

# Bibliometric Analysis of Research Trends in Clinical Learning Environment for Nursing and Midwifery Education

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**Introduction:** The clinical learning environment is central to nursing and midwifery education, providing critical contexts for student training and professional development. This study fills a gap by offering a comprehensive bibliometric analysis of trends in The clinical learning environment research within nursing and midwifery education.

**Methods:** A descriptive bibliometric study was conducted on June 7, 2024, using the Scopus database to retrieve research articles related to The clinical learning environment from 1957 until June 2024. VOSviewer software was used to analyze scientific collaborations and map co-occurrence networks of key terms.

**Results:** The United States and Australia led in publications and citations. Key journals included Nurse Education Today, Nurse Education in Practice, Journal of Advanced Nursing, and Journal of Clinical Nursing. Prominent authors like Saarikoski M. Levett-Jones T. and Henderson A. significantly contributed. Co-occurrence analysis highlighted themes such as student experiences, clinical competence, psychological factors, and teaching methodologies.

**Discussion:** This study highlights key trends in The clinical learning environment research and the significant contributions of specific countries, journals, and authors. The collaboration networks provide insights into the interrelated nature of various factors influencing the clinical learning environment. Limitations of the study include the reliance on a single database, which may not capture all relevant articles, particularly those in less prominent journals or non-English languages. Additionally, citation metrics may be influenced by factors such as self-citations or field-specific citation practices.

**Conclusion:** These insights highlight areas for future research, including the role of virtual learning environments and cultural competency in The clinical learning environment. The findings contribute to shaping future research and practice in nursing and midwifery education.

**Keywords:** clinical learning environment, nursing students, midwifery students, bibliometric analysis, Nursing education, Midwifery education

## Introduction

The Clinical Learning Environment (CLE), which gives students practical experience, is crucial to educating nurses and midwives. CLE is a fundamental component of nursing and midwifery programs, providing students with essential skills required for their future careers in the nursing field.<sup>1</sup> Despite its critical role in education, there has been limited comprehensive analysis of the global research landscape concerning the CLE, creating a gap in understanding its evolving trends and collaborations. The clinical learning environment (CLE), a complex term encompassing physical places, resources, and the socio-psychological context that forms the teaching and learning experience, is central to nursing and midwifery education.<sup>2</sup> To promote pleasant learning experiences and attain desired student outcomes, a nurturing CLE characterized by effective communication and adequate clinical trainer support is essential.<sup>3</sup>

Midwifery clinical practice experience prepares the students to apply the theory they gained in university to practice and knowledge, feeling, and reflexivity as it relates to midwifery.<sup>4</sup> Clinical education settings serve as the crucible where nursing learners apply theoretical knowledge in practical patient care scenarios.<sup>5</sup>

The Clinical Learning Environment (CLE) encompasses the application and integration of theoretical knowledge, skills, and professional activities by healthcare undergraduate students, such as nurses and midwives, under the guidance of mentors, clinical staff, and nurse educators.<sup>6</sup> Commonly referred to as clinical clerkships or work-integrated learning (WIL) in Australia.<sup>7</sup> The CLE includes essential components like physical infrastructure, educational resources, and psychosocial factors, all of which significantly influence learning outcomes.<sup>2</sup> The Clinical Learning Environment (CLE) entails the practical application of knowledge and skills by nursing and midwifery students, guided by mentors and educators.<sup>6</sup> Other synonyms like Clinical clerkships, work-integrated learning (WIL) are widely recognized in Australia.<sup>7</sup>

The components of the Clinical Learning Environment (CLE) contains the physical settings like the hospitals, clinics, The resources like the tools, equipments, and materials available for learning in these clinical settings. Furthermore and the psychosocial environment which involves the relationships, communication, and support between students, mentors, and clinical staff. All Together, these elements create a supportive framework that helps nursing and midwifery students connect their classroom knowledge with real-life skills.<sup>2</sup> However, the initial immersion into clinical settings can overwhelm novice students, often leading to stress and anxiety due to the complex nature of these environments.<sup>8</sup>

The effectiveness of the CLE experiences depends on factors such as the quality of supervision, availability of resources, and combination of theory into practice.<sup>9,10</sup> Controversial issues within the CLE include student-teacher ratios, entrance to clinical departments, and support from lecturers and clinical staff.<sup>5,9,11</sup> Moreover, differences in CLE quality throughout regions and institutions pose challenges, with notable differences in student satisfaction and perceived educational quality.<sup>12</sup>

Another study reveals that newly qualified midwives were usually able to conduct different and demanding clinical conditions safely. However, despite their capability, these midwives often report feeling uncertain about their abilities and missing confidence in their skills.<sup>13</sup> The study done by Modarres et al<sup>14</sup> identified several key issues in clinical education, including inadequate physical and safety spaces in the ward, a lack of facilities for scientific conferences, interference in clinical education, unnecessary involvement in natural childbirth, irregularities in clinical procedures, and the absence of an organized evaluation system. Some studies Propose solutions that advocate continuous quality improvement, adequate supervision, and supportive learning environments.<sup>15,16</sup> Assessment tools like the Midwifery Student Evaluation of Practice (MidSTEP) offer possibilities for evaluating student perceptions and enhancing educational quality.<sup>15</sup> It is essential to highlight the significance of bibliometric analysis in exploring research trends within the CLE. To address this complexity and diversity, bibliometric analysis provides a systematic, quantitative approach to explore the CLE's research landscape, uncovering publication patterns, collaboration networks, and emerging research themes. Bibliometric analysis offers a systematic and quantitative approach to assessing the scholarly landscape, providing valuable insights into publication patterns, collaboration networks, and emerging research themes.

Pritchard initiated 1969 the concept of bibliometrics, defining it as “the application of mathematics and statistical methods to books and other media of communication”. This method examines the volume and scope of scientific literature within diverse fields. Initially developed within library and information sciences, bibliometrics is now significantly applied across various scientific disciplines.<sup>17</sup>

In nursing research, bibliometrics has been applied to topics such as pressure injury prevention and measurement tools,<sup>18</sup> military nursing,<sup>19</sup> and meta-approaches to knowledge.<sup>20</sup> In the context of nursing education, bibliometric methods have been used to investigate mobile learning,<sup>21</sup> simulation studies,<sup>22</sup> and nursing competencies.<sup>23</sup>

Bibliometrics is compatible with analyzing the production of one or more scientific journals within a specific field. This method has been employed in nursing using the Scopus database to conduct bibliometric analyses of single journals such as the Journal of Nursing Management<sup>24</sup> and the Advanced Journal of Nursing.<sup>25</sup> Additionally, six nursing journals in the Web of Science have been subject to bibliometric analysis.<sup>26</sup> Bibliometrics, closely linked with scientometrics, seeks to recognize and quantitatively examine the literature within a field.<sup>27</sup> These analyses are vital for calculating scientific and clinical activity, suggesting insights into the current improvement within a particular branch.<sup>28</sup>

However, to date, no such analysis has been undertaken in the scientific production of clinical learning environments. Additionally, our analysis is more extensive, covering articles on clinical learning environments from journals indexed in the Scopus database from inception to 2024. To our knowledge, no previous bibliometric analysis has specifically addressed this breadth, emphasizing the importance and relevance of our study. This study fills this gap by offering a comprehensive analysis of trends, patterns, key publications, and collaboration networks within CLE research. This research aims to contribute to the discourse on the CLE by analyzing trends, patterns, influential publications, and authors, as well as uncovering collaboration networks among researchers and key terms in the research literature through bibliometric analysis and visualization.

Our analysis aims to answer the following questions: (1) How are the annual publication and citation trends of the CLE? (2) Which Countries, Journals, and authors are most productive and influential in the field of CLE? (3) How are the collaboration networks among countries and authors researching the CLE for Nursing and midwifery education? The keyword occurrence and co-occurrence patterns within the CLE for Nursing and midwifery education?

## Materials and Methods

A descriptive bibliometric study was carried out. According to the three stages of data collection, screening, and analysis that Fauzi<sup>29</sup> outlined, the steps of the methodology employed in a study conducted by Torné-Ruiz<sup>27</sup> were applied. Researchers use bibliometric analysis for various purposes, including trend identification in publication performance, collaboration study, and key contributor analysis. It further aids in exploring the structural framework of specific research domains. This methodology employs quantitative techniques, such as citation analysis, to assess metrics like publication and citation counts.<sup>30</sup>

### Stage I: Data Collection

#### Literature Research

On June 7, 2024, a search was conducted within the Scopus database. It was utilized in this study to gather all the bibliographical information needed to create the summary analysis of CLE research performance from 1957 until June 2024. The reputable Elsevier Co. established Scopus, setting it apart from other databases and providing indexes for over 14,000 papers across various topics such as social sciences and mathematics.<sup>31</sup> Scopus is the most extensive abstract and citation database.<sup>28</sup> Its database guarantees a greater selection of high-quality peer-reviewed journals than other databases like Google Scholar, PubMed, and Web of Science.<sup>32</sup>

First, we defined a search term based on relevant articles or documents, then checked the search by testing it against combined and separate terms. A search string was created that included the following keywords: “Influence” OR “Impact”, OR “Effect” OR “challenges” OR “experience” OR “perception” OR “viewpoint” OR “perspective” OR “effect” OR “difficulties” AND “internship” OR “clinical learning experience” OR “clinical learning environment” OR “clinical placement” OR “clinical practice setting” OR “clinical environment” OR “clinical learning” OR “clinical supervision” OR “clinical education” AND “nursing education” OR “midwifery education” OR “maternity” OR “student nurses” OR “nursing students” OR “midwifery” OR “midwives” OR “midwifery students”. To narrow the search, “topic” was used instead of “all fields”. This implies that the keywords were restricted to those that appeared in the title, abstract, or keywords. Figure 1 presents the research protocol and selection technique adopted and followed from the PRISMA flow diagram.<sup>33</sup> The data exported from Scopus was prepared using Microsoft Excel version 16.82 for analysis and VOSviewer (Centre for Science and Technology Studies, Leiden University, Leiden, Netherlands).

#### Identifying Relevant Studies

Several inclusion criteria were established to find relevant articles and incorporate them into our study: (a) published articles on the nursing topic, (b) original articles, reviews, and conference papers, and (c) English language. The following items met the exclusion criteria: (a) articles deemed non-original, such as (notes, books, letters to the editor, editorials, and other documents, among others). To guarantee that every article was included, prevent bias resulting from the daily updating of the databases, and provide a static picture of the field at that moment in time, the search was conducted on a single day, June 7, 2024.

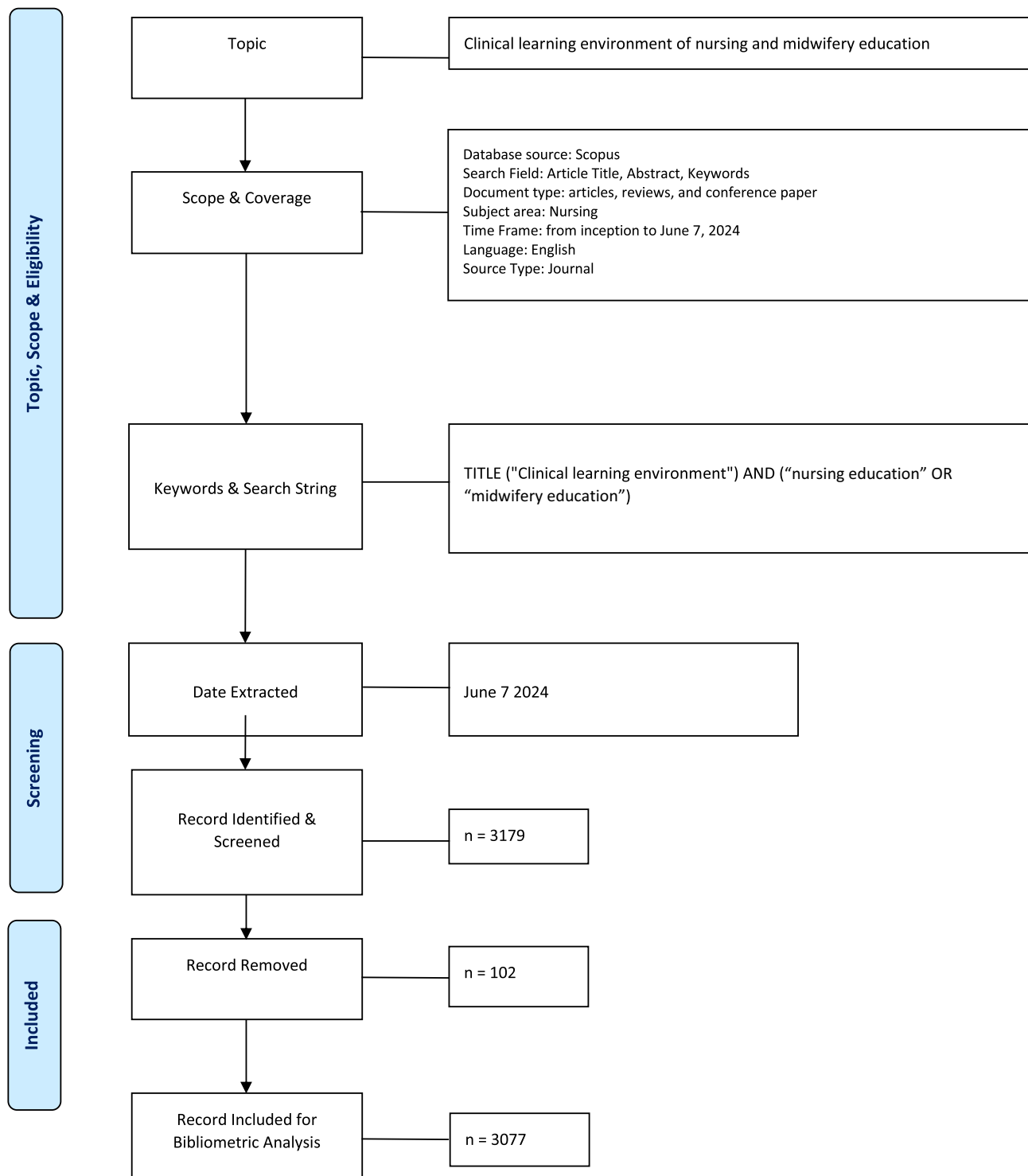


Figure 1 Prisma study flow diagram.

## Stage 2: Screening

### Eligibility Criteria

A filter based on “document type” was implemented to guarantee the quality of the articles in the study. Moreover, the “document type” specifications were used again to evaluate the article titles and abstracts and identify which ones should be included and which should be excluded.

## Study Selection and Data Collection

One of the researchers (AM) independently chose the articles based on their abstracts and titles, with two reviewers (ZA and NI) resolving any differences.

The article selection procedure adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) methodology.<sup>34</sup>

## Stage 3: Analyzing the Data

### Performance Analysis

The Scopus tool was first used to perform a descriptive bibliometric analysis. Bibliographic details, including authors, titles, publishing years, source titles, author affiliations, numbers, and citation data, were among the information that was extracted. Additionally, Metrics about publications included total publications (TP), productive authors (CA), and annual publication (AP); and metrics pertaining to citations included such as total citations (TC). According to the Journal Citation Report (JCR), extra data from the journals was also used, including publisher and impact factor (IF).

### Science Mapping

Finally, the classification and performance analysis are followed. Furthermore, the data that were downloaded from Scopus were imported into VOSviewer, a program that was developed for creating and viewing bibliometric maps, in order to display the data over time. The bibliometric research community can download the programme for free at <https://www.vosviewer.com>. Using co-citation data, VOSviewer can be used, for instance, to create maps of authors or journals or, using co-occurrence data and to create maps of keywords.<sup>35</sup> A variety of variables, including citations, affiliations, countries, publication language, and keywords, were used in these analyses.<sup>27</sup>

## Results and Discussion

The search in the Scopus database found 3179 articles; finally, after the inclusion and exclusion criteria were applied and the articles were assessed based on their title and abstract, the number of articles was lowered to 3077 for the final analysis. A PRISMA flow diagram was used in [Figure 1](#) to represent the process visually.

## Annual Publication and Citation Trends

This part analyses the patterns of publication and citation trends in the field of clinical learning environment of Nursing and midwifery education. We calculated the total number of publications published and citations received annually from the 1957 to June 2024. This research offers insightful information on the changing influence and intellectual activity in the topic.

The data from 1957 to 2024 reveals distinct trends in research on the clinical learning environment of Nursing and midwifery education. Initially, from 1957 to 1975, the field experienced minimal activity with infrequent publications, specifically only two years (1957 and 1966) showing any research output. This period indicates the nascent stage of the field, with little to no academic attention. From 1976 to 1989, there was a slight increase in research activity, marked by sporadic publications and citations, such as in 1976, and a noticeable peak in 1986 with 8 publications and 85 citations. This period signifies the beginning of a growing interest in and gradual establishment of the field clinical learning environment of nursing and midwifery education.

The 1990s is viewed a steady increase in research output, reflecting an increasing academic interest. Notably, from 1994 onwards, there was significant growth, with a peak in 1998 recording 28 publications and 535 citations. This decade marks a period of expansion and increased academic engagement with the field. The early 2000s continued this trend with substantial growth, particularly between 2000 and 2004, where there was a significant increase in both publications and citations. The period from 2005 to 2009 represents a peak in research activity, culminating in 2009 with 90 publications and 3202 citations, indicating the field's maturity and prominence within the academic community.

From 2010 to 2019, research activity remained high but exhibited fluctuations. For example, 2014 is observed a peak with 127 publications and 3775 citations, highlighting vigorous but variable academic interest. This decade shows up the field's establishment and continuous evolution. However, the recent years from 2020 to 2024 reveal

a mixed trend. While 2021 marked a high point with 282 publications, citations have shown variability, suggesting possible delays in citation accumulation. Notably, 2022 and 2023 witnessed a decline in citations and 2024 is seen a significant drop with only 137 publications and 24 citations. This decline could be due to shifting research priorities, global events impacting research activities, as newer publications tend to have lower citations or delays in the academic dissemination process.

In conclusion, the research trends in the clinical learning environment of Nursing and midwifery education have evolved significantly over the decades. From minimal initial activity to periods of substantial growth and peak interest, followed by recent fluctuations and a notable decline, the field has demonstrated dynamic changes. This bibliometric analysis highlights the importance of sustained research to address new challenges and opportunities, ensuring the continued development and relevance of this critical area in nursing and midwifery education.

Figure 2 illustrates the trends in publications and citations.

### Most Productive and Influential Counties

This part focuses on the countries that are making contributions to clinical learning environment of Nursing and midwifery education. By comparing how research production is distributed across various countries, we can understand more about the international context of research participation and collaboration in this field.

Table 1 presents data on the total publications (TP) and total citations (TC) related to research trends in the clinical learning environment of Nursing and midwifery education across different countries. From the Table 1, it is evident that the United States has the highest number of publications with 804, followed by Australia with 657 publications. In terms of total citations, Australia leads with 15,695 citations, followed by the United States with 12,633 citations, indicating a significant impact and recognition of research conducted in this field. Other countries with notable contributions include the United Kingdom, Canada, and Sweden, with 440, 218, and 107 publications respectively. However, it is important to note that the number of publications alone may not fully represent the quality or impact of research in each country, as citation counts also play a crucial role in assessing research influence. Additionally, countries like China, Finland, and Turkey show comparatively lower numbers of publications and citations, suggesting potential areas for further research and collaboration to enhance understanding and improve the clinical learning environment for Nursing and midwifery education globally.

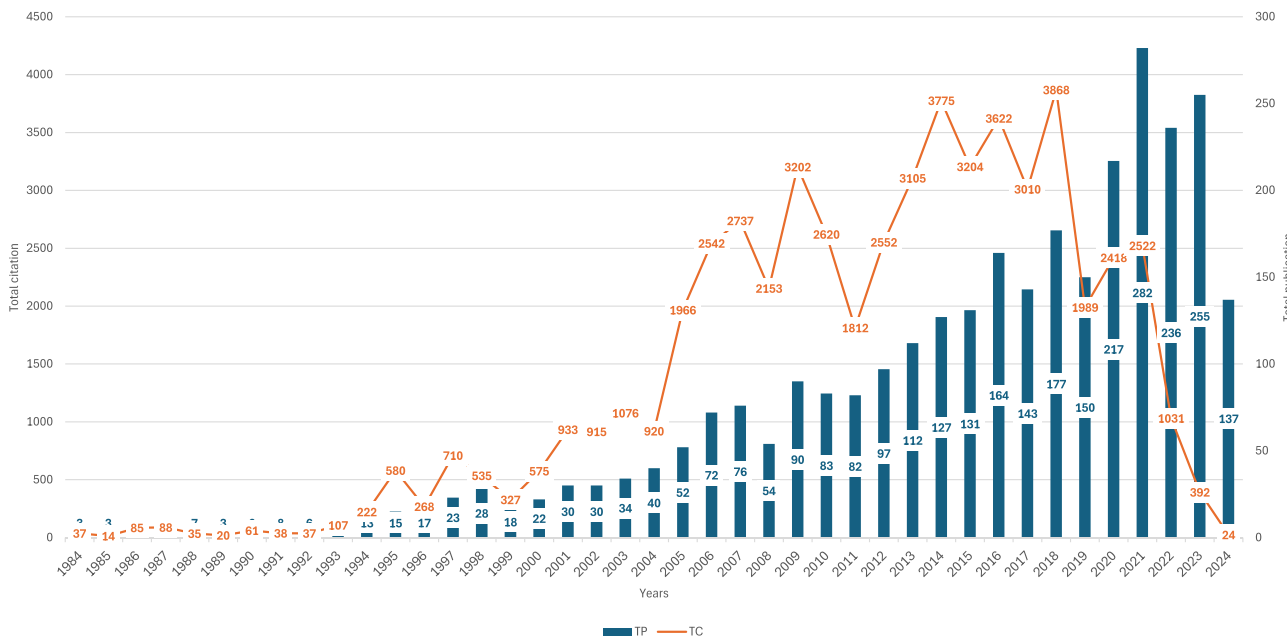


Figure 2 Annual publications and citations trends.



**Table 1** Top 12 Most Productive and Influential Counties

NO	COUNTRY/	TP	TC
1	Australia	657	15,695
2	United States	804	12,633
3	Canada	218	4500
4	China	78	918
5	Finland	60	2366
6	Iran	91	1150
7	Ireland	101	2439
8	Italy	60	1186
9	Norway	102	1261
10	Sweden	107	2417
11	Turkey	58	938
12	United Kingdom	440	9970

## Most Productive and Influential Journals

In this section, the ten most significant sources in the fields of Clinical learning environments of Nursing and midwifery education are ranked and examined. These sources play a crucial role in the field's information dissemination, research trend-setting, and academic discourse cultivation. It assesses each journal based on several key metrics: total publications (TP), total citations (TC), average citations per publication (TPP), CiteScore, Source Normalized Impact per Paper (SNIP), and SCImago Journal Rank (SJR), along with the publisher.

The journal *Nurse Education Today* stands out with the highest number of total publications (TP = 523) and total citations (TC = 14,166), reflecting its significant influence and productivity in the field. It also has a high CiteScore of 5.5, which indicates its articles are frequently cited. Its SNIP (1.622) and SJR (0.946) values further reinforce its impact and standing within the academic community.

*Nurse Education in Practice* follows with 362 publications and 7,165 citations. This journal also boasts a high CiteScore of 4.9 and a substantial SNIP of 1.334, indicating its well-regarded influence and quality within the field.

*Journal of Advanced Nursing* and *Journal of Clinical Nursing*, both published by Wiley-Blackwell, also show notable performance. The *Journal of Advanced Nursing* has 102 publications and 3,952 citations, leading to a high average citation per publication (TPP = 38.7) and a CiteScore of 5.3, indicating its articles are highly impactful. Similarly, the *Journal of Clinical Nursing* has 109 publications and 3,438 citations, with a high CiteScore of 6.0 and the highest SNIP of 1.496, suggesting strong journal influence and high citation rates.

*Journal of Nursing Education* and *Journal of Professional Nursing*, with respectable citation counts and influence metrics, show steady contributions with 137 and 106 publications, respectively. Despite lower citation averages per publication, their consistent publication records highlight their roles in disseminating educational research.

*BMC Nursing* and *Nursing Education Perspectives* have lower total publications and citations but still demonstrate relevance with SNIPs of 1.428 and 0.729, respectively, indicating that while their volume is less, the impact of their published works remains significant.

Lastly, *Nurse Educator* has the lowest total publications (TP = 60) and citations (TC = 522) among the listed journals but maintains a consistent citation per publication and notable metrics, such as a SNIP of 1.267 and SJR of 0.472.

**Table 2** Shows Top 10 Most Productive and Influential Journals

No	Journal	TP	TC	ACP	CITE SCORE	SNIP	SJR	PUBLISHER
1	Bmc Nursing	77	1042	13.5	3.3	1.428	0.769	Springer Nature
2	Collegian	52	1037	19.9	2.8	0.863	0.442	Elsevier
3	Journal Of Advanced Nursing	102	3952	38.7	5.3	1.411	0.913	Wiley-Blackwell
4	Journal Of Clinical Nursing	109	3438	31.5	6.0	1.496	0.938	Wiley-Blackwell
5	Journal Of Nursing Education	137	2501	18.3	2.8	0.954	0.628	Slack, Inc.
6	Journal Of Professional Nursing	106	1396	13.2	3.5	1.17	0.706	Elsevier
7	Nurse Education In Practice	362	7165	19.8	4.9	1.334	0.765	Elsevier
8	Nurse Education Today	523	14,166	27.1	5.5	1.622	0.946	Elsevier
9	Nurse Educator	60	522	8.7	2.2	1.267	0.472	Wolters Kluwer Health
10	Nursing Education Perspectives	78	1293	16.6	1.6	0.729	0.35	Wolters Kluwer Health

**Abbreviations:** TP, Total Publications; TC, Total Citations; ACP, Average Citations per Paper; CITE Score, Citation Impact Score; SNIP, Source Normalized Impact per Paper; SJR, SClmago Journal Rank.

In conclusion, this analysis highlights the varying degrees of productivity and impact among the journals. Journals like Nurse Education Today, Nurse Education in Practice, Journal of Advanced Nursing, and Journal of Clinical Nursing are leaders in volume and influence. In contrast, others contribute significantly to specific nursing and midwifery education research niches. Table 2 presents the top 10 most influential sources.

## Most Productive and Influential Authors

This section lists and examines the top 10 authors who have had the most influence on the clinical learning environment of Nursing and midwifery education. By analyzing measures like total production and total citations, we can determine the influence and importance of their academic contributions.

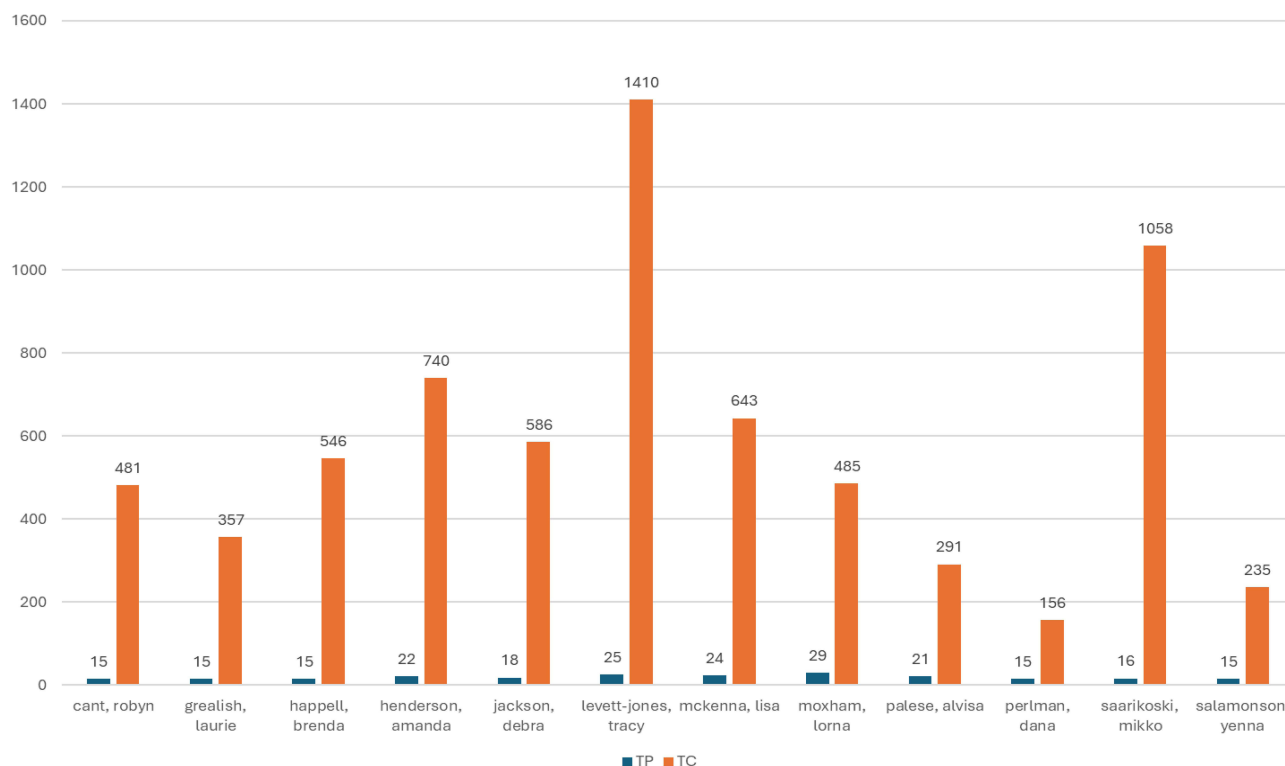
Figure 3 highlights the most influential and productive authors in clinical learning environments of Nursing and midwifery education in terms of production by total publications (TP) and impact by total citations (TC). According to the authors' figures, Tracy Levett-Jone is the most prominent, with 25 documents and 1410 citations; this means that she is the most productive and influential author in the field of clinical learning environments in nursing and midwifery education. On the other hand, Mikko Saariko-ski has a considerable impact with 16 document publications and 1058 citations, an indication of the high regard and regular referencing of his work.

Lorna Moxham, who has the highest number of publications (29), shows moderate influence with 485 citations, indicating a substantial contribution in terms of quantity, though individual works might not be as frequently cited as those of Levett-Jones or Saarikoski. Lisa McKenna, with 24 publications and 643 citations, and Amanda Henderson, with 22 publications and 740 citations, also demonstrate a balanced combination of productivity and influence, contributing extensively to the field.

Other notable authors include Debra Jackson, who has 18 publications and 586 citations, and Robyn Cant with 15 publications and 481 citations, both showing a significant presence and impact in the research community. Brenda Happell, Laurie Grealish, and Dana Perlman, with 15 publications each, show varying degrees of influence, with Happell having 546 citations, Grealish 357 citations, and Perlman 156 citations. Yenna Salamonson and Alvisa Palese, with 15 and 21 publications respectively, and citation counts of 235 and 291, are also recognized for their contributions, albeit with a relatively lower impact than others.

Overall, the figure underlines the contributions of these authors, highlighting those who have made significant impacts through both high productivity and influence. Tracy Levett-Jones emerges as a pivotal figure, combining both high





**Figure 3** Top 12 productive and influential authors.

volume and high impact in her research. The data provides a comprehensive view of the key contributors, showcasing the range of influence and productivity across the field.

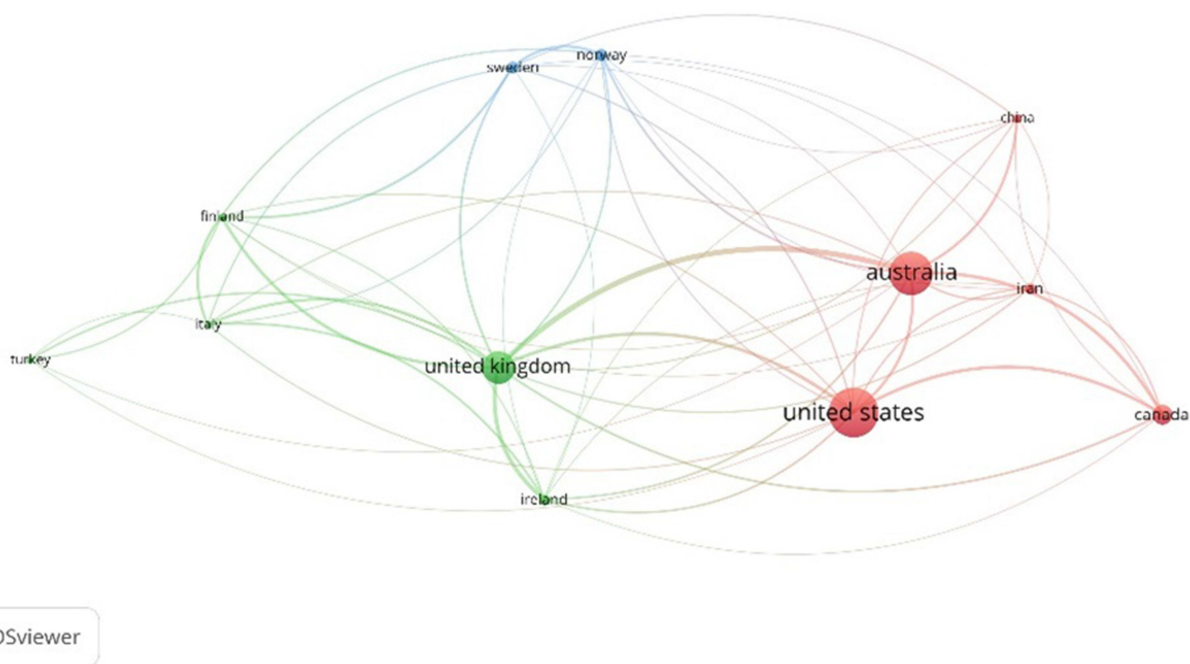
## Countries Collaboration Network

A robust international collaborative framework is present within the domain of clinical learning environments for nursing and midwifery education, with specific nations rising to prominence as pivotal contributors.

Figure 4 shows a visualization of countries co-authorship in scholarly publications of clinical learning environment in nursing and midwifery education publications. The circles red, green and blue, represent individual countries, and the lines connecting them represent co-authorship between researchers in those countries. The size of the circle indicates how productive a country is in terms of research output, while the thickness of the lines indicates the strength of the collaboration between the countries. The United States is the most productive country (largest circle), and it has strong collaborations with Canada and the United Kingdom (thickest lines). The Figure 3 also displays several countries that work closely together in clusters. The United States, Australia, and the United Kingdom are the three most noticeable nodes, indicating them as major centers of this field of study. The countries are arranged into color-coded clusters that represent areas of especially significant collaboration. As an example, the green cluster, which mostly includes of European nations like Finland, Italy, Ireland, and the United Kingdom, suggests substantial regional collaboration. On the other hand, the red cluster, which includes China, Iran, Australia, Canada, and the United States, shows considerable multinational ties.

The close relationships between European nations (such as the UK, Ireland, Finland, and Italy) suggest strong regional cooperation. On the other hand, there are notable continental collaborations between the US, Australia, Canada, China, and Iran. Despite having decreased research output, smaller nodes such as Norway, Sweden, Turkey, and Iran still showed considerable collaboration.

Overall, while the US, Australia, and the UK are leading in the field of clinical learning environment of Nursing and midwifery education research, also there is potential for other countries to grow through stronger international



**Figure 4** Visualization of countries co-authorship and collaboration.

partnerships and focused research efforts, enriching the global understanding of clinical learning environments for Nursing and midwifery education.

## Authors Collaboration Network

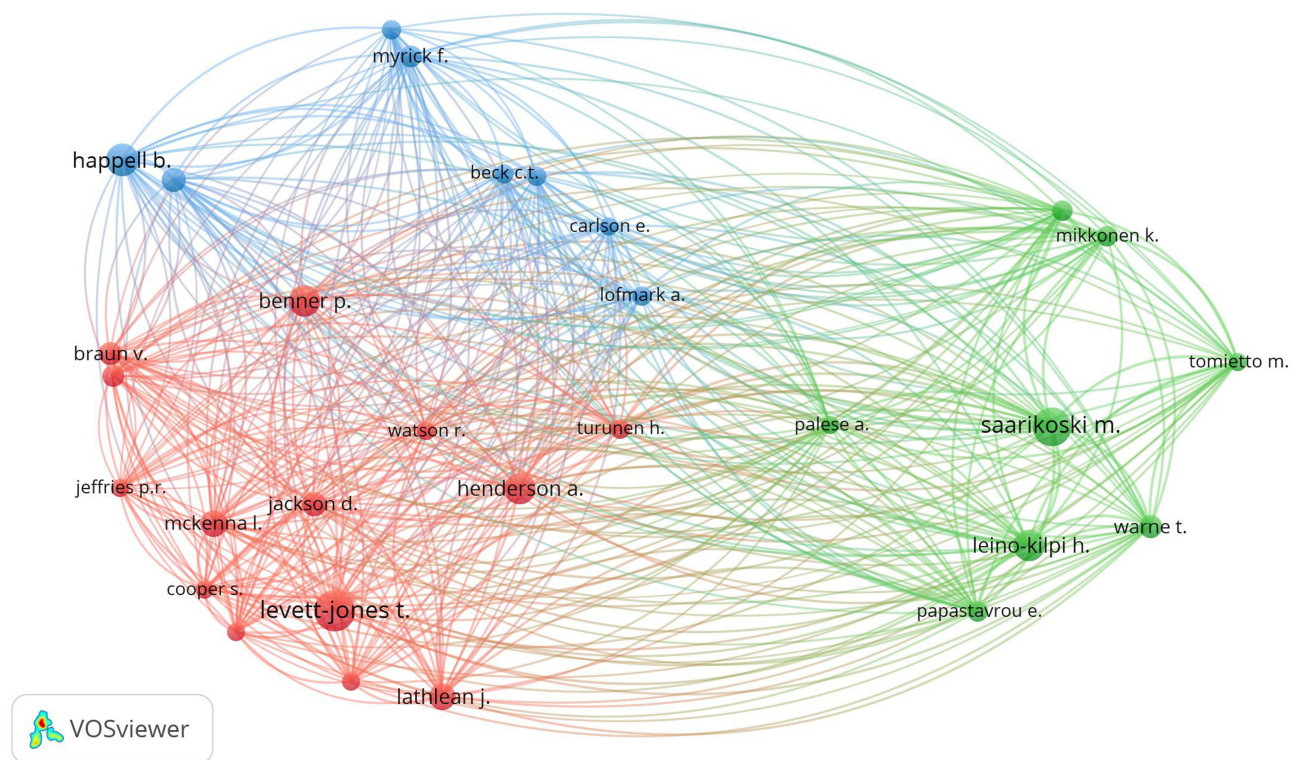
The authors' collaboration network reveals key figures in the field of clinical learning environments for nursing and midwifery education, showcasing the strong interconnectedness and influence of prominent researchers.

In examining the network, several key authors stand out due to their central positions and numerous connections. Saarikoski M. emerges as a highly influential figure, with a prominent node and extensive links to other authors, suggesting a significant impact on the field. Similarly, Levett-Jones T. and Henderson A. are also central, indicating that their research is frequently cited alongside other works, marking them as pivotal contributors to the literature on clinical learning environments.

The network can be divided into several clusters based on color-coded co-citation relationships. The red cluster includes authors such as Levett-Jones T., Henderson A., Braun V., and Jeffries P.R., indicating a strong connection and possibly a shared focus on practical aspects of nursing education and the clinical learning environment. In contrast, the blue cluster, featuring authors like Myrick F., Happell B., Beck C.T., and Carlson E., suggests a different thematic or methodological focus within the broader research area. Myrick F.'s central role within this cluster points to a significant influence on this research subgroup.

The green cluster is highlighted by authors such as Saarikoski M., Mikkonen K., Palese A., and Leino-Kilpi H. Their frequent co-citations indicate a shared interest in specific aspects of clinical education and student experiences in nursing and midwifery. Saarikoski M.'s central position in this cluster underscores the pivotal role in advancing this research theme.

In summary, the co-citation network underscores the collaborative nature and interconnectedness of research on clinical learning environments for Nursing and midwifery education. Key authors such as Saarikoski M., Levett-Jones T., and Myrick F. are central to this research landscape, with significant interdisciplinary collaboration across various thematic clusters. This network provides valuable insights into the influential authors and emerging trends in this vital study area. [Figure 5](#) shows the collaborative network of key authors.



**Figure 5** Productive authors collaboration network.

## Mapping Keywords Co-Occurrence Network

The Keyword Co-occurrence Network sheds light on the interconnection of popular terms in the clinical learning environment of Nursing and midwifery education. Each term is linked to a unique cluster and shows varying link weight and strength levels. The visualization depicts the co-occurrence network of keywords related to research on the clinical learning environment for Nursing and midwifery education. Each node represents a keyword, and the edges (lines) between them indicate how frequently these keywords appear together in the same documents. The size of the nodes reflects the frequency of each keyword, while the thickness and color of the edges signify the strength of their co-occurrence relationships. At the center of this network are the most frequently occurring keywords: “nursing education”, “nursing student”, “human”, and “education”. These central nodes indicate the core focus areas of the research, underscoring that studies often address educational aspects and the student experience in clinical learning environments.

The keyword “nursing education” is highly interconnected with terms like “clinical competence”, “curriculum”, “teaching”, and “learning”, highlighting a strong focus on educational strategies, curriculum development, and the assessment of clinical competencies in nursing education research.

“Nursing student” is another central keyword, frequently co-occurring with “students, nursing”, “clinical education”, “preceptorship”, and “procedures”. This cluster suggests a significant emphasis on the practical and experiential aspects of nursing education, such as clinical placements and the role of preceptors in facilitating student learning.

The keyword “human” is also prominent and linked with a broad range of terms, including “psychological aspect”, “health personnel attitude”, and “organization and management”. This indicates a diverse interest in the human elements of nursing education, such as the psychological experiences of students and the organizational factors influencing clinical learning environments. Several peripheral keywords like “female”, “male”, “adult”, and “psychology” suggest that demographic factors and psychological aspects are also considered in the research, albeit to a lesser extent. The network’s color-coded clusters reveal thematic groupings. For example, the green cluster predominantly includes student demographics and clinical education keywords, while the red cluster focuses on educational processes and methodologies. The



blue cluster centers around attitudinal and psychological aspects, highlighting the multifaceted nature of research in this area.

Overall, the co-occurrence network highlights the interrelated themes of educational strategies, student experiences, clinical competence, and psychological factors in the research on clinical learning environments for Nursing and midwifery education. The densely interconnected nodes suggest a well-established literature with strong interconnections among key concepts. Figure 6 shows the keyword co-occurrence networks.

### Limitations and Future Research Directions

There are several basic limitations to the study, despite the fact that our bibliometric analysis provides useful data on the current state of research in the clinical learning environment of Nursing and midwifery education and the Most Appropriate trends. Considering the study’s limitations, we emphasized that articles within this research’s purview may have been found in other scientific databases that were not examined. However, we choose to employ this scientific foundation similarly to other writers because Scopus has a broader coverage (Abdulaziz Yasin Nageye et al; Kokol et al). Although we acknowledge that Scopus bibliometric data are not explicitly created for bibliometric analysis, they may contain inaccuracies. These will probably not impact the primary findings of the current bibliometric research. A sizable number of articles from unrestricted research are brought to light by this bibliometric study, providing a helpful representation of the most recent findings on the topic.

Furthermore, the national scientific output map revealed inadequate research in low-income countries, Emphasizing the need for further research and institutional cooperation to strengthen and improve research in these areas. Although we acknowledge that Scopus bibliometric data are not explicitly created for bibliometric analysis, they may contain inaccuracies. These will probably not impact the primary findings of the current bibliometric research. This bibliometric

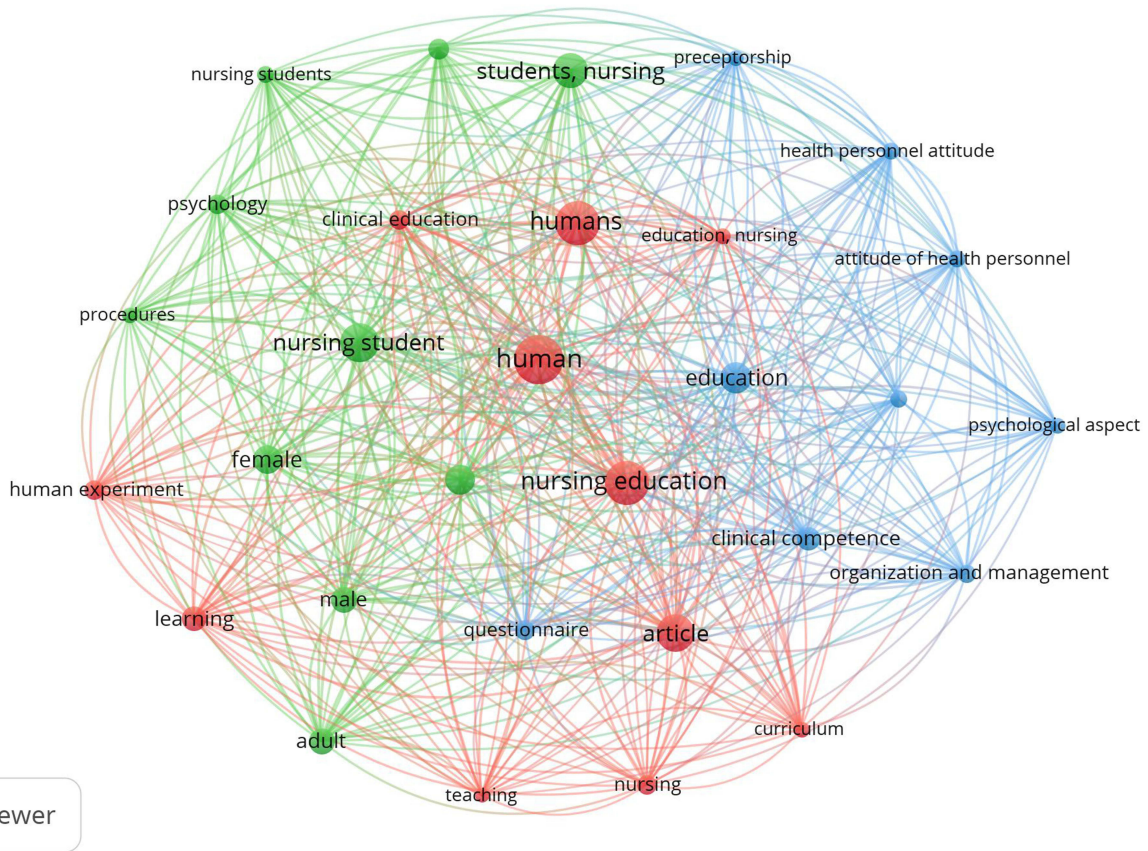


Figure 6 The keywords co-occurrence networks.

study brings to light a sizable number of articles from unrestricted research, providing a helpful representation of the most recent findings on the topic.

## Conclusion

This bibliometric analysis and visualization of research trends in the clinical learning environment for Nursing and midwifery education from inception to June 7, 2024, reveal significant evolutionary patterns and contributions across the globe. The study highlights several key findings.

The research field experienced minimal activity from 1957 to 1975, indicating its emerging stage. From 1976 to 1989, there was a gradual increase in academic attention, and the 1990s marked a period of steady growth, reflecting a growing interest in the clinical learning environment. The early 2000s witnessed substantial growth, culminating in a peak of research activity between 2005 and 2009, signifying the field's maturity. From 2010 to 2019, they maintained high research activity with some fluctuations, underscoring continuous evolution and establishment. However, recent years (2020–2024) exhibited a mixed trend with peaks and subsequent declines, potentially due to global events impacting research priorities and dissemination processes.

International contributions show that the United States and Australia emerged as the leading contributors in both publications and citations, indicating their significant impact and recognition in the clinical learning environment of Nursing and midwifery education. Other notable contributors include the United Kingdom, Canada, and Sweden. Despite fewer publications, countries like China, Finland, and Turkey demonstrate potential for further research and collaboration.

Key journals such as “Nurse Education Today”, “Nurse Education in Practice”, “Journal of Advanced Nursing”, and “Journal of Clinical Nursing” are pivotal in disseminating research, with high volumes of publications and citations. These journals are significant focuses for scholarly communication and collaboration within the field. Influential authors like Saarikoski M., Levett-Jones T., and Henderson A. stand out due to their central roles and significant contributions. The co-citation network reveals robust interdisciplinary collaboration, highlighting the interconnectedness of research themes and the importance of critical authors in advancing the field.

The co-occurrence network of keywords underscores the interrelated themes of educational strategies, student experiences, clinical competence, and psychological factors. Central keywords like “nursing education”, “nursing student”, “human”, and “education” indicate the core focus areas, with various thematic clusters revealing the multi-faceted nature of research. However, this study has certain limitations. The bibliometric data analyzed depends on the databases used, which may not encompass all relevant publications, particularly those in non-English languages or those published in less prominent journals. Additionally, citation metrics may not fully capture the quality or impact of research, as they can be influenced by factors unrelated to the intrinsic value of the work, such as self-citations or citation practices within specific regions or disciplines. Furthermore, the recent decline in citations may be partly attributed to delays in academic dissemination rather than a decrease in research activity or interest.

Future research is needed to address these limitations and further explore emerging areas within the field. Studies focusing on the impact of digital and online learning environments, the integration of advanced technologies such as simulation and virtual reality in clinical education, and the role of cultural competence in diverse clinical settings are essential. Additionally, longitudinal studies assessing the long-term outcomes of various educational interventions on clinical competence and patient care will provide deeper insights. Collaborative international research efforts are also crucial to enhancing understanding and improving the clinical learning environment globally, particularly in under-represented regions of developing countries.

Finally, by highlighting key contributors, influential journals, collaborations, and central research themes, this study provides a comprehensive overview of the field's development and dynamic nature, guiding future research directions and fostering continued advancements in clinical Nursing and midwifery education.

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## Disclosure

The authors report no conflicts of interest in this work.

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