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Advancing Emergency Preparedness in Nursing Education: A Bibliometric Analysis of Global Research Trends, Knowledge Networks, and Future Directions

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ABSTRACT : Background: Emergency preparedness is an essential component of nursing education, equipping future nurses with the knowledge, competencies, and clinical skills required to respond effectively to disasters, public health emergencies, and other critical situations. Understanding research development in this field is important for identifying established knowledge, emerging themes, and gaps that may guide nursing education and practice.
Aim: This study aimed to map the global research landscape of emergency preparedness in nursing education by examining publication trends, intellectual structures, collaborative knowledge networks, and emerging research themes.
Methods: The researcher conducted a bibliometric analysis of 9,258 Scopus-indexed records published between 2000 and 2026. Descriptive publication and citation analyses were performed, while VOS viewer was used to examine the intellectual structure through co-citation analysis and the conceptual structure through author keyword co-occurrence analysis.
Results: The dataset comprised 8,458 articles and 800 review papers, with 140,909 citations, an average of 15.22 citations per publication, and a dataset-level h-index of 117. Publication output peaked in 2022 with 1,071 publications, while citations peaked in 2021 with 19,893 citations. Co-citation analysis identified six interconnected thematic clusters reflecting nursing education and student experiences, qualitative research and educational evaluation, nursing competencies, disaster nursing competency frameworks, experiential learning, and clinical placement experiences. Co-word analysis revealed three major thematic clusters: emergency nursing practice and clinical response; nursing education and professional competencies; and nursing students and pandemic-related preparedness.
Conclusions: Research on emergency preparedness in nursing education encompasses clinical response, competency development, educational strategies, and student preparedness. The findings highlight the importance of integrating disaster and emergency preparedness competencies into nursing curricula, strengthening simulation-based and experiential learning, and addressing students' psychological and educational needs. Future research should further examine the effectiveness of educational interventions, competency assessment, and the translation of preparedness training into clinical and disaster-response practice.
Keywords: *Emergency preparedness; Nursing education; Nursing students; Disaster nursing; Bibliometric analysis; VOS viewer; Co-citation analysis; Co-word analysis.*

I. INTRODUCTION

Emergencies and disasters present significant challenges to healthcare systems, requiring coordinated, timely, and effective responses from healthcare professionals. Events such as infectious disease outbreaks, pandemics, natural disasters, mass casualty incidents, and other public health emergencies place considerable demands on healthcare personnel, particularly nurses, who play essential roles in patient assessment, clinical management, triage, infection prevention, health education, and the delivery of emergency care. The increasing complexity of these situations highlights the importance of preparing the nursing workforce with the knowledge, clinical competencies, decision-making abilities, and practical skills necessary to respond effectively to unexpected and high-pressure situations. Consequently, emergency preparedness has become an important consideration in nursing education and professional development.

Nursing education serves as a fundamental foundation for developing competent and adaptable nurses capable of responding to diverse healthcare challenges. Integrating emergency preparedness into nursing curricula enables students and

practicing nurses to develop the competencies required to recognize potential threats, assess risks, prioritize patient needs, implement appropriate interventions, and participate in coordinated emergency responses. Beyond theoretical instruction, educational approaches such as simulation-based learning, clinical training, experiential activities, and competency-based education provide opportunities to strengthen clinical judgment, technical skills, teamwork, communication, and confidence. These approaches are particularly relevant in preparing nursing learners for situations in which rapid assessment and appropriate clinical decisions may influence patient outcomes. The increasing attention to simulation, training, knowledge development, and clinical competence in literature reflects the importance of educational strategies in strengthening nursing preparedness.

The COVID-19 pandemic further emphasized the importance of emergency preparedness within nursing education. The unprecedented demands placed on healthcare systems highlighted the need for nurses to possess competencies in prevention and control, patient management, emergency communication, psychological support, and crisis response. It also demonstrated the importance of educational institutions in ensuring that nursing students and graduates are equipped to function in rapidly changing healthcare environments. In addition to infectious disease emergencies, nursing education must address preparedness for natural and human-induced disasters, mass casualty incidents, public health crises, and other situations requiring coordinated emergency management. These circumstances reinforce the need for comprehensive educational frameworks that incorporate preparedness, response, mitigation, recovery, and resilience into nursing education and professional training.

Despite the growing importance of emergency preparedness, its integration into nursing education involves multiple dimensions, including curriculum development, faculty preparedness, clinical competency assessment, simulation design, institutional support, and collaboration with healthcare and emergency management organizations. Differences in educational approaches, available resources, institutional priorities, and national emergency response systems may influence how preparedness competencies are developed and evaluated. Furthermore, the expanding range of emergency situations requires continuous adaptation of nursing education to address emerging risks and changing healthcare demands. Understanding how research in this area has developed is therefore important for identifying established knowledge, examining research priorities, and recognizing areas that require further investigation.

Bibliometric analysis offers a systematic approach to examining the development and structure of scientific research through quantitative assessment of publications, citations, authorship patterns, institutional contributions, international collaborations, and keyword relationships. By mapping publication trends and knowledge networks, bibliometric methods can provide an overview of the intellectual structure of a research field, identify influential publications and contributors, and reveal the relationships among major research themes. In the context of emergency preparedness in nursing education, these methods can help determine how scholarly attention has evolved, which countries and institutions contribute to the field, what topics receive considerable research interest, and which emerging themes may shape future educational and research directions. The use of bibliometric mapping tools, such as VOS viewer, further enables the visualization of co-authorship, co-citation, bibliographic coupling, and keyword co-occurrence networks.

The Scopus dataset examined in the present study comprises 9,258 publications published between 2000 and 2026. The preliminary distribution of publications indicates an increase in research output over time, particularly from 2020 onward, with the highest annual publication count recorded in 2022. The author keyword distribution also reflects the breadth of research themes associated with nursing education and emergency-related preparedness. Frequently occurring terms include COVID-19, nursing, nursing education, nursing students, simulation, emergency department, emergency nursing, pandemic, knowledge, training, triage, and disaster. These themes suggest that research in the broader field encompasses educational preparation, clinical competencies, simulation-based approaches, and responses to emerging healthcare challenges. Examining the relationships among these topics may provide insights into the evolution and knowledge structure of emergency preparedness research within nursing education.

Although research on nursing education, emergency nursing, disaster response, simulation, and pandemic-related preparedness has expanded, a systematic overview of the global research landscape is valuable for understanding how these areas are interconnected and how the field has developed over time. Mapping publication patterns, citation relationships, international research collaboration, and emerging thematic clusters can help clarify the current direction of scholarly work and identify potential gaps in the literature. Such an overview may also support nursing educators, researchers, academic institutions, and policymakers in identifying research priorities and strengthening evidence-informed educational strategies for emergency preparedness.

Therefore, this study aims to advance understanding of emergency preparedness in nursing education through a bibliometric analysis of Scopus-indexed publications from 2000 to 2026. Specifically, it seeks to examine global publication trends and citation patterns, identify the most productive authors, sources, institutions, and countries, analyze international collaboration and knowledge networks, and map the major and emerging research themes through bibliometric visualization. By providing a comprehensive overview of the scientific landscape, this study intends to identify the intellectual structure and development of the field, highlight research opportunities, and offer directions for future investigations. Ultimately, the findings may contribute to the advancement of nursing education by informing curriculum development, educational interventions, research collaboration, and evidence-based approaches to strengthening emergency preparedness among the nursing workforces.

II. PRESENT STUDY

The growing importance of emergency preparedness in healthcare has emphasized the need to strengthen nursing education through effective teaching strategies, competency development, and evidence-based approaches to emergency and disaster response. The literature encompasses several interconnected areas, including nursing education, nursing students, emergency nursing, disaster preparedness, simulation-based learning, clinical training, pandemic response, knowledge development, and triage. Understanding how these research areas have evolved and how they are interconnected is essential for identifying the current direction of scholarship and recognizing emerging priorities in emergency preparedness education.

In this context, the present study employs a bibliometric approach to examine the global research landscape of emergency preparedness in nursing education using Scopus-indexed publications from 2000 to 2026. Through bibliometric performance analysis and network visualization, the study aims to identify publication and citation trends, examine the contributions of researchers and institutions, explore international research collaborations, and determine the intellectual and thematic structure of the field. Specifically, the study seeks to:

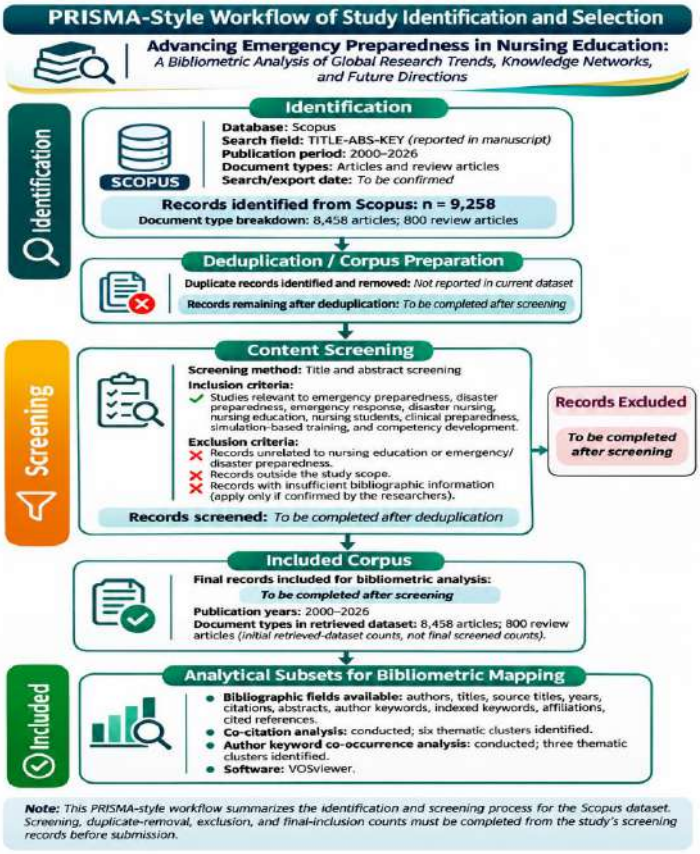
1. Examine global publication trends and citation patterns related to emergency preparedness in nursing education, including the contributions of leading authors, journals, institutions, and countries.
2. Analyze international collaboration and knowledge networks through co-authorship, bibliographic coupling, and co-citation analysis to identify influential contributors, research relationships, and the intellectual foundations of the field.
3. Identify and examine major research themes and emerging topics through author keyword co-occurrence and thematic mapping, highlighting developments in nursing education, disaster preparedness, emergency response, simulation, training, and competency development.
4. Determine potential research gaps and future directions that may contribute to strengthening emergency preparedness education, curriculum development, educational interventions, and nursing workforce readiness.

III. METHODS

Bibliometric Analysis

This study employed a bibliometric analysis to examine the global research landscape of emergency preparedness in nursing education. Bibliometric analysis is a quantitative research approach used to evaluate the development, productivity, intellectual structure, and thematic relationships of scholarly publications within a particular field. Through the systematic examination of bibliographic records, this approach enables researchers to identify publication trends, influential research contributions, citation relationships, and emerging areas of investigation. Furthermore, science mapping techniques provide visual representations of relationships among cited references, authors, and keywords, allowing researchers to explore the knowledge structure and conceptual development of a research field (van Eck & Waltman, 2014).

The present study utilized two principal bibliometric techniques: reference co-citation analysis and keyword co-occurrence analysis. These approaches were selected to examine the intellectual foundations and conceptual structure of research concerning emergency preparedness in nursing education.



1. **Co-Citation Analysis**. Co-citation analysis was employed to identify the intellectual foundations and influential scholarly contributions within the field. This technique examines how frequently two cited references are cited together in subsequent publications, based on the assumption that frequently co-cited works may share related theoretical, conceptual, or methodological perspectives (McCain, 1990). In this study, reference co-citation analysis was used to identify interconnected research contributions associated with nursing education, emergency nursing, disaster preparedness, clinical competency development, simulation-based learning, and disaster nursing frameworks. The resulting network visualization illustrates the relationships among cited references and provides insights into the intellectual structure of the research field. The identified clusters were interpreted according to their prominent cited references and their relevance to emergency preparedness in nursing education.
2. **Co-Word Analysis**. Keyword co-occurrence analysis was conducted to identify the major research themes and conceptual relationships within the literature. This technique examines the frequency with which keywords appear together in publications, based on the assumption that frequently co-occurring terms indicate conceptual relationships among research topics (Callon et al., 1983; Zupic & Čater, 2015). In the present study, co-word analysis was used to identify prominent and interconnected themes related to emergency preparedness in nursing education, including emergency nursing practice, nursing education, clinical competence, disaster planning, simulation training, nursing students, and pandemic-related preparedness. The resulting network visualization presents the relationships among keywords through clusters, nodes, and connecting lines. The identified clusters were examined and interpreted according to their dominant keywords and thematic relevance to the research objectives.

Both analytical techniques were used to provide complementary perspectives on the research landscape. Co-citation analysis focused on the intellectual foundations of the field, whereas co-word analysis examined its conceptual structure and major research themes. The combined application of these techniques provided a basis for understanding the development of scholarly knowledge, identifying interconnected research areas, and recognizing potential directions for future research in emergency preparedness and nursing education.

Search Strategy and Data Collection

A comprehensive literature search was conducted using the Scopus database to retrieve publications related to emergency preparedness in nursing education. Scopus was selected as the primary bibliographic database because it provides structured bibliographic records, citation information, author affiliations, abstracts, keywords, and cited references that support bibliometric and science mapping analyses.

The search strategy was designed to capture publications addressing nursing education and emergency- or disaster-related topics. The search terms covered three principal concept groups: (1) nursing and nursing education, (2) emergencies, disasters, and public health crises, and (3) preparedness, response, training, education, and competency development. These concepts were combined using Boolean operators to retrieve publications addressing the intersection of nursing education and emergency preparedness. Search was conducted using the TITLE-ABS-KEY field, which includes publication titles, abstracts, author and indexed keywords.

The publication period covered 2000 to 2026 to examine the historical development and recent progression of research in the field. The search strategy was intended to capture different dimensions of emergency preparedness, including emergency nursing, disaster management, disaster planning, simulation-based training, clinical competence, and nursing student preparedness. The retrieved records were exported from Scopus in CSV format for subsequent data organization, screening, and bibliometric analysis.

The exported dataset contained 9,258 bibliographic records published between 2000 and 2026. Of these records, 8,458 were classified as articles and 800 as review articles. The dataset included essential bibliographic information such as authors, publication titles, source titles, publication years, citation counts, abstracts, author keywords, indexed keywords, affiliations, and cited references. These metadata provided the necessary information for examining publication patterns, citation relationships, research collaboration, and keyword co-occurrence.

Following data retrieval, the bibliographic records were prepared for analysis by examining the completeness and consistency of the exported information. Author names, publication details, keywords, and cited references were considered in organizing the dataset for bibliometric mapping. The records were subsequently used to generate the co-citation and co-word network visualizations in VOS viewers. The resulting maps were interpreted based on the distribution of nodes, the strength of their connections, and the thematic groupings identified by the software.

Bibliometric Mapping and Visualization

VOS viewers were used to construct and visualize the bibliometric networks generated from the Scopus dataset. The software facilitates the identification and visualization of relationships among bibliographic entities through network mapping and clustering techniques (van Eck & Waltman, 2014).

For the co-citation analysis, cited references were examined to identify publications that were frequently cited together. The resulting network was used to identify influential scholarly contributions and intellectual connections related to nursing education, emergency preparedness, clinical competence, and disaster nursing. References were grouped into clusters according to their citation relationships, and the clusters were interpreted based on the visible cited works and their conceptual relevance to the research topic.

For the co-word analysis, keywords from the retrieved publications were examined to identify frequently occurring terms and their relationships. The resulting network visualization was used to identify major thematic clusters associated with emergency nursing practice, nursing education and professional competencies, and nursing students' experiences during public health emergencies. The size of the nodes represented the relative prominence of keywords, while the connecting lines illustrated their co-occurrence relationships. The distance between nodes provided a visual indication of their relatedness within the network.

The interpretation of both visualizations was guided by the study's objectives and research title. The co-citation map provided insights into the intellectual foundations of emergency preparedness in nursing education, while the co-word map revealed the major conceptual themes and research directions. Together, these analyses provided an overview of the development, knowledge structure, and emerging areas of scholarly interest in the field.

Table 1: Search string used for database search

Concept group	Search terms / purpose
Nursing and nursing education	nurs* OR "nursing education" OR "nursing student*" OR "nurse education" OR "nursing curriculum" OR "clinical nursing education"
Emergency and disaster context	emergenc* OR disaster* OR "public health emergency" OR pandemic* OR "mass casualty" OR "emergency nursing" OR "disaster nursing"
Preparedness and education	preparedness OR readiness OR response OR training OR education OR simulation OR competency OR "disaster planning" OR "emergency management"

IV. RESULTS AND DISCUSSION

Descriptive Analysis

The Scopus dataset comprised a total of 9,258 publications related to the landscape research examined in this study, covering the period from 2000 to 2026. The dataset consisted of 8,458 research articles and 800 review articles, representing the scholarly literature retrieved for bibliometric analysis. Based on the exported citation information, the publications accumulated a total of 140,909 citations, with an average of 15.22 citations per publication. The calculated H-index was 117, indicating that at least 117 publications received 117 or more citations each. These indicators demonstrate the extent of scholarly visibility and citation activity within the retrieved dataset.

Figure 1 illustrates the annual publication output and citation trends from 2000 to 2026. The publication pattern indicates a gradual increase in research productivity during the earlier years, followed by a more pronounced expansion beginning in 2020. Publication output increased from 493 records in 2020 to 852 in 2021, reaching its highest level in 2022, with 1,071 publications. Although the number of publications decreased to 945 in 2023 and 866 in 2024, the dataset recorded 899 publications in 2025, indicating continued scholarly activity in the field. A total of 791 publications were recorded for 2026; however, this figure should be interpreted cautiously because the year was still ongoing at the time of data collection.

The citation pattern also demonstrated considerable variation across the publication period. The highest annual citation total was recorded in 2021, with 19,893 citations, followed by 13,991 citations in 2022 and 11,444 citations in 2020. Citation counts subsequently declined in the following years, reaching 5,483 in 2024, 3,058 in 2025, and 314 in 2026. This pattern may reflect the citation accumulation period, as recently published studies generally have had less time to receive citations than older publications. Therefore, the lower citation counts for most recent years should not necessarily be interpreted as a decline in research relevance or scholarly quality.

The substantial increase in publication output beginning in 2020 suggests growing scholarly attention to nursing education and emergency-related healthcare concerns. The emergence of the COVID-19 pandemic and the associated challenges to healthcare systems and nursing education may have contributed to increased research

activity during this period. The growing volume of publications also reflects the continuing importance of examining nursing education, emergency nursing practice, clinical competencies, simulation-based training, disaster planning, and nursing students' preparedness for public health emergencies.

Overall, the descriptive findings indicate an expanding body of scholarly literature, particularly in the years following 2020. The combination of increasing publication productivity and substantial citation activity demonstrates the growing research attention given to the relationship between nursing education and emergency preparedness. These findings provide a foundation for the subsequent co-citation and co-word analyses, which further examine the intellectual connections and thematic structure of the research field.

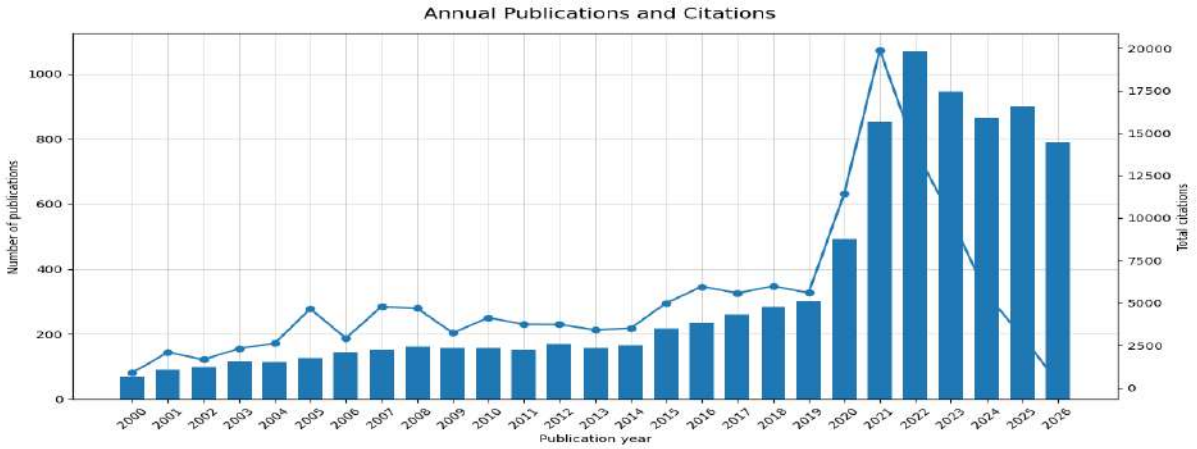


Figure 1: Citations and publications (authors' work)

Co-Citation Analysis

Co-citation analysis was conducted to identify the intellectual foundations and influential scholarly contributions within the research landscape of emergency preparedness in nursing education. This technique examines the frequency with which two cited references are cited together in subsequent publications, providing insights into the conceptual, theoretical, and methodological relationships among scholarly works. Through the identification of co-citation patterns, the analysis helps reveal the major knowledge foundations that have shaped research on nursing education, emergency nursing, disaster preparedness, clinical competency development, and educational approaches to emergency response.

The Scopus dataset contained bibliographic records and cited references that were used to construct the co-citation network in VOS viewer. The resulting visualization revealed six interconnected thematic clusters, represented by red, green, blue, purple, yellow, and cyan nodes. These clusters illustrate the intellectual relationships among studies addressing nursing education, professional competency development, clinical placement, simulation-based learning, disaster nursing frameworks, and qualitative research methodologies.

The red cluster primarily represents research related to nursing education, nursing student experiences, clinical learning, and simulation-based approaches. The green cluster emphasizes qualitative research methodologies, nursing experiences, and educational evaluation. The blue cluster reflects research concerning nursing competencies, professional education, and the development of nursing practice. The purple cluster contains references related to disaster nursing competencies and established frameworks for disaster preparedness. The yellow cluster highlights experiential learning and the progressive development of clinical competence, while the cyan cluster focuses on clinical placement and the integration of nursing education into practical settings.

Among the visible cited references, works associated with disaster nursing competency frameworks, including the International Council of Nurses (ICN) framework for disaster nursing, demonstrate the direct connection between professional competency standards and emergency preparedness education. Other prominent references include Kolb's experiential learning theory, Benner's novice-to-expert framework, and methodological works by Guba, Clarke, and Craig. These contributions provide theoretical and methodological foundations for understanding how nursing knowledge, clinical competence, educational experiences, and research practices are developed and evaluated.

The connections among the clusters indicate that emergency preparedness in nursing education is supported by a broader body of scholarly knowledge involving educational theories, clinical competency development, student learning experiences, and disaster-specific professional standards. In particular, the relationship between experiential learning, simulation-based education, clinical placement, and disaster nursing competencies highlights the importance of integrating theoretical instruction with practical preparedness activities. The co-citation network therefore provides an overview of the intellectual structure of the field and demonstrates how different educational and professional perspectives contribute to the advancement of emergency preparedness in nursing education.

The total link strength of a cited reference represents the cumulative strength of its co-citation links with other references in the network. As described by van Eck and Waltman (2014), this measure helps identify the relative connectedness of items within a bibliometric network. The most frequently co-cited references and their corresponding total link strengths are presented in Table 2. These indicators provide additional information about the scholarly contributions that are most strongly connected within the identified research landscape.

Table 2: Top 10 documents with the highest co-citation and total link strength

No.	Cited Reference	Citations	Total Link Strength
1	Guba, E. G. – Naturalistic Inquiry (1985)	110	134
2	Craig, J. – Consolidated Criteria for Reporting Qualitative Research	84	103
3	Petrovic, K. – Nursing Education in a Pandemic: Academic Experiences	71	100
4	Hendel, T. – Anxiety and Coping Strategies Among Nursing Students	59	92
5	Clarke, V. – Using Thematic Analysis in Psychology	102	78
6	The Essentials: Core Competencies for Professional Nursing Education	99	69
7	Yu, L. – Emotional Responses and Coping Strategies in Nursing	31	53
8	Bergs, J. – Clinical Placement Experience of Nursing Students	36	51
9	Petrovic, K. – Nursing Education in a Pandemic: Academic Experiences	51	50
10	Bergs, J. – Clinical Placement Experience of Nursing Students	32	49

The co-citation analysis identified six thematic clusters based on network visualization, illustrating the intellectual structure and interconnected knowledge foundations of research on emergency preparedness in nursing education. Total link strength represents the cumulative strength of a document's co-citation links with other documents in the network, indicating the extent of its connections within the scholarly literature (van Eck & Waltman, 2010). The resulting network structure is presented in Figure 2. Each cluster was examined and interpreted inductively based on the themes and representative cited publications, allowing the researchers to assign corresponding labels and characterize the major areas of scholarship represented in the network. These clusters reflect interconnected research domains encompassing nursing education and student experiences, qualitative research and educational evaluation, nursing competencies, disaster nursing competency frameworks, experiential learning, and clinical placement experiences.

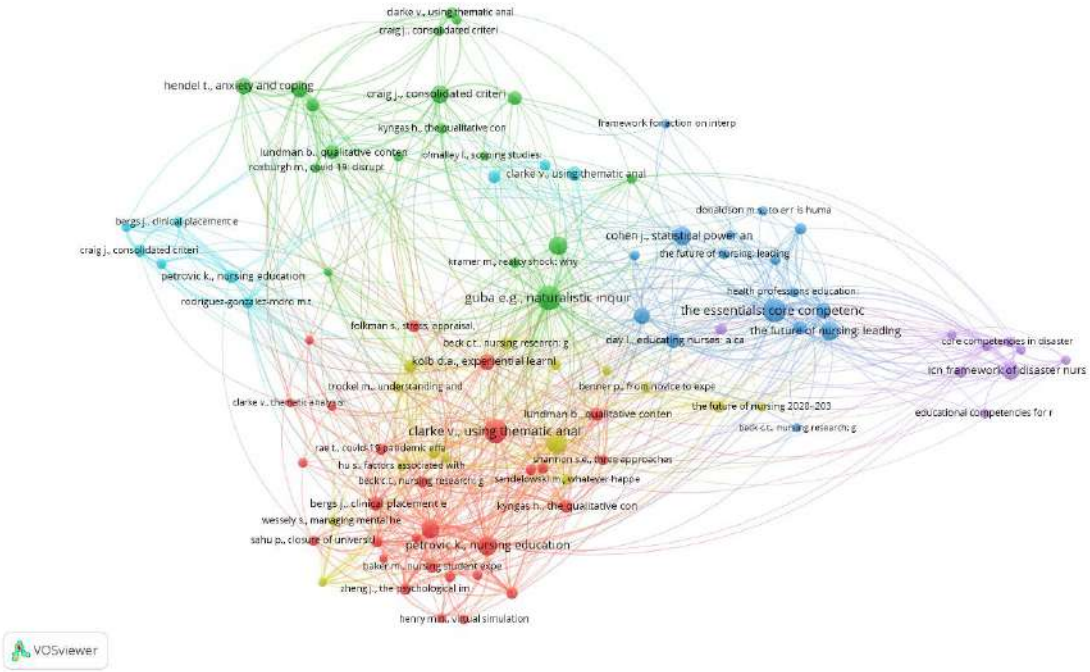


Figure 2: Co-citation analysis

Co-Citation Analysis and Thematic Clusters

The co-citation analysis generated a network visualization illustrating the intellectual connections among influential publications related to nursing education, emergency preparedness, and competency development. The map reveals interconnected research themes involving nursing education, disaster nursing competencies, experiential learning, clinical simulation, nursing student experiences, and qualitative research methodologies. The relationships among the cited references indicate that emergency preparedness in nursing education is connected not only to disaster-specific competencies but also to broader educational foundations, clinical learning experiences, and the development of professional nursing capabilities. Based on the network visualization, six thematic clusters were identified and interpreted according to their prominent cited references and conceptual relationships.

Cluster 1 (Red): Nursing Education, Student Experiences, and Simulation-Based Learning

The red cluster highlights the relationship between nursing education, student experiences, clinical learning environments, and simulation-based approaches. Prominent references include Petrovic et al. on nursing education, Baker et al. on nursing student experiences, Henry et al. on virtual simulation, and studies addressing clinical placement, university experiences, and the effects of the COVID-19 pandemic. The presence of these references suggests that nursing education research places considerable emphasis on the learning experiences of students and the educational strategies used to develop clinical competencies. Simulation-based learning, particularly virtual simulation, provides opportunities for students to engage with clinical situations in a controlled educational environment. In emergency preparedness education, these approaches can support the development of clinical judgment, decision-making, prioritization, and confidence when responding to challenging situations. Furthermore, disruptions to clinical placements and face-to-face learning during the COVID-19 pandemic highlight the importance of flexible educational approaches that maintain learning continuity while preparing nursing students for complex healthcare environments. This cluster emphasizes the importance of student-centered learning, simulation, and clinical exposure in strengthening the educational foundation of emergency preparedness.

Cluster 2 (Green): Qualitative Research, Nursing Experiences, and Educational Evaluation

The green cluster is characterized by methodological references and studies examining experiences, perceptions, and challenges in nursing and healthcare education. Prominent works include Guba et al. on naturalistic inquiry, Craig et al. on consolidated criteria for reporting qualitative research, Clarke et al. on thematic analysis, and Lundman et al. on qualitative content analysis. Other visible references address anxiety, coping, and the disruption of nursing education during the COVID-19 pandemic. These connections demonstrate the importance of qualitative research in understanding how nursing students, educators, and healthcare professionals experience educational and clinical challenges. In the context of emergency preparedness, qualitative approaches can provide insights into learners' perceived readiness, confidence, emotional responses, barriers to competency development, and experiences during emergency-related training. Such evidence can complement

quantitative assessments by explaining how educational interventions are experienced and why certain preparedness strategies may be effective or challenging to implement. This cluster highlights the contribution of qualitative inquiry to evaluating nursing education and understanding the human and institutional factors influencing emergency preparedness.

Cluster 3 (Blue): Nursing Competencies and the Development of Professional Preparedness

The blue cluster centers on nursing competencies, professional education, and the development of the nursing workforce. Its visible references include works related to the future of nursing, healthcare professional education, nursing core competencies, and statistical approaches to research evaluation. These references suggest an intellectual connection between nursing education and the establishment of professional standards and competency-based approaches to preparing nurses for contemporary healthcare demands. Developing nursing competencies requires more than theoretical knowledge; it involves integrating clinical judgment, communication, critical thinking, teamwork, and evidence-based decision-making into educational and professional practice. In emergency preparedness, these competencies are particularly important because nurses must recognize urgent clinical conditions, prioritize patient needs, coordinate with multidisciplinary teams, and respond appropriately under pressure. The cluster therefore reflects the importance of competency-oriented nursing education in preparing the nursing workforce to address complex and rapidly changing healthcare situations.

Cluster 4 (Purple): Disaster Nursing Competencies and Emergency Preparedness Frameworks

The purple cluster is particularly relevant to the present study because it contains references explicitly addressing core competencies in disaster nursing, the International Council of Nurses (ICN) framework for disaster nursing, and educational competencies for disaster response. These references indicate the importance of establishing structured competency frameworks to guide nursing education and professional preparation for disasters and emergencies. Disaster nursing requires specialized knowledge and skills in preparedness, response, mitigation, recovery, risk assessment, triage, and coordinated patient care. The presence of disaster-related competency frameworks suggests that emergency preparedness should be systematically integrated into nursing education rather than treated as an isolated topic. Educational institutions may use these frameworks to guide curriculum development, identify essential learning outcomes, and assess students' readiness to participate in emergency and disaster response activities. This cluster emphasizes the importance of competency-based disaster nursing education and the alignment of academic preparation with recognized professional standards.

Cluster 5 (Yellow): Experiential Learning and Clinical Competency Development

The yellow cluster focuses on experiential learning and the development of nursing competencies through practical educational experiences. Visible references include Kolb et al. on experiential learning, Benner et al. on the progression from novice to expert, and other works addressing nursing research, stress appraisal, and learning experiences. These theoretical and educational foundations highlight the importance of active participation, reflection, practical application, and progressive skill development in nursing education. Experience is particularly relevant to emergency preparedness because students need opportunities to apply theoretical knowledge to realistic clinical and emergency scenarios. Through simulation exercises, case-based activities, supervised clinical practice, and reflective learning, nursing students can develop the ability to assess situations, make timely decisions, and perform appropriate interventions. Benner's novice-to-expert perspective also reinforces the importance of progressive learning experiences in developing clinical competence. This cluster underscores the value of structured practical exposure and experiential learning in preparing nursing students to manage emergencies and other complex clinical situations.

Cluster 6 (Cyan): Clinical Placement and the Integration of Nursing Education into Practice

The cyan cluster includes references related to clinical placement experiences and nursing education, including visible works by Bergs et al., Petrovic et al., and Craig et al. Its connections with the other clusters suggest the importance of integrating academic instruction with supervised clinical experiences. Clinical placement provides opportunities for nursing students to apply theoretical knowledge, develop professional skills, and become familiar with actual healthcare environments. In emergency preparedness education, clinical exposure can strengthen students' understanding of emergency procedures, patient assessment, infection prevention, communication, and collaboration with healthcare professionals. However, clinical placement alone may not provide sufficient exposure to large-scale emergencies or disaster situations. Therefore, it may be complemented by simulation-based activities, disaster drills, and structured emergency preparedness training. This cluster highlights the role of clinical learning environments in bridging the gap between classroom instruction and practical nursing responsibilities.

Overall, the six clusters demonstrate that emergency preparedness in nursing education is an interdisciplinary and multidimensional research area involving competency development, educational frameworks, simulation, experiential learning, clinical placement, and the evaluation of nursing students' and professionals' experiences. The network further indicates that methodological foundations and established nursing education theories provide an important basis for understanding how preparedness competencies are developed and assessed. Among the identified clusters, the disaster nursing competency framework represents a particularly direct

connection to emergency preparedness, while the remaining clusters provide complementary educational, theoretical, and methodological foundations. These relationships suggest that advancing emergency preparedness requires the integration of disaster-specific competencies into broader nursing education strategies, supported by simulation, practical training, clinical learning, and continuous evaluation.

Table 3 summarizes the co-citation analysis by presenting its clusters, cluster labels, number of articles, and representative publications.

Table 3. Co-citation Clusters in Emergency Preparedness and Nursing Education

Cluster	Cluster label	Number of cited references	Representative cited references
1 (Red)	Nursing Education, Student Experiences, and Simulation-Based Learning	28	Petrovic et al. (nursing education); Baker et al. (nursing student experiences); Henry et al. (virtual simulation); references on clinical placement and COVID-19-related educational experiences
2 (Green)	Qualitative Research, Nursing Experiences, and Educational Evaluation	18	Guba et al. (naturalistic inquiry); Clarke et al. (thematic analysis); Craig et al. (qualitative research reporting); Lundman et al. (qualitative content analysis); Hendel et al. (anxiety and coping)
3 (Blue)	Nursing Competencies and Professional Preparedness	16	*The Future of Nursing*; *The Essentials: Core Competencies for Professional Nursing Education*; references on health professions education and nursing core competencies
4 (Purple)	Disaster Nursing Competencies and Emergency Preparedness Frameworks	15	International Council of Nurses (ICN) framework for disaster nursing; references on core competencies in disaster nursing and educational competencies for disaster response
5 (Yellow)	Experiential Learning and Clinical Competency Development	9	Kolb et al. (experiential learning); Benner et al. (novice-to-expert framework); references on clinical learning and stress appraisal
6 (Cyan)	Clinical Placement and Integration of Nursing Education into Practice	9	Bergs et al. (clinical placement experiences); Petrovic et al. (nursing education); references on clinical learning and the integration of theoretical knowledge into practice

Co-word Analysis

The same bibliographic dataset was subjected to a co-word analysis to examine the conceptual structure and major research themes in emergency preparedness in nursing education. The network visualization revealed three thematic clusters (Figure 3), representing the interconnected concepts and research areas identified through keyword co-occurrence. The red cluster focused on emergency nursing practice and clinical response, with prominent keywords related to emergency care, emergency departments, triage, resuscitation, patient care, and patient safety. The green cluster emphasized nursing education and professional competencies, including nursing education, clinical competence, emergency nursing, disaster planning, continuing education, and professional training. Meanwhile, the blue cluster centered on nursing students and pandemic-related preparedness, with keywords associated with student learning, nursing students, anxiety, mental health, COVID-19, and pandemic experiences. Table 4 presents the major keywords identified in the co-word analysis, together with their respective occurrence frequencies and total link strength, as obtained from the VOS viewer output.

Table 4: Top 15 keywords in the co-occurrence of keywords analysis

Ranking	Keyword	Occurrences	Total link strength
	artificial intelligence	369	2178

2.	nursing education	289	2329
	machine learning	116	528
	deep learning	91	510
	Chatgpt	75	425
	nursing students	92	1152
	Curriculum	69	698
	clinical competence	25	268
	decision making	32	220
	generative artificial intelligence	34	230
	learning systems	37	121
	virtual reality	36	176
	natural language processing	29	157
	educational measurement	22	247
	systematic review	26	202

The network map of the co-word analysis is presented in Figure 3. Three thematic clusters were identified and categorized based on the researchers' inductive interpretation of the keywords and their conceptual relationships. Although each cluster represents a distinct research theme, the connections among the keywords indicate that these themes are closely related and partially interconnected, reflecting the overlapping dimensions of emergency nursing practice, nursing education and professional competencies, and nursing students' preparedness for emergencies and pandemics.

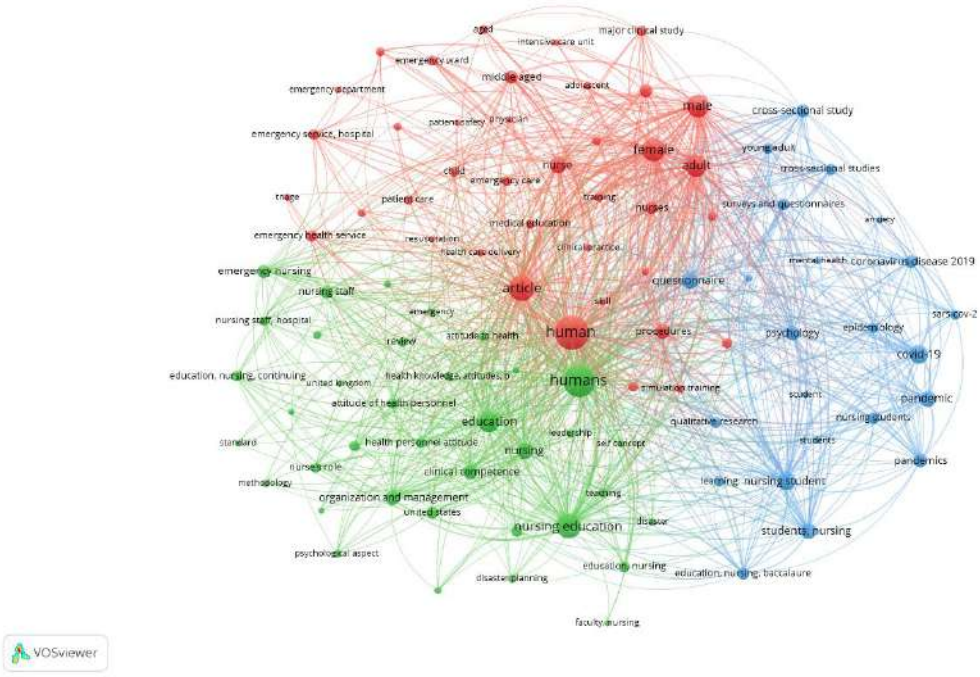


Figure 3: Co-word analysis

Co-Word Analysis

The co-word analysis was conducted to identify the major research themes and conceptual relationships within the literature on emergency preparedness in nursing education. The VOS viewer network

visualization revealed three distinct but interconnected thematic clusters, represented by red, green, and blue nodes. The size of the nodes reflects the frequency of keyword occurrence, while the connecting lines indicate the co-occurrence relationships between keywords. The visualization demonstrates that research in this field encompasses emergency nursing practice, nursing education and competency development, and the experiences of nursing students during public health emergencies. The interconnectedness of these themes suggests that emergency preparedness is examined not only as a clinical responsibility but also as an important component of nursing education, professional development, and healthcare system readiness.

Cluster 1 (Red): Emergency Nursing Practice, Clinical Procedures, and Healthcare Response

The red cluster represents research focused on emergency nursing practice, clinical care delivery, and the management of emergency situations. Prominent keywords include *human, nurse, nurses, emergency care, emergency department, emergency ward, emergency service hospital, patient care, patient safety, triage, resuscitation, clinical practice, medical education, training,* and *procedures*. The prominence of these terms indicates that a substantial research focus concerns the clinical responsibilities of nurses in emergency settings and the competencies required to provide safe and effective patient care. The presence of keywords such as triage, resuscitation, and patient safety highlights the importance of rapid assessment, clinical decision-making, prioritization, and appropriate interventions during emergencies. Furthermore, the association of emergency nursing with medical education and training suggests that the development of clinical competencies is closely connected to educational preparation. This cluster emphasizes the importance of integrating emergency nursing principles, clinical procedures, and practical training into nursing education to prepare future nurses for complex and time-sensitive healthcare situations.

Cluster 2 (Green): Nursing Education, Professional Competencies, and Emergency Preparedness

The green cluster centers on nursing education, professional development, and the establishment of competencies necessary for effective nursing practice. Frequently visible keywords include *nursing education, education, nursing, clinical competence, emergency nursing, nursing staff, nursing staff hospital, education nursing continuing, teaching, leadership, disaster, disaster planning, organization and management, standard,* and *health knowledge attitudes*. These terms indicate that research in this cluster emphasizes the role of educational preparation, continuing professional development, and competency enhancement in strengthening nursing practice. The presence of emergency nursing, disaster, and disaster planning demonstrates the connection between nursing education and preparedness for emergency and disaster situations. Similarly, keywords related to clinical competence, leadership, and organization and management highlight the importance of developing nurses who can coordinate care, make informed decisions, and participate effectively in emergency response activities. The association between nursing education and disaster planning further suggests that preparedness should be incorporated into nursing curricula and continuing education programs. This cluster underscores the importance of competency-based education, structured training, and professional development in advancing emergency preparedness among nursing students and practicing nurses.

Cluster 3 (Blue): Nursing Students, Pandemic Experiences, and Psychological Preparedness

The blue cluster focuses on nursing students, educational experiences, and psychological dimensions associated with public health emergencies, particularly the COVID-19 pandemic. Prominent keywords include *nursing students, students, student, nursing student, students nursing, learning, questionnaire, psychology, anxiety, mental health, coronavirus disease 2019, SARS-CoV-2, COVID-19, pandemic, pandemics, cross-sectional study,* and *qualitative research*. The concentration of these terms suggests considerable research attention to the experiences, perceptions, and psychological well-being of nursing students during periods of healthcare disruption. The prominence of COVID-19 and pandemic-related keywords reflects the influence of the global pandemic on nursing education, particularly in relation to clinical exposure, learning continuity, anxiety, and preparedness for emerging health threats. The presence of learning, questionnaire, and qualitative research also indicates the use of different approaches to examine students' knowledge, attitudes, experiences, and perceptions. These findings highlight the importance of addressing not only the clinical and technical dimensions of emergency preparedness but also the psychological readiness and educational support required by nursing students during crises. This cluster emphasizes the need for educational strategies that strengthen student resilience, maintain learning opportunities, and prepare future nurses to respond to public health emergencies.

Overall Interpretation of the Co-Word Analysis

Overall, the three clusters demonstrate that emergency preparedness in nursing education is a multidimensional research area connecting clinical emergency response, nursing education and competency development, and the experiences of nursing students during public health crises. The red cluster highlights the clinical and operational dimensions of emergency nursing, while the green cluster emphasizes educational preparation, professional competencies, and disaster planning. Meanwhile, the blue cluster illustrates the importance of understanding nursing students' learning experiences, psychological well-being, and preparedness during pandemics and other public health emergencies.

The connections among the clusters indicate that clinical preparedness, educational development, and student readiness are closely related research dimensions. In particular, the relationship between nursing education, clinical competence, disaster planning, and emergency nursing suggests the importance of integrating emergency preparedness into both academic curricula and continuing professional development. Likewise, the prominence of pandemic-related and student-centered keywords highlights the need for educational institutions to develop responsive learning strategies that address emerging healthcare threats and support students' psychological and professional readiness.

These findings suggest several directions for future research, including the development and evaluation of competency-based emergency preparedness curricula, the effectiveness of simulation-based emergency training, the assessment of nursing students' disaster response knowledge and skills, and the integration of psychological resilience and crisis management into nursing education. Strengthening these areas may contribute to preparing a competent and adaptable nursing workforce capable of responding effectively to emergencies, disasters, and evolving public health challenges.

Implications

Theoretical Implications

The findings of this bibliometric analysis contribute to the theoretical understanding of emergency preparedness in nursing education by highlighting the interconnected roles of nursing education, clinical competency development, experiential learning, and disaster response preparation. The identified research themes suggest that emergency preparedness should be understood not merely as the acquisition of emergency-related knowledge but as a multidimensional educational process involving the development of clinical judgment, practical skills, professional competence, and the ability to respond effectively to unexpected healthcare situations.

Experiential learning theory provides a relevant foundation for understanding how nursing students develop emergency preparedness competencies through active participation, practical application, and reflective learning. The prominence of clinical competence, simulation training, and emergency nursing in co-word analysis supports the importance of learning experiences that allow students to apply theoretical knowledge to realistic clinical and emergency scenarios. Through simulation exercises, case-based learning, and supervised clinical experiences, nursing students can strengthen their decision-making, problem-solving, and response capabilities. These educational approaches emphasize the relationship between theoretical instruction and practical competency development, which is essential in preparing future nurses for emergency situations.

Furthermore, Benner's novice-to-expert framework offers a useful perspective for understanding the progressive development of nursing competence. The identified themes involving nursing education, clinical practice, and professional competencies suggest that emergency preparedness requires continuous learning and the progressive development of clinical skills. Nursing students must gradually develop the knowledge, confidence, and judgment necessary to manage complex patient conditions and respond to emergency situations. This perspective reinforces the importance of structured educational experiences, competency assessment, and continuous professional development in preparing nurses for emergency and disaster response.

The findings also highlight the relevance of competency-based education and disaster nursing frameworks in establishing the knowledge and skills required for emergency preparedness. The appearance of disaster planning, emergency nursing, and clinical competence as interconnected research themes indicates that preparedness education should encompass multiple dimensions of emergency management, including prevention, mitigation, readiness, response, and recovery. Integrating these dimensions into nursing education provides a conceptual basis for developing graduates who can contribute to individual patient care, community safety, and coordinated healthcare responses during emergencies.

Additionally, the prominence of nursing students, COVID-19, pandemic, anxiety, and mental health in the co-word analysis highlights the importance of considering psychological preparedness alongside clinical competence. Emergency situations can create significant emotional and professional challenges for nursing students and healthcare personnel. Therefore, theoretical approaches to emergency preparedness should recognize the relationship between clinical readiness, psychological resilience, learning experiences, and professional development. Overall, these findings support a comprehensive theoretical perspective in which emergency preparedness is developed through the integration of experiential learning, competency-based education, clinical practice, and psychological readiness.

Practical Implications

The findings have important practical implications for nursing curriculum development, teaching strategies, clinical training, and competency evaluation. The prominence of nursing education, emergency nursing, clinical competence, disaster planning, and simulation training indicates the need for academic institutions to strengthen the integration of emergency preparedness into undergraduate and continuing nursing education programs. Rather than treating emergency preparedness as an isolated instructional topic, nursing schools should

incorporate relevant competencies across classroom instruction, laboratory activities, simulation exercises, and clinical learning experiences.

For curriculum development, nursing programs should consider systematically integrating disaster preparedness, emergency response, triage, patient safety, resuscitation, infection prevention, crisis management, and disaster planning into relevant nursing subjects. These competencies should be aligned with the expected responsibilities of nurses in emergency departments, hospitals, communities, and disaster-affected settings. Curriculum developers and nursing faculty may also use established disaster nursing competency frameworks to guide the identification of learning outcomes, instructional content, and assessment strategies.

Regarding teaching and learning strategies, simulation-based training and experiential learning should be strengthened to provide students with opportunities to practice responding to realistic emergency situations. Simulated mass casualty incidents, disaster response scenarios, emergency triage exercises, and pandemic-related case studies can help students develop clinical judgment, teamwork, communication, prioritization, and decision-making skills. These approaches also provide opportunities for structured feedback and reflection, allowing students to identify areas for improvement before encountering similar situations in actual clinical environments.

Clinical instructors and nursing educators also have an important role in assessing students' preparedness through competency-based evaluation. Assessment strategies may include simulation performance, objective structured clinical examinations, scenario-based assessments, practical demonstrations, and reflective activities. These approaches can help determine whether students can appropriately apply emergency-related knowledge and perform essential nursing interventions. Furthermore, clinical placements should be complemented by structured emergency preparedness activities because routine clinical exposure may not provide sufficient opportunities to experience large-scale disasters or complex emergency situations.

The findings also emphasize the need to address the psychological and educational needs of nursing students during emergencies and public health crises. Nursing institutions should provide appropriate learning support, mental health resources, stress management activities, and opportunities to develop resilience. The experiences associated with the COVID-19 pandemic demonstrate the importance of maintaining educational continuity and providing alternative learning strategies when conventional clinical placements or face-to-face instruction are disrupted. Academic institutions should therefore establish flexible educational approaches that allow students to continue developing essential competencies during periods of healthcare system disruption.

At the institutional and policy levels, collaboration among nursing schools, hospitals, public health agencies, and emergency management organizations should be strengthened. Partnerships can support the development of coordinated disaster drills, interprofessional simulation activities, clinical training opportunities, and standardized emergency preparedness programs. Nursing educators and healthcare administrators may also use the findings of this study to identify educational priorities, improve institutional preparedness policies, and promote continuing professional development.

Ultimately, strengthening emergency preparedness in nursing education requires a coordinated approach that combines curriculum integration, simulation-based learning, clinical competency assessment, psychological support, and institutional collaboration. By translating these educational priorities into structured and evidence-informed programs, nursing institutions can better prepare for the future and practice nurses to respond effectively to emergencies, disasters, and evolving public health threats.

V. Conclusion, Limitations, and Future Works

Conclusion

This bibliometric analysis provides an overview of the global research landscape on emergency preparedness in nursing education, highlighting the development of scholarly publications, knowledge networks, and emerging research themes. The findings demonstrate that emergency preparedness is a multidimensional area of nursing education that encompasses clinical competence, emergency nursing practice, disaster planning, simulation-based training, experiential learning, and the preparation of nursing students for public health emergencies. The increasing research attention observed in recent years reflects the growing recognition of the importance of preparing the nursing workforce to respond effectively to complex healthcare challenges, including pandemics, disasters, and other emergency situations.

The co-citation analysis revealed interconnected intellectual foundations involving nursing education, professional competency development, clinical learning experiences, qualitative research, and disaster nursing competency frameworks. These connections demonstrate that emergency preparedness is supported by both established educational theories and professional frameworks that emphasize progressive competency development, experiential learning, and the integration of theoretical knowledge with clinical practice. Meanwhile, the co-word analysis identified three major thematic clusters: emergency nursing practice and clinical response; nursing education and professional competencies; and nursing students and pandemic-related preparedness. Collectively, these themes illustrate the relationship between clinical readiness, educational preparation, and the psychological and learning experiences of nursing students during emergencies.

The findings further emphasize the importance of integrating emergency preparedness into nursing curricula through structured educational interventions, simulation-based exercises, supervised clinical experiences, and competency-based assessment. Nursing students must be equipped not only with theoretical knowledge but also with the practical skills, critical thinking, decision-making abilities, communication, teamwork, and psychological readiness necessary to respond to emergencies and disasters. Strengthening these educational components may contribute to developing a competent, adaptable, and resilient nursing workforce capable of addressing evolving healthcare demands.

Overall, this study highlights the importance of advancing emergency preparedness as an integral component of nursing education and professional development. By identifying major research themes, intellectual connections, and areas of scholarly interest, the findings provide a foundation for future investigations, curriculum enhancement, institutional collaboration, and the development of evidence-informed emergency preparedness programs. Continued research in this area is essential to ensure that nursing education remains responsive to emerging public health threats and the increasing complexity of emergency and disaster response.

Limitations and Future Works

Despite its contributions, this study has several limitations that should be considered when interpreting its findings. First, the analysis was based on publications retrieved from the Scopus database. Although Scopus provides extensive bibliographic coverage, relevant studies indexed in other databases, such as Web of Science, PubMed, and CINAHL, may not have been included. Consequently, the findings may not represent the entirety of global research on emergency preparedness in nursing education. Future studies could incorporate multiple bibliographic databases to improve publication coverage and provide a more comprehensive representation of the research landscape.

Second, the analysis was limited to English-language journal articles and reviews published between 2000 and 2026. The exclusion of publications in other languages, conference proceedings, book chapters, and other document types may have resulted in the omission of relevant research contributions. Additionally, publications from 2026 should be interpreted cautiously because the year was still ongoing at the time of data retrieval. Future bibliometric investigations may expand the publication period and document coverage to examine subsequent developments in the field.

Third, the study primarily employed bibliometric performance indicators, co-citation analysis, and author keyword co-occurrence analysis to examine the intellectual and conceptual structures of the literature. Although these methods provide valuable insights into publication patterns, knowledge networks, and research themes, they do not fully capture the methodological quality, practical effectiveness, or educational outcomes of individual studies. Furthermore, keyword variations, differences in terminology, and inconsistencies in bibliographic records may influence the formation and interpretation of network clusters.

Thematic evolution analysis, co-word dynamics, and topic dendrograms were not included in the present study. These additional techniques could have provided a more detailed understanding of how research themes have developed, converged, or changed over time. Their inclusion in future investigations may offer deeper insights into the progression of emergency preparedness research and the emergence of new educational priorities. Future studies may also employ systematic reviews, meta-analyses, and qualitative evidence synthesis to complement bibliometric findings and evaluate the effectiveness of specific educational interventions.

Future research should particularly focus on the development and evaluation of competency-based emergency preparedness curricula, simulation-based disaster response training, and standardized assessment tools for measuring nursing students' knowledge, skills, attitudes, and readiness. Further investigation is also needed into the integration of disaster nursing competency frameworks into undergraduate nursing programs, the role of clinical placements in developing emergency response capabilities, and the effectiveness of interprofessional emergency preparedness education. Additionally, greater attention should be given to psychological preparedness, resilience, and educational continuity during pandemics and other public health emergencies.

Expanding international research collaboration may also strengthen the global knowledge base by encouraging the exchange of educational strategies, competency frameworks, and evidence-based preparedness practices across different healthcare and academic settings. Comparative studies involving countries with different levels of disaster exposure, healthcare resources, and nursing education systems may provide valuable insights into context-specific approaches to emergency preparedness. Ultimately, future research should move beyond identifying publication trends and research networks toward evaluating how evidence-based educational strategies can improve nursing preparedness and contribute to safer, more responsive healthcare systems.

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Ethical Compliance

This bibliometric study utilized published bibliographic records and did not involve direct participation of human subjects, collection of identifiable personal information, or experimental procedures. Therefore, formal

ethics approval was not required, subject to applicable institutional policies. Ethical research practices were observed through appropriate acknowledgment and citation of original publications, accurate reporting of bibliographic data, and responsible interpretation of the findings.

Data Access Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request and subject to applicable data access conditions.

Conflict of Interest Declaration

The authors declare that they have no competing interests.

Author Contributions

The authors contributed to the development of the research topic, study conceptualization, and manuscript preparation. Literature retrieval, bibliographic data collection, and data analysis were conducted by designated members of the research team. All authors contributed to the interpretation of findings, manuscript writing, critical revision, and approval of the final manuscript.

REFERENCES

[1] Abou Hashish, E., & Banoona, R. (2022). Disaster nursing and disaster preparedness: An investigation of nursing students' knowledge, competence and attitudes. *Nursing Management*. https://doi.org/10.7748/nm.2022.e2058

[2] Callon, M., Courtial, J.-P., Turner, W. A., & Bauin, S. (1983). From translations to problematic networks: An introduction to co-word analysis. *Social Science Information, 22*(2), 191–235. https://doi.org/10.1177/053901883022002003

[3] Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

[4] Hill, P. P., Díaz, D. A., & D'Amato-Kubiet, L. A. (2025). Disaster! The effects of a large-scale simulation on nursing students' disaster competence. *Journal of Nursing Education, 64*(4), 217–226. https://doi.org/10.3928/01484834-20241125-01

[5] Hung, M. S. Y., Lam, S. K. K., Chow, M. C. M., Ng, W. W. M., & Pau, O. K. (2021). The effectiveness of disaster education for undergraduate nursing students' knowledge, willingness, and perceived ability: An evaluation study. *International Journal of Environmental Research and Public Health, 18*(19), 10545. https://doi.org/10.3390/ijerph181910545

[6] International Council of Nurses. (2019). *Core competencies in disaster nursing: Version 2.0*. https://www.icn.ch/resources/publications-and-reports/core-competencies-disaster-nursing-version-20

[7] Kang, J.-S., Lee, H., & Seo, J. M. (2023). Relationship between nursing students' awareness of disaster, preparedness for disaster, willingness to participate in disaster response, and disaster nursing competency. *Disaster Medicine and Public Health Preparedness, 17*, e220. https://doi.org/10.1017/dmp.2022.198

[8] Kaviani, F., Aliakbari, F., Sheikhbardsiri, H., & Arbon, P. (2022). Nursing students' competency to attend disaster situations: A study in Western Iran. *Disaster Medicine and Public Health Preparedness, 16*(5), 2044–2048. https://doi.org/10.1017/dmp.2021.263

[9] Koca, B., & Arkan, G. (2020). The effect of the disaster management training program among nursing students. *Public Health Nursing, 37*(5), 769–777. https://doi.org/10.1111/phn.12760

[10] Longo, B. M. (2022). Earthquake preparedness and knowledge of recommended self-protective actions: A survey of nursing students. *Disaster Medicine and Public Health Preparedness, 16*(2), 495–499. https://doi.org/10.1017/dmp.2020.422

[11] McCain, K. W. (1990). Mapping authors in intellectual space: A technical overview. *Journal of the American Society for Information Science, 41*(6), 433–443. https://doi.org/10.1002/(SICI)1097-4571(199009)41:6<433::AID-ASI11>3.0.CO;2-Q

[12] Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ, 372*, n71. https://doi.org/10.1136/bmj.n71

[13] Park, Y. M., & Hwang, W. J. (2024). Development and effect of a simulation-based disaster nursing education program for nursing students using standardized patients. *Journal of Nursing Research, 32*(1), e314. https://doi.org/10.1097/JNR.0000000000000596

[14] Phan, Q., Geller, D. E., Broughton, A. S., & Swan, B. A. (2023). Evaluating a low-cost disaster preparedness simulation for prelicensure nursing students. *Disaster Medicine and Public Health Preparedness, 17*, e343. https://doi.org/10.1017/dmp.2022.280

[15] van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics, 84*(2), 523–538. https://doi.org/10.1007/s11192-009-0146-3

[16] Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429–472. https://doi.org/10.1177/1094428114562629