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The hotspots and trends of nursing master's education in China: a bibliometric analysis from 2000 to 2022

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Abstract

Background Graduate nursing education is the main way to train high-quality nursing personnel. Globally, the nursing education system has been gradually improved, forming a multi-level, multi-channel, and multi-specification education system including secondary, specialized, undergraduate, and postgraduate.

Objective To analyze the research hotspots and trends of nursing postgraduate education in China by using bibliometric methods, and to provide reference for scholars at home and abroad to understand the current status of this field.

Methods Literature related to graduate nursing education was searched in the Chinese full-text journal database (CNKI) from January 2000 to May 2022 and analyzed using CiteSpace software.

Results A total of 998 kinds of literature were included, with a growing trend in the number of articles issued. The research hotspots and trends of nursing graduate education in China are clinical practice, cultivation mode, and core competence.

Conclusion Chinese nursing graduate education is improving. Foreign experience should be drawn upon, combined with the hotspots and trends summarized in this study, to promote the development of nursing graduate education in China.

Keywords Nursing education, Master degree, Nursing, Research, Hot topics, Visual analysis

Introduction

To develop top-notch nursing talent, graduate nursing education is the primary approach. With the gradual improvement of the nursing education system worldwide, secondary, specialized, undergraduate, and postgraduate education now includes a multi-level, multi-channel, and multi-specification education system [1].

Graduate nursing education abroad originated in 1950, while in China it began in 1992 [2, 3]. Regarding training objectives, curriculum, and assessment techniques, there are substantial distinctions between the two.

The cultivation aim is the first. High-level, specialized, applied nurses who possess specific scientific research skills and are capable of engaging directly in

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clinical nursing practice are the kind of people China hopes to develop [4]. The goal of nursing education in the US is to produce experts who possess a high degree of theory and practice in a specific specialty or disease [5].

The curriculum is the next item. In the United States, Australia, and Canada, MSN studies last 1.5–2 years; in China, the last 3 years [6]. The curriculum in the US is modular and consists of basic courses, advanced practice core courses, and specialized courses [7]. Under China's credit system, students must complete restricted electives, clinical competency training, required public courses, required specialized courses, academic activities, and dissertations [8].

Evaluation of the course comes last. Colleges and universities in the UK have a great deal of autonomy when it comes to postgraduate education, and they can arrange for their specialists to perform quality evaluations [2]. Among the most prominent bodies for evaluation are the Nursing and Midwifery Council, the Quality Assurance Agency for Higher Education, and the National Department of Health [9].

Based on higher education institutions' self-evaluations and with government backing, the U.S. graduate education quality assessment system is defined by social evaluation as its central component. This encompasses the National League for Nursing Education Assessment Committee, the Council on Nursing Education, and more assessment agencies [10].

China has formed a three-tier quality management and guarantee system, including the Academic Degrees Committee of the State Council, provincial academic degrees committees, and degree-granting institutions. The quality evaluation institutions for medical graduate education are the Ministry of Education and the National Health and Planning Commission, which have high authority. However, there is no independent quality evaluation organization for nursing higher education.

However, with the development of research and practice related to nursing graduate education in China, and the establishment of nursing as a secondary discipline in 2024, it is evident that the nursing education system in China is improving. Analyzing the current research hotspots of nursing graduate education in China through bibliometric methods can help scholars at home and abroad understand the current status of related research in China, and provide a reference basis to promote the globalization connection of nursing graduate education and the further development of the discipline. Research hotspots refer to issues, directions, or topics in a particular discipline or field that are currently attracting widespread attention and research [7].

Methods

Data sources

From January 2000 to May 2022, we searched the Chinese Journal Full Text Database (CNKI) using the theme terms “Nursing” “Master Degree” “Education” and “Training”.

Inclusion criteria: (1) Literature related to the research topic “Master's Degree Education in Nursing”; (2) The language of publication was Chinese.

Exclusion Criteria: (1) The type of study was English review, bibliometric study, dissertation, conference paper, institution profile, etc.; (2) The research topic was undergraduate nurse education, continuing education for nurses, and so on; (2) There were no keywords; (3) Full text is not available.

Literature quality assessment

To ensure the quality of the literature assessment, two postgraduate students independently reviewed the literature searched at the same time. If there were any discrepancies, they were noted. Literature screening was carried out independently by two researchers and in case of disagreement, a consensus was reached after consulting a third researcher. 220 documents that did not pertain to the topic were removed from the original 1218 documents, leaving 998 materials that did. The literature screening process is shown in Fig. 1.

Data analysis

In this study, CiteSpace software was used as a research tool to scientifically analyze the literature in a specific field to predict and summarise future directions. Several studies have demonstrated the good validity of this method [11, 12].

It uses co-citation analysis and pathfinding network algorithms to measure the literature in a specific field to identify the main knowledge inflection points and paths of the evolution of the discipline, to analyze the underlying dynamic mechanisms, and to identify the frontiers of the development of the discipline through a series of visual maps [13].

Setting panel-related parameters to map knowledge mapping and analysis of keywords, research hotspots and literature frontiers. Setup as follows: “Time Slicing”: 2000–2022; “Year PerSlice”: 1; “Term Source”: Title, Keywords Plus; “Node Types”: keyword, “Pruning”: Pathfinder, pruning sliced networks, pruning the merged network.

Results

Publication and trend number

This study includes 998 papers for analysis, with the number of articles published increasing from 1 in 2001 to a maximum of 105 in 2020, with an overall tendency

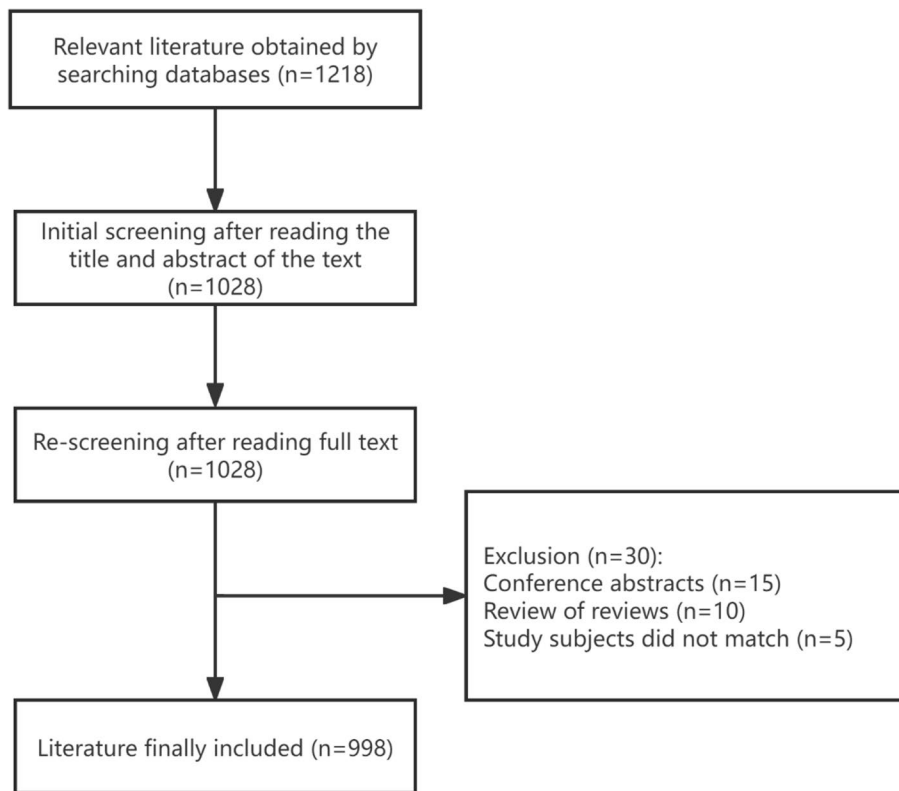


Fig. 1 Literature screening flowchart

toward growth. In 2022, only 10 articles were published, most likely due to the short search duration. It demonstrates how nursing academics have begun to pay more attention to master’s degree nursing education in China. See Fig. 2.

High-frequency keywords

The essential terms for an article’s subject matter are its keywords, and high-frequency keywords are frequently used to pinpoint trending topics within a field of study [14]. Research hotspots are identified by the high frequency of keywords; centrality, a measure of a node’s value in a network, is utilized to find and assess the literature’s importance [15]. The graph’s nodes’ sizes,

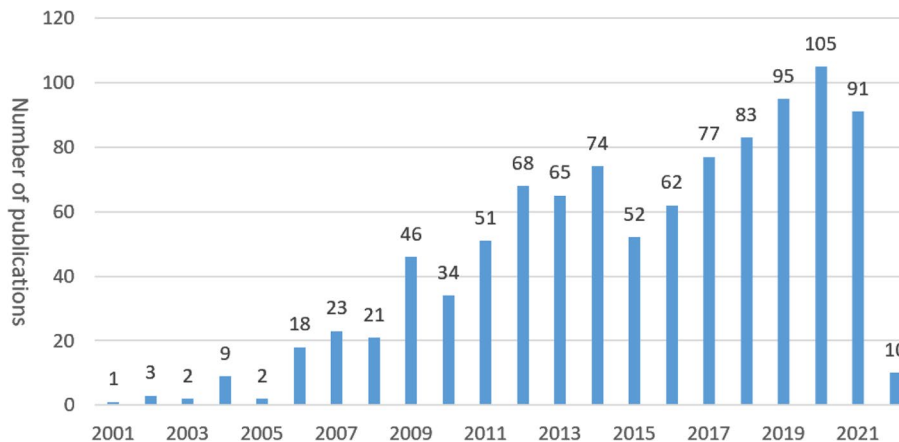


Fig. 2 Number of papers published per year based on CNKI Database using CiteSpace, China, 2022

which are proportionate to the frequency of the keywords, show how frequently the terms occur. In other words, a word's importance increases with its centrality, meaning that a word with more nodes will occur more frequently [16].

By combining the top 10 frequency and centrality of the top 10 keywords, clicking "Network Summary Table" will give you the keyword table's precise specifications. In this study, we remove the keywords that cannot reveal the research hotspots such as professional degree, nursing, postgraduate, master's degree in nursing, master's degree in nursing, master's degree, cultivation, and so on, and we get the high-frequency keywords with the top 10 frequency rankings. Consult

Table 1 Keywords frequency and centrality based on CNKI database using CiteSpace, China, 2022

Frequency	Keywords	Centrality	Keywords
57	Clinical Practice	0.66	Core competence
55	Training Model	0.55	Specialist education
53	Core competence	0.31	Delphi Method
42	Curriculum	0.3	Qualitative research
34	Qualitative Research	0.2	Health Education
32	Influencing Factors	0.18	Training
28	Health Education	0.17	Curriculum
25	Nurse Specialist	0.16	Training Models
23	Delphi Method	0.16	Nursing Management
15	Training Objectives	0.15	Influencing Factors

Table 1; Fig. 3. The corresponding English words in Fig. 3 are shown in Table 2.

Keyword clustering

By clustering the keywords, the degree of closeness between the keywords is demonstrated, which can indicate the research hotspot or direction. The keyword clustering in this study uses the Relative Likelihood Ratio (LLR) algorithm with 203 nodes, 217 connecting lines, and a network density of 0.0106. The keywords form a total of 12 cluster labels. The smaller values of the labels indicate that the cluster contains more keywords. Most of the cluster names were taken from the high centrality words in each cluster, and the research themes represented by the clusters presented the development pattern and main research directions of Chinese master's degree nursing students.

Twelve clusters in total were created, in the following order: core competencies, nursing school, Delphi method, education, nursing education, nursing, model of training, health education, professional degree, curriculum, master's degree, and qualitative research.

Highlighting keywords

A burst word is a word that refers to a change in the level of attention given to a topic in the field of research over a specific period. Words with high emergent intensity (burst value) represent the frontiers of that period. Research frontiers are specific to a particular field of research, at a particular time. As the most active element of the research field, research frontiers help to grasp the



Fig. 3 Keywords frequency and centrality based on CNKI Database using CiteSpace, China, 2022

Table 2 English word description in Fig. 3

Chinese	English	Chinese	English
护理	Nursing	专科护士	Specialist Nurses
研究生	Postgraduate	德尔菲法	Delphi Method
教育	Education	硕士	Master's Degree
专业学位	Professional Degree	护理专业	Nursing
护理教育	Nursing Education	培养目标	Training Objectives
护理学	Nursing Science	培养	Training
护理硕士	Master of Nursing	护理学院	School of Nursing
临床实践	Clinical Practice	培养方案	Cultivation program
培养模式	Cultivation Mode	综述文献	Review of Literature
核心能力	Core Competence	临床能力	Clinical Competence
课程设置	Curriculum	科研能力	Research Competence
质性研究	Qualitative Research	护士	Nurses
影响因素	Influencing Factors	课程	Courses
健康教育	Health Education	医科大学	Medical University

future research direction and development trend of the subject area and support the theoretical sublimation of academic research.

Click “Business” in the Control Panel and run CiteSpace software. Sort the keywords according to the mutation intensity and summarise the mutation time of each mutated word to extract the top 25 keywords in terms of mutation intensity. The table shows that Cultivation objectives, cultivation mode, core competence, evaluation index, and index system are the most popular keywords from 2008 to 2014. Specialist nurses and curriculum are the most popular keywords in the current stage. See Table 3 for details.

Discussion

Research hotspot 1: clinical practice

Using a combination of emerging terms and high-frequency keywords, it is evident that research on Chinese master’s degree nursing programs has gradually shifted toward clinical practice. While master’s degree nursing programs in Australia require students to complete 6–8 months of clinical practice, in China, this requirement is 18 months [17, 18]. Several domestic and international universities have created online virtual simulation teaching platforms to enhance students’ clinical practice during the novel coronavirus pneumonia epidemic [19, 20].

The perceived clinical competence of 188 nursing students increased significantly ($P < 0.05$) throughout the course of a 2-day intervention led by Fung et al. [20] using a virtual simulation instruction tool. A study by Saukoriipi et al. [21] utilizing the Clinical Learning Environment, Supervision, and Nurse Teacher scale revealed that clinical practice has an impact on students’ performance

Table 3 Prominent keywords based on CNKI database using CiteSpace, China, 2022

Keywords	Strength	Start and end time
Nursing science	5.56	2003–2011
Nursing education	2.14	2004–2007
Training	2.21	2006–2009
Nursing specialism	3.45	2008–2010
Nursing	2.53	2008–2009
Training objectives	2.52	2008–2013
Overview literature	3.39	2009–2011
Nursing talent	2.51	2009–2010
Comparative studies	2.36	2009–2011
Core competencies	2.45	2010–2011
Evaluation indicators	2.18	2010–2012
School of nursing	4.23	2011–2013
Medical university	4.16	2011–2013
Indicator systems	3.6	2011–2014
Community nursing	3.46	2011–2012
Training model	3.16	2014–2016
Research capacity	2.21	2014–2016
Professional degree	4.2	2016–2017
Training programmes	3.4	2016–2018
Health education	2.26	2016–2020
Specialist nurse	4.17	2017–2022
Quality of life	2.67	2019–2022
Training	2.59	2019–2020
Older people	3.14	2020–2022
Courses	2.46	2020–2022

in clinical learning. The study involved 2608 students from a Finnish university who completed the questionnaire survey.

Meanwhile, the results of a cross-sectional study of 205 nurse practitioners in China showed that clinical practice was strongly associated with students’ core competencies ($P < 0.05$) [22]. Results of a scoping review that included 45 studies showed that clinical practice increased students’ work readiness [23]. Therefore, clinical practice should be emphasized in postgraduate nursing students to provide a good integration of theory and practice to improve students’ nursing skills.

Research hotspot 2: cultivation mode

Combining high-frequency keywords and emerging terms, it is clear that Chinese nursing master’s degree students are gradually focusing on their cultivation mode. Cultivation refers to the process of implementing talent education under the guidance of certain modern educational theories and educational ideas, by specific cultivation objectives, with relatively stable teaching content

and curriculum system, management system, and assessment methods [24].

Using expert symposiums and clinical research, Lan et al. [25] created a curriculum system that combines theory and practice (theoretical courses, professional practice, and dissertation). They then used an objective competence evaluation system to assess the impact of the program on 54 postgraduate nursing students and discovered that the cultivation program was both scientific and practical, significantly contributing to the development of professional practice competence ($P < 0.05$). With an integrated practical training teaching model based on the core competencies of advanced practice nurses as the leading model, Fan et al. [26] intervened with 248 nursing postgraduate students. The results demonstrated that the experimental group outperformed the control group in practical training and teaching satisfaction ($P < 0.01$).

A meta-analysis of seven randomized controlled studies involving 639 nurses found that the competency-based training paradigm improved work competence [27]. Farokhzadian et al. [28] used the Verrinder model to develop a cultural care training program for nursing students. A pilot study with 73 students found that the program improved cultural competence ($P < 0.05$). Both domestic and foreign countries are constantly doing in-depth research and practice to nurture high-level nursing talents with strong professionalism and professional understanding.

Research hotspot 3: core competence

By combining keywords with emergent words, it is possible to observe that relevant research on Chinese master's degree nursing students gradually focuses on core competence, which is defined as the set of skills, knowledge, attitude, interpersonal communication, and sense of responsibility that master's degree nursing students gradually accumulated during the process of education and teaching. These competencies cover not only basic professional knowledge and clinical practice ability, but also critical thinking, research ability, teaching ability, management ability, and intercultural communication ability [29].

Jokiniemi et al. [30] found that there were variations in the core competencies of nurses in the patient, nursing, organizational, and academic domains ($P < 0.05$) after using the Clinical Nurse Competency Questionnaire to administer an online survey to 184 nurses from three nations: Finland, Denmark, and Iceland. Using a modified version of the Professional Nurse Self-Assessment Scale of clinical core competencies (PROFNurseSASII), Wangenstein et al. [31] conducted a cross-sectional survey with 97 postgraduate nursing students from five different countries and discovered that their capacity for

accepting accountability and working with other medical professionals. The greatest ratings went to cooperation and following professional ethics.

Wang et al. [32] conducted a questionnaire survey on 1120 nursing students using the Chinese Registered Nurse Core Competency Scale, which showed that the total core competency score of the nursing students was (176.55 ± 43.95), which was at a moderate level. Critical thinking and research scored the lowest, and gender and years of study were the influencing factors of core competencies [32]. With the continuous progress of global health and medical technology (e.g., artificial intelligence, big data), scholars at home and abroad should continue to strengthen communication and cooperation in the future to promote the cultivation of core competencies of nursing graduate students.

Conclusions

This study summarized the research hotspots of China's master's program in nursing education over the last 20 years, including clinical practice, cultivation mode, and core competence, using CiteSpace visual analytic software. The graduate education model for nurses in the United States is currently evolving. Postgraduate nursing education abroad began earlier, and the literature on the subject is more extensive. Therefore, to raise the standard of China's graduate nursing program, we should continue to learn from other cultivation models while also implementing localized modifications that correspond to China's unique national circumstances and cultural heritage.

Limitations

This study has some limitations. Firstly, only literature from the Chinese full-text journal database (CNKI) was selected; therefore, not all literature was fully included. Second, only literature in Chinese was searched, and some keywords may be missed. Finally, this study is based on high-frequency keyword co-occurrence analysis, which excludes new research topics with a low occurrence rate.

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Authors' contributions

Author Song was in charge of the literature search, statistical analysis, and paper writing. Author Yao was in charge of statistical analysis and the first draft of the paper, while authors Ying Song were in charge of the literature search and screening. Article supervision was the responsibility of authors Liu. The final manuscript was written with the participation and approval of all authors.

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The funders had no role in study design, data collection and interpretation, or the decision to submit the work for publication.

Availability of data and materials

The database used (CNKI) is public and no administrative permissions were required to access the raw data.

Declarations

Ethic approval and consent to participate

The data used in this study was published literature and therefore did not require ethical approval.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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