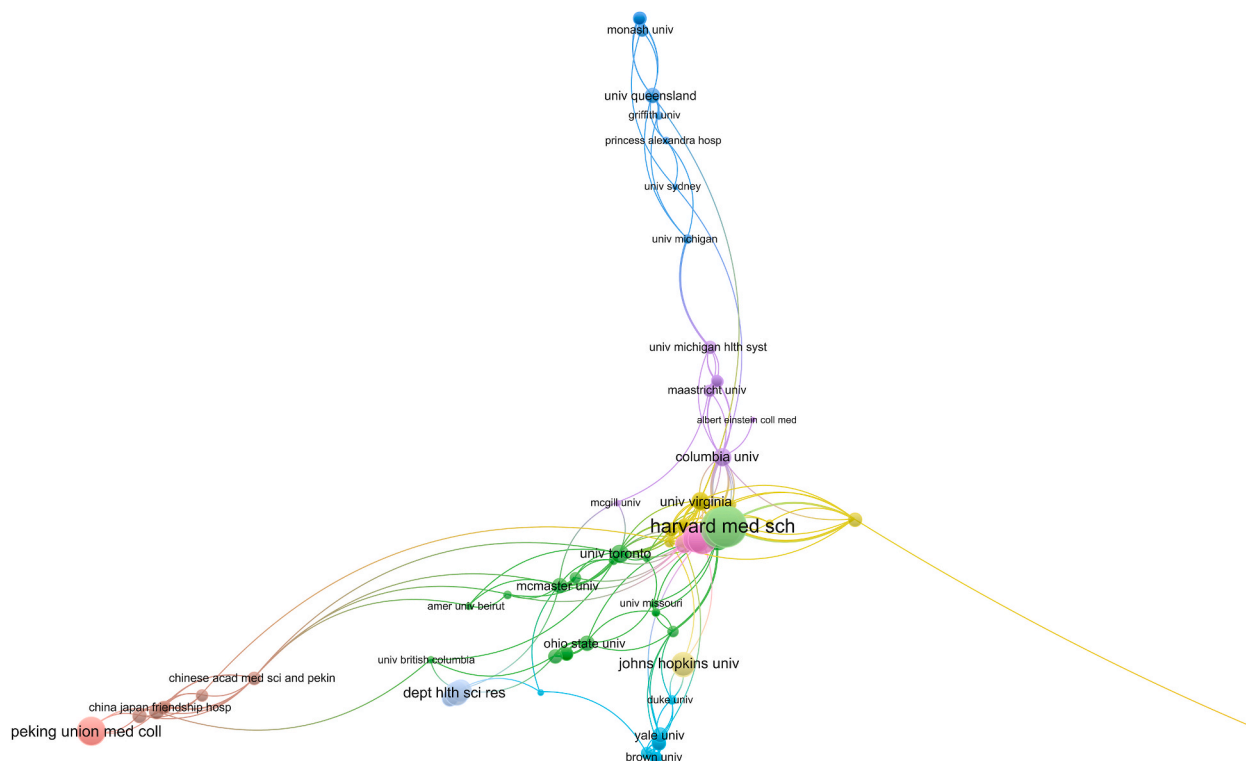


Fig. 4. A network map displaying cooperation between institutions involved in VTE nursing.

3.5. Authorship collaboration

A total of 2947 authors participated in the VTE nursing research. Among them, 2720 authors (92.30 %) published only one article. Additionally, 215 authors (7.30 %) published 2–5 articles, 9 authors (0.31 %) published 6–10 articles, and 3 authors (0.10 %) published >10 articles. Table 3 provides information on the top 10 most productive authors and their corresponding citation counts. Notably, Heit from the Mayo Clinic holds the first position, publishing 17 articles with 4673 citations. Heit contributed six highly cited articles to this field, as shown in Table 4. Other highly productive authors include Kabrhel C from the Massachusetts General Hospital (documents = 14, citations = 297), Petterson TM from the Mayo Clinic (documents = 13, citations = 3164), and Bailey KR from the Mayo Clinic (documents = 10, citations = 355). Fig. 5 depicts the network cooperation among the 80 authors, where a minimum requirement of three articles was established. This analysis identified 35 groups of cooperating authors. Notably, Wang Y demonstrated close collaboration with Zhang Y and Heit JA, as indicated by the red, blue, and pink nodes. However, collaborations among other authors were not found to be closely connected.

Table 3
The top 10 productive authors on VTE in nursing research.

Rank	Author	Institution	Country	Papers (%)	Citations
1	Heit JA	Mayo Clinic	USA	17 (2.52 %)	4673
2	Kabrhel C	Massachusetts General Hospital	USA	14 (2.07 %)	297
3	Petterson TM	Mayo Clinic	USA	13 (1.93 %)	3164
4	Bailey KR	Mayo Clinic	USA	10 (1.48 %)	355
5–7	Ashrani AA	Mayo Clinic	USA	9 (1.33 %)	333
	Goldhaber SZ	Harvard University	USA		329
	Liu Y	Peking Union Medical College Hospital	China		63
8	Rimm EB	Harvard University	USA	8 (1.19 %)	178
9	Camargo CA	Harvard University	USA	7 (1.04 %)	243
10	Harrington LB	Harvard University	USA	6 (0.89 %)	37
	Leibson CL	Mayo Clinic	USA		199
	Wu XJ	Peking Union Medical College Hospital	China		71

Categorical variables are expressed as numbers (percentages).
VTE: venous thromboembolism; USA: the United States of America.

Table 4
Top 10 co-cited references on VTE in nursing research.

Rank	Co-cited reference	Author	Year	Article type	Co-citation
1	Risk factors for deep vein thrombosis and pulmonary embolism: a population-based case-control study.	Heit JA	2000	Original article	1646
2	Relative impact of risk factors for deep vein thrombosis and pulmonary embolism: a population-based study.	Heit JA	2002	Original article	787
3	Epidemiology of venous thromboembolism.	Heit JA	2015	Rewiew	580
4	The epidemiology of venous thromboembolism.	Heit JA	2016	Rewiew	564
5	The epidemiology of venous thromboembolism in the community.	Heit JA	2008	Rewiew	376
6	The epidemiology of venous thromboembolism in the community: implications for prevention and management.	Heit JA	2006	Rewiew	235
7	Different combined oral contraceptives and the risk of venous thrombosis: systematic review and network meta-analysis.	Stegeman BM	2013	Rewiew	209
8	Residual thrombosis on ultrasonography to guide the duration of anticoagulation in patients with deep venous thrombosis: a randomized trial.	Prandoni P	2009	Original article	166
9	Comprehensive overview of nursing and interdisciplinary care of the acute ischemic stroke patient: a scientific statement from the American Heart Association.	Summers D	2009	Rewiew	163
10	Baccalaureate education in nursing and patient outcomes.	Blegen MA	2013	Original article	162

Categorical variables are expressed as numbers.
VTE: venous thromboembolism.

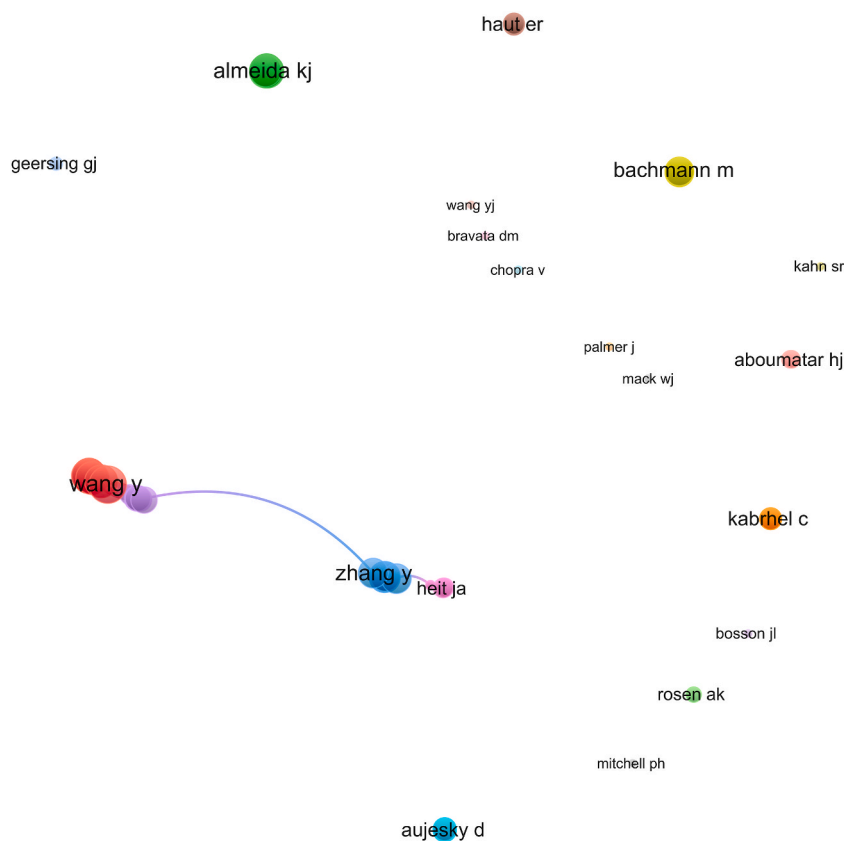


Fig. 5. A network map depicting cooperation between authors contributing to VTE nursing.

3.6. Journal analysis

In total, 675 articles on VTE nursing were distributed across 359 journals. Among these, 241 journals (37.71 %) published only one article, whereas 105 journals (15.56 %) published 2–5 articles. Additionally, 12 journals (1.78 %) published 6–10 articles, and one journal (0.15 %) published >10 articles. As shown in Table 5, the top 10 most productive journals accounted for 15.26 % (103/675) of

all articles. *Thrombosis Research* published the highest number of papers, with 11 articles (1.63 %), followed by *The International Journal of Nursing Studies*, *Journal of Clinical Nursing*, and *Journal of the American Geriatrics Society*, each with 10 articles (1.48 %). The average impact factor (IF) among the top ten journals was 4.37, with the *Journal of Thrombosis and Haemostasis* receiving the highest IF of 10.4. Notably, the majority of active journals in this field were based in the USA.

3.7. Keywords mapping

A total of 2388 keywords were extracted, accumulating 5623 occurrences. Fig. 6 depicts the cluster analysis of keywords that appeared at least five times, revealing the presence of four distinct clusters. Fig. 6 illustrates the network visualisation map in which the included keywords are classified into four main research clusters, represented by different colours: the blue cluster for patient studies, yellow cluster for prevention studies, green cluster for risk factor and epidemiology studies, and red cluster for management studies. High-frequency keywords provide valuable insights into the main topics within the field. Table 6 presents the top 20 keywords related to exposure to DVT and disease in DVT nursing research. Within the blue cluster, keywords such as ‘deep vein thrombosis’, ‘venous thrombosis’, ‘meta-analysis’, and ‘medical patient’ had notable occurrences. In the yellow cluster, keywords such as ‘venous thromboembolism’, ‘prevention’, and ‘prophylaxis’ were highly frequent. The green cluster highlighted keywords such as ‘pulmonary embolism’, ‘risk factor’, and ‘epidemiology’ as significant contributors. Lastly, the red cluster encompassed keywords such as ‘thrombosis’, ‘management’, and ‘care’, which displayed a high occurrence. These clusters provided a visual representation of prominent topics and themes within the domain of VTE nursing research.

4. Discussion

VTE stands as a significant global public health issue, characterised by a high incidence rate, posing a severe threat to public health on a global scale. This condition has garnered increasing attention from nursing researchers [11]. Fig. 2B clearly illustrates the rapid growth stage of VTE nursing research, signifying a heightened global interest in this field. Researchers have played a pivotal role in advancing the understanding of VTE nursing, resulting in a substantial increase in the volume of research dedicated to this subject. Consequently, the number of research publications on VTE nursing has experienced significant growth. This observed trend underscores the escalating emphasis on understanding and addressing the challenges associated with VTE within the nursing community.

4.1. Publication status

Concerning publication volume, the analysis of country distribution revealed that eight of the top ten countries are developed nations, with research centres predominantly concentrated in North America and Western Europe. The correlation analysis results indicate that the variation in publication quantity among different countries can be attributed, to some extent, to economic and population factors [12]. Citations serve as bibliometric indicators to assess the quality of publications, with the USA, China, and Australia emerging as the top three countries with the highest citation counts. This reinforces the notion that these countries, particularly the USA, China, and the UK, significantly contribute to both the quality and quantity of research output.

Harvard University, Johns Hopkins University, and Mayo Clinic stand out as the most prolific research institutions, emphasising active collaboration among American institutions. Strengthening cooperative networks among different research institutions or teams is crucial for future studies, including basic scientific research and clinical trials, and contributing to the progress of scientific research.

Analysing the most influential authors is helpful for scholars to understand existing partnerships and identify potential cooperative subjects at globally. According to Price’s law [13], the number of essential authors (n) is determined by formula $0.749 \sqrt{\text{Max}(p)}$, where $\text{Max}(p)$ is approximately equal to the number of documents published by the author holding the top rank in the research field. In accordance with Price’s law, the identification of important and outstanding authors is based on those who have published at least three articles. According to the statistics, 80 authors were deemed essential, with Heit, Kabrhel, and Petterson emerging as the top three contributors to this field. Heit JA and colleagues primarily focused on the risk factors of VTE [14,15]. Additionally, studies conducted by their research team, reporting on the epidemiology of VTE [16–19], garnered significant attention. Co-citation analysis, considered a superior method for evaluating the academic influence of a journal or scholar [20], resulted in the creation of a co-citation network among authors using VOSviewer. As depicted in Fig. 5, the collaboration between authors was not closely knit, indicating the need for strengthened cooperation in future research.

In terms of journal analysis, *Thrombosis Research*, *The International Journal of Nursing Studies*, *Journal of Clinical Nursing*, and *Journal of the American Geriatrics Society* emerged as the top four journals with the highest number of publications in the field. Among the top 13 journals, eight were affiliated with the USA. Notably, despite China being the second-largest publishing country, no Chinese journals ranked among the top, highlighting the necessity for China to bolster the presence of several international journals in this field. This strategic move is expected to attract more scientific publications and facilitate the widespread dissemination of academic perspectives.

4.2. Research frontiers

In general, the keywords utilised by authors in an article act as representative terms, providing a concise overview of the research theme. Co-occurrence analysis of keywords, a widely used bibliometric method, visually presents knowledge content and structure,

Table 5
The top 10 productive journals on VTE in nursing research.

Rank	Journal	Country	Papers (%)	IF (2022)
1	Thrombosis Research	USA	11 (1.63 %)	7.5
2-4	The International Journal of Nursing Studies	UK		8.1
	Journal of Clinical Nursing	UK	10 (1.48 %)	4.2
	Journal of the American Geriatrics Society	USA		6.3
5	Medicine	USA	9 (1.33 %)	1.6
6	American Journal Of Translational Research	USA	8 (1.19 %)	2.2
7-9	International Journal of Clinical and Experimental Medicine	USA	7 (1.04 %)	0.1
	Journal Of Thrombosis And Haemostasis	USA		10.4
	Orthopaedic Nursing	USA		0.7
10	Cureus Journal of Medical Science	USA	6 (0.89 %)	1.2
	Journal of Arthroplasty	USA		3.5
	Journal Of Vascular Surgery	USA		4.3
	Thrombosis And Haemostasis	Germany		6.7

Categorical variables are expressed as numbers (percentages).

VTE: venous thromboembolism; USA: the United States of America; UK: the United Kingdom.

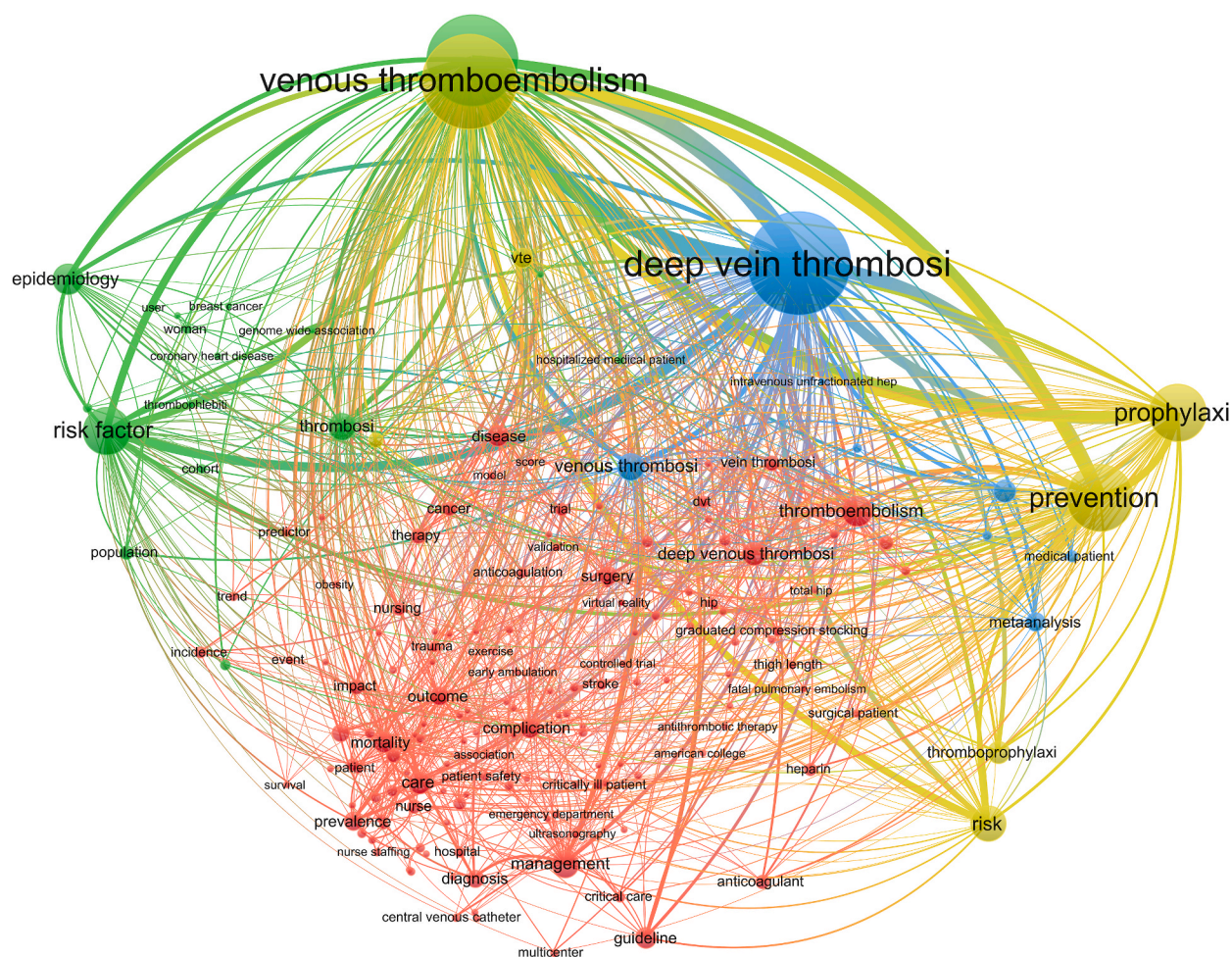


Fig. 6. A co-occurrence network displaying keywords in the field of VTE nursing.

unveiling the evolution process and hot topics within a field [21,22]. Employing VOSviewer software, we categorised all keywords into major clusters with distinct colours. Fig. 6 illustrates the network visualisation map, wherein the included keywords were classified into four primary research clusters: blue (patient study), yellow (prevention study), green (risk factor and epidemiology study), and red (management study). This analysis underscores that the epidemiology, risk factors, prevention, and management of VTE are focal points of research in this field.

Table 6
Co-occurrence analysis of keywords on VTE in nursing research.

Rank	Keyword	Count (%)	Rank	Keyword	Count (%)
1	Deep vein thrombosis	180 (3.20 %)	11	Complication Outcome Venous thrombosis Mortality	42 (0.75 %)
2	Pulmonary embolism Venous thromboembolism	143 (2.54 %)	12		39 (0.69 %)
3	Prevention	89 (1.58 %)	13	Deep venous thrombosis	37 (0.66 %)
4	Prophylaxi	61 (1.08 %)	14	Epidemiology	34 (0.60 %)
5	Risk factor	57 (1.01 %)	15	Surgery	33 (0.59 %)
6	Risk	54 (0.96 %)	16	Diagnosis Disease	31 (0.55 %)
7	Management	51 (0.91 %)	17	Molecular weight heparin	28 (0.50 %)
8	Thromboembolism	47 (0.84 %)	18	Guideline	27 (0.48 %)
9	Thrombosis	45 (0.80 %)	19	Nurse	24 (0.43 %)
10	Care	44 (0.78 %)	20	Cancer Nursing Prevalence	23 (0.41 %)

Categorical variables are expressed as numbers (percentages).
VTE: venous thromboembolism.

VTE presents as a significant global burden, with approximately 10 million cases reported annually, ranking as the third most prevalent vascular disease following acute myocardial infarction and stroke [23]. In six European countries encompassing a total population of 300 million, nearly half a million cases of DVT and 300,000 cases of pulmonary embolism are reported annually [24]. The identification of high-risk populations for early intervention is a critical concern for healthcare professionals given the associated risks with VTE. Large-scale population surveys indicate a steady increase in VTE incidence, attributed primarily to population aging, a higher prevalence of comorbidities associated with VTE (such as obesity, surgery, heart failure, and cancer), and the improved sensitivity and widespread use of imaging tests for DVT [23,25]. The annual average incidence of VTE rises exponentially with age, reaching up to one case per hundred individuals aged >80 years [16,26]. From the age of 45 years, the lifetime risk of developing VTE is estimated to be 8 % [27]. Incidence rates vary among racial and ethnic groups, with a higher incidence observed in black individuals [28] and a lower incidence in Asian individuals [28], though the reasons for these disparities remain unclear. The risk does not differ by sex, although it appears to be approximately two times higher in men than in women when cases related to pregnancy and oestrogen therapy [29]. Furthermore, the risk is notably high in patients undergoing major orthopaedic surgery, with postoperative rates of approximately 1 %, even with pharmacological thromboprophylaxis. Approximately 20 % of all VTE cases are cancer-related [30], whereas surgery and immobilisation contribute to 15 % of the cases [26].

Approximately half of all VTE events have identifiable triggers and can potentially be prevented through interventions of a limited duration [31]. Nursing plays a pivotal role in VTE prevention in hospitalised individuals. A thorough physical evaluation of patients during hospitalisation [32]. Additional nursing precautions should be taken for patients with conditions such as anaemia, hypertension, diabetes, and cardiovascular disease. This includes addressing various discomforts, managing diet [33], and ensuring unobstructed bowel movements by providing high-fibre foods. Promoting healthy living habits, such as avoiding smoking, is essential to prevent nicotine-related harm [34,35]. Water and electrolyte levels should be carefully adjusted during treatment, and care should be taken to maintain proper body balance. A quiet, clean, and sterile nursing environment reduces the risk of incision infections and other complications. For postoperative patients, elevating the lower limbs by approximately 20°–30° during bed rest is recommended, facilitating venous blood flow to the lower limbs. Encouraging deep breathing exercises within the first 24 h after surgery is beneficial. Once the patient condition stabilises, assisting them in engaging in functional exercises and recovery training as soon as possible is important. Gradually increasing the activity level [36], helps accelerate venous blood circulation in the lower limbs. Minimising the need to puncture the lower limbs and central veins is advised. In patients undergoing puncture procedures, close observation of the puncture site is necessary to promptly address signs of inflammation or other complications [37].

4.3. Limitations

This study has several limitations that merit acknowledgement: (1) The analysis was conducted using pertinent documents from the WoSCC database, potentially introducing bias in the sources considered. Documents from sources outside this database were not taken into account. (2) The WoSCC database primarily comprises English-language publications, potentially introducing linguistic bias. Relevant studies published in other languages were excluded from the analysis. (3) To mitigate deviations arising from different expressions of the same concept, some results underwent manual standardisation before analysis. However, acknowledging that this process can only reduce errors and not completely eliminate them is crucial. (4) Diligent efforts were made to verify the publications of the top ten authors to minimise bias resulting from authors with the same name. However, complete avoidance of bias caused by changes in author affiliations or other factors was not entirely possible. Therefore, considering these limitations when interpreting the results of this study is crucial.

5. Conclusion

In this study, we conducted a comprehensive analysis of literature related to VTE nursing from 1999 to 2022, encompassing data on the countries, institutions, authors, publication journals, keywords, and co-cited references. Through this comprehensive examination, we identified research hotspots and anticipated future developments in the field. Among the authors, Heit JA from the Mayo Clinic in the USA emerged as the most prolific contributor, publishing the highest number of articles. *Thrombosis Research* stood out as the leading publisher in VTE nursing, with >11 publications. Collaboration between organisations showcased effective communication and cooperation, indicating a dynamic research environment. However, we emphasize the importance of strengthening collaboration among individual authors to further enhance the depth of research. Our predictions suggest that future research in VTE nursing will persist, with a continued focus on the epidemiology, risk factors, prevention, and management of VTE. We believe our findings offer valuable insights into new directions for VTE nursing, and the identified hotspots hold the potential for significant scientific breakthroughs in the near future. This article not only underscores the existing shortcomings in VTE nursing research but also provides clear direction and guidance for subsequent studies in this crucial field.

Data availability statement

Data are included in the article/supplementary materials/references in the article. Further data will be available upon request.

CRedit authorship contribution statement

Xuan Zhang: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **Yuehui Yang:** Data curation, Formal analysis, Investigation. **Fang Wu:** Conceptualization, Data curation, Project administration, Visualization, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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