Analysis of hot spots and frontiers of nursing scenario simulation teaching research at home and abroad

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Abstract

Objective: To analyze the research hotspots and trends of nursing scenario simulation teaching at home and abroad, and to provide reference for future nursing talent education. Methods: CNKI and Web of Science databases were searched. From the establishment of the database to April 2022, relevant literature on nursing scenario simulation teaching research at home and abroad was retrieved, and Cite Space software was used for visual analysis. Results: The research focus on China was the application and application effect of nursing scenario simulation teaching. The research hotspots abroad are the quality evaluation, reliability and influence of nursing scenario simulation teaching. Conclusion: The research and development of nursing scenario simulation teaching gradually tend to be systematic.

1 Introduction and background

According to the National Plan for the Development of Nursing (2021–2025), to meet the people's growing health needs and achieve a "healthy China", nurse training should be strengthened and the nursing workforce expanded. The state and medical schools are actively organizing vocational skills competitions and using scenario-based simulation to improve the comprehensive training of nursing students. Using

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case studies, role plays and simulators, guide students in applying multidisciplinary knowledge and solving real clinical problems to achieve specific teaching objectives are referred to as situational simulation teaching (e.g., Chimpololo, A., 2021). Scenario-based learning has been shown in studies to improve students' thinking skills, communication skills, and emergency response skills, as well as help them better adapt to their future clinical work (e.g., Gao, Q.Y et al., 2022). This study aims to analyze the current situation and trends in nursing simulation teaching at home and abroad to provide a reference for future nursing teaching in China.

2 Data and methods

2.1 Data sources

The data sources were CNKI China Journal Full Text Database and Web of Science (WoS) core collection, with "comprehensive scenario simulation teaching", "scenario simulation teaching", "Comprehensive scenario-based teaching", "Scenario-based teaching", "Standardised patient scenario-based teaching", "Case study teaching", "Nursing Practical training", "Integrated practical training in nursing", and "Scenario simulation teaching". The Chinese literature search yielded 2034 articles, which were screened and included 416 articles; the English literature search yielded 1862 articles.

2.2 Research Methodology

This study used Cite Space software as a research tool to conduct a scientometric analysis of the literature in a specific field to predict and summarize future directions. A Java-based information visualization tool called Cite Space uses co-citation analysis and a path finding algorithm to gauge the body of literature on a certain topic. It measures the literature in a particular field using co-citation analysis and a pathfinding network algorithm to identify the major knowledge inflection points and paths of the discipline's evolution, analyze potential dynamic mechanisms underlying this evolution, and identify the frontier of the discipline's development through a series of visual maps. The project will also be utilized to investigate the main disciplinary development trajectories and associated knowledge inflection points.

The literature data was imported into the Cite Space software (5.8.R3), and the relevant settings panel parameters were set: "Time Slicing": 2005–2022; "Years Per Slice":1; "Term Source": Title, Keywords Plus; "Node Types": keyword, "Pruning": Pathfinder, pruning sliced networks, pruning the merged network. Keyword knowledge mapping and analysis, research hotspots, and literature frontiers.

2.3 Evaluation of the literature's quality

To ensure the quality of the assessment of the literature, two postgraduate students reviewed the retrieved literature simultaneously and independently, excluding 2061 articles (1618 in Chinese and 443 in English) that did not match the theme. Where there was disagreement in the literature, a third party was consulted and a consensus

was reached. Finally, 416 Chinese documents and 1862 English documents were included.

3 Findings

3.1 An examination of the number of publications

The number of articles published in the field of domestic scenario-based teaching and learning research is on the rise, peaking at 42 in 2018. Only 8 articles were published in 2022, probably because the search was less than one year old. indicating that research on scenario-based simulation teaching and learning has gradually piqued the interest of Chinese scholars. See Table 1 for details.

Nursing simulation education has been the subject of an upsurge in foreign-language articles. It climbed from 34 articles in 2005 to 134 items at its peak in 2021, which included a gain of 29 articles between 2016 and 2017. As a result, we should use international research hotspots and frontiers to inform domestic research on nursing simulation teaching and learning. This suggests that pertinent research by foreign scholars predates that in China. See Table 2.

Table 1 The number of articles published on nursing scenario simulation teaching at home

Year	Chinese literature(Article)	Year	Chinese literature(Article)
2005	1	2014	36
2006	1	2015	25
2007	3	2016	39
2008	3	2017	33
2009	8	2018	42
2010	11	2019	39
2011	17	2020	32
2012	18	2021	27
2013	21	2022	8

Table 2 The number of articles published on nursing scenario simulation teaching at abroad

Year	English literature(Article)	Year	English literature(Article)
2005	34	2014	82
2006	42	2015	84
2007	45	2016	87
2008	51	2017	115
2009	51	2018	111
2010	70	2019	117
2011	68	2020	134
2012	67	2021	145
2013	70	2022	35

Table 3 Top 10 domestic high frequency keywords

Frequency	Keyword	Centrality	Keyword
33	Practical Training	0.49	Case Studies
23	Scenario simulation	0.43	Application Effect
9	student nurses	0.31	Scenario simulation
8	Teaching	0.26	student nurses
8	Case Studies	0.22	Practical training
8	Teaching methods	0.2	Teaching methods
7	Application Effect	0.2	Midwifery
6	Applications	0.18	Practical training
6	Experimental teaching	0.18	Evidence-based nursing
6	Practical teaching	0.16	Teaching

3.2 Keyword analysis

3.2.1 High-frequency keywords

Set "Threshold" to Top 50 in the software's parameter selection panel, then click "Node Types": Keyword. The size of the nodes in the graph reflects the frequency of keywords. By clicking on the "Network Summary Table", a table of specific keyword parameters was obtained, and the top 10 keywords in terms of frequency and centrality were compiled. The top 10 domestic frequency keywords were: Practical Training, Scenario simulation, student nurses, Teaching, Case Studies, Teaching methods, Application Effect, Applications, Experimental teaching, Practical teaching. The top 10 domestically-centric keywords are Case Studies, Application Effect, Scenario simulation, student nurses, Practical training, Teaching methods, Midwifery, Practical training, Evidence-based nursing, Teaching. See Table 3.

The top 10 foreign frequency keywords are standardized patient, care, education, skill, performance, medical education, communication, competence, Communication skill, Medical student. The top 10 keywords for foreign centrality are resident, care, simulated patient, education, performance, 4th year student, communication, skill, medical student, management. See Table 4.

3.2.2 Keyword dynamic frontier changes

To learn more about the keywords, open the Control Panel and select the Layout-Timeline View. It is generally accepted that Q>0.3 indicates a significant clustering structure and S>0.7 indicates that the clustering is convincing. In this study, the Q value of the Chinese literature map is 0.8196 and the S value is 0.9477, while the Q value of the English literature map is 0.7448 and the S value is 0.8851. The labels of each cluster are the keywords in the co-occurrence network, and these keywords are distributed in the clusters to which they belong according to the year in which they

Table 4 Top 10 foreign high-frequency keywords

Frequency	Keyword	Centrality	Keyword
370	standardized patient	0.34	resident
165	care	0.33	care
165	education	0.27	simulated patient
161	skill	0.26	education
136	performance	0.26	performance
124	medical education	0.22	4th year student
107	communication	0.18	communication
107	competence	0.16	skill
105	Communication skill	0.16	medical student
103	Medical student	0.16	management

appear in the corresponding time, demonstrating the development of the keywords in each cluster.

Scenario-based simulation, teaching methods, case teaching, nursing students, teaching, practice teaching, nursing practice, practical training teaching, pbl, and operational teaching were the top ten Chinese keywords. The English keywords are organized into nine major clusters: standardized patient, performance, management, medical student, quality measurement, primary care, and reliability, primary care, dependability, result, and communication abilities.

3.2.3 The emergent keywords

Emergent words are generated using mutation detection techniques and represent hot words in a research area and can be used to identify research hotspots and trends in that area. Click on "Burstness" in the Control Panel and run the Cite Space software. Sorted by mutation intensity, the mutation time of each emergent word was sorted and summarized, and the top 25 emergent keywords were extracted to obtain the emergent words in the field. The table shows the emergent words of the national study. Practical training in midwifery, Senior High School, Surgical nursing, and so on are the most intense buzzword of 2016–2017. Practical Skills, and Teaching Reform for the current phase of hot words. See Table 5.

The most intensively studied emergent words abroad are performance, clinical competence, and structured clinical examination. Future research trends in nursing scenario-based simulation teaching are validity, impact. See Table 6.

4 Discussion

4.1 An examination of research hotspots and frontiers in nursing simulation teaching in China

4.1.1 Nursing scenario simulation teaching

Combining high-frequency keywords and emergent words, it can be seen that scenario simulation teaching is gradually being applied to various aspects of nursing teaching, such as evidence-based nursing, medical and surgical nursing, practical

Table 5 Domestic emergent words

Emergent words	Strength	start and end time
Practical training in midwifery	0.96	2016–2016
Senior High School	0.96	2016–2016
Secondary nursing students	0.55	2016–2017
Operating theatre	0.55	2016–2016
Teaching effectiveness	0.54	2016–2016
Surgical nursing	0.99	2017–2017
Psychological practical training	0.49	2017–2017
Case library	0.49	2017–2017
Competencies	0.49	2017–2017
Human care	0.49	2017–2017
Nursing staff	0.49	2017–2017
University students	0.49	2017–2017
Bachelors	0.49	2017–2017
Hands-on	0.49	2017–2017
Practical Skills Training	0.49	2017–2017
Case guidance	0.49	2017–2017
Scenario-based teaching	0.49	2017–2017
Quality Care	0.49	2017–2017
Qualitative research	0.49	2017–2017
First aid competencies	0.49	2017–2017
Microlearning	0.9	2018–2019
Teaching Nursing	0.9	2018–2019
Higher Education	0.6	2018–2019
Practical Skills	0.5	2018–2019
Teaching Reform	0.5	2018–2019

teaching, and practical training. Gao, Q.Y (e.g., Gao, Q.Y et al., 2022) et al. used situational simulation teaching to teach internal medicine nursing and conducted an operational assessment, theoretical knowledge assessment, and questionnaire survey at the end of the course; the results showed that all of the experimental group's scores were higher than those of the control group. The results of the questionnaire survey revealed that the situational simulation teaching method was well-liked by the students. Guo S. Y. et al. (e.g., Guo S. Y et al., 2021) used this method in comprehensive practical nursing training, in which students were allowed to take corresponding nursing measures through the computer under the progressive development of a pre-defined scenario while being guided by a simulated environment and a simulated patient. Zhang, S (e.g., Zhang, S., 2022) used it to teach pediatric nursing. With more health and health-care awareness people have, more nursing staff are needed. And the professional competence of nursing is required to be higher, so it is very important to gain basic knowledge for nursing students via education. Nursing students' interest in learning can be more effectively stimulated through scenario-based simulation exercises with multidisciplinary collaboration to improve their comprehensive nursing skills and adapt to clinical work as soon as possible.

Table 6 Foreign emergent words	Emergent words	Strength	start and end time
	performance	9.65	1991–2002
	clinical competence	8.61	1991–2007
	simulated patient	5.23	1991–2000
	resident	6.92	1993–2004
	internal medicine	5.22	1993–2002
	competence	5.37	1997–2006
	structured clinical examination	9.84	1999–2005
	osce	5.68	2000–2006
	student	5.06	2002–2008
	physician	5.46	2003–2011
	behavior	4.91	2004–2010
	primary care	5.07	2005–2009
	satisfaction	4.63	2007–2009
	Risk	6.82	2008–2014
	curriculum	5.83	2008–2015
	patient safety	4.41	2013–2016
	health care	4.49	2014–2018
	simulation	6.85	2015–2022
	program	6.35	2015–2017
	validity	4.16	2015–2019
	perception	6.77	2017–2020
	nursing education	7.7	2018–2022
	nursing student	4.43	2018–2022
	impact	8.69	2019–2022
	united states	4.46	2020–2022

4.1.2 Nursing scenario simulation teaching's application effect

Under the impetus of the nursing professional skills competition, scenario simulation has been gradually implemented in various nursing teaching sessions to increase classroom interest while also improving students' overall practical ability. Wang, M et al. (e.g., Wang, M et al., 2019) used situational simulation teaching on 50 nursing students' practical training in acute and critical care, and the results showed that the experimental group outperformed the traditional teaching mode group in operational examinations and independent learning ability ($P<0.05$). The same conclusions as Radhamani, R et l (e.g., Radhamani, R.,2021). Zhang, S (e.g., Zhang, S., 2022) conducted situational simulation teaching and traditional teaching for 142 students, with the results indicating that the performance and teaching satisfaction of the situational simulation teaching group was significantly higher than that of the traditional teaching group ($P<0.05$). In a specific simulation situation, students were allowed to integrate in a role-playing manner to deepen their understanding of basic knowledge and perceptual understanding of operational skills in an immersive manner, and to improve their clinical thinking and problem-solving skills, whereas the traditional teaching mode neglected to cultivate students' clinical thinking and communication skills in comprehensive nursing practical training.

4.2 Analysis of hot spots and frontiers in foreign research on nursing simulation teaching

4.2.1 Quality evaluation of nursing simulation teaching

Few relevant studies have been conducted in China, and foreign scholars are also in the exploratory stage. Paige, J. T et al. (e.g., Paige, J. T et al., 2021) used the teamwork assessment scale to assess the teamwork ability of students participating in simulation training. Abe, Y et al. (e.g., Abe, Y et al., 2013) used the teamwork activity inventory to assess students' non-technical skills. Meanwhile, some scholars pointed out that satisfaction and confidence are valid indicators for measuring the teaching of scenario-based simulations (e.g., Carter, O et al., 2016). While domestic scholars Guo S. Y et al. (e.g., Guo S. Y et al., 2022) used a fuzzy comprehensive evaluation method to assess the teaching quality of nursing scenario simulation practical training. Yang, J et al. (e.g., Yang. J et al., 2016) and others constructed an evaluation index system involving teachers, students, and teaching contents. The evaluation content includes theoretical performance, operational performance, competency assessment (teamwork, patient communication), satisfaction, and objective structure clinical examination (OSCE), but a complete and accepted quality evaluation system has yet to be formed.

4.2.2 Nursing simulation teaching dependability

Nursing graduates who enter clinical work must deal with a wide range of complex clinical cases. Situational simulation teaching can help students develop their comprehensive nursing and problem-solving skills, as well as their interdisciplinary comprehensive application of knowledge, laying the groundwork for the development of new types of applied talents. A meta-analysis found that simulation teaching improves students' knowledge, skills, and interest in undergraduate nursing education (e.g., Li, Y. Y et al., 2022). It is more interesting than traditional teaching methods, and teachers can use it in future lessons based on the situation. Tseng, L. P et al. (e.g., Tseng, L. P et al., 2021) conducted simulation training with 120 senior nursing students, and the experimental group demonstrated a significant improvement over the previous year's performance as well as increased situational awareness among nursing students. Furthermore, Rubbi, I (e.g., Rubbi, I et al., 2016) used learning satisfaction, self-confidence scales, self-administered questionnaires, and an overall satisfaction survey to implement a scenario-based simulation with 51 junior nursing students and discovered that students were highly motivated. Non-traditional teaching modes are more motivating, gradually improve students' hands-on skills, develop clinical thinking skills, and increase students' competitiveness for employment after graduation.

4.2.3 Nursing scenario-based simulation teaching's impact

Many medical universities have failed to teach practical training face to face due to the impact of the Covid-19, and simulation training has become one of the best teach-

ing methods during that time. Lee, J., & Son, H. K (e.g., Lee, J., & Son, H. K., 2022) conducted simulation training in obstetrics for 47 nursing students in Korea and investigated the effect of the training using questionnaires before and after the course, revealing that the experimental group's communication attitude improved significantly after the simulation training. The study also found that this teaching method could improve nursing students' clinical judgment (e.g., Ayed, A et al., 2022). A systematic evaluation (e.g., Lei, Y. Y et al., 2022) showed that scenario-based simulation has a strong effect on nursing education, helping nursing students to increase their knowledge base, enhance their professional skills and develop critical thinking skills and communication skills. In a complete scenario simulation, students apply all the theoretical knowledge they have in a practical problem and make nursing measures applicable to that scenario, deepening their understanding of theoretical knowledge and their perceptual understanding of operational skills. In future research, a library of typical clinical cases can be constructed for easy application by teachers in various universities to promote teaching and learning.

5 Summary

This paper examines the hotspots of nursing scenario simulation teaching research in China and abroad, with a focus on application and application effect research in China and quality evaluation, reliability, and impact research in the rest of the world. The traditional teaching mode can no longer meet the needs of students, as a result of teaching reform and societal needs, and it has become necessary to explore new methods, of which scenario simulation teaching meets the requirements. The following studies, when combined with the results of the software analysis, can be used as follow-up studies: (1) developing an evaluation system for nursing scenario simulation teaching; (2) developing a library of typical clinical cases; and (3) delving deeply into the effects and influencing factors of nursing scenario simulation teaching application.

Data Availability Datasets are available through the corresponding author upon reasonable request.

Declarations

Conflict of Interest There have been no conflicts of interest.

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