Review

Current status of clinical nursing specialists and the demands of osteoporosis specialized nurses in Mainland China

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Abstract

The clinical nursing specialist (CNS) is an expert who applies an expanded range of practical, theoretical, and research-based competencies to the care of patients within in a specialty clinical area within the larger discipline of nursing. A large number of studies consistently conclude that the CNS is a valuable healthcare resource that provides high-quality clinical and evidence-based nursing practice and improves patient outcome. The CNS has been involved in healthcare practices for many years, with an increasingly diverse role. However, the training for the CNS in China is only in a preliminary developmental stage. The aim of this article is to review the history and development of the CNS role. Furthermore, the epidemiologic status of osteoporosis, as well as the feasibility and necessity of developing training programs in China for the osteoporosis CNS, will be discussed.

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1. Introduction

The nursing practice is at heart of all healthcare systems. Strong evidence continues to emerge linking patient outcomes to nurse staffing and nursing practice environments [1–5]. Specialty nursing science is a developing trend due to ongoing reforms in the healthcare system, including continual improvements in the education level and modifications to disease spectrums and their management, and the increase in the aged population. Currently, Western countries are at the forefront of specialty nursing development [6].

In 2000, training programs emerged in several specialty nursing fields to drive the development of domestic specialty nursing in China [7]. The programs targeted the training of advanced practice nurses, including clinical nurse specialists (CNSs), nurse practitioners (NP), certified nurse midwife (CNM), and certified registered nurse anesthetists, who (CRNA) who origin from development of specialty nursing present a stable and valuable medical source to promote the
The development of advanced practice nurses is influenced by many factors, such as the correlation between work and vacation time, and the cost-effectiveness of improved nursing education [24]. Although introduced to Mainland China by 1996, further development of the CNS has been comparatively slow [25]. Li et al. suggested training nurses in specialty branch fields to drive specialized and international development of nursing science [26]. The training and assignment of the CNS has since been overseen by clinical nursing managers and educators in Mainland China. This training was pioneered at the Sir Run Run Shaw Hospital of the Medical School of Zhejiang University, based on the successful management experiences of Loma Linda University Medical Center. In 2000, this hospital designated specific positions for advanced specialized nurses [6]. Subsequently, the first enterostomal therapy school in Mainland China was established under the concerted effort from the Chinese Nurses Association, the School of Nursing of Sun Yat-sen University, the School of Professional and Continuing Education of The University of Hong Kong, and the Hong Kong Stoma Therapist Association. The Chinese Nurses Association established certification for a critical care program in 2002, which was developed by the Hong Kong Society of Critical Care Nursing in collaboration with the School of Nursing of Peking Union Medical College. In 2003, the Jiangsu Nursing Association and hospital authorities in Jiangsu Province established the first provincial training base for nurses specialized in diabetes mellitus [27]. In 2005, a program for training nurses specialized in geriatric care was introduced by the Guangdong Health Department and the Hong Kong Hospital Authority [28]. Soon afterwards, additional training programs were developed in Hunan province, Sichuan province, Chongqing city, and others.

3. CNS roles

The CNS was initially expected to be skilled in consultation, research, staff/patient/family education, care coordination, institutional management of medical care, symptom management for clients, and diagnosis and responses to illness, but generally without formal or standardized education [29–31]. Initially, the CNS often worked in impoverished areas and disease-specific related chronic care facilities [32]. However, the continued development and progression of the CNS in new and more clinically demanding activity models has led to the evolution of their role and practice spheres, including as clinical specialists, educators, consultants, advisors, researchers, managers, clinical administrators, collaborators, communicators, liaisons, change agents, and innovators [11,15,19,33–39].

3.1. Clinical specialist

The CNS is a core functional component of many healthcare systems, and has thus been accepted by healthcare organizations, staffs, and clients [40,41]. It is generally recognized that the CNS can effectively ameliorate healthcare outcomes, reduce patient injuries, minimize hospital stays, improve patient education, develop better clinical procedures and
policies, and implement improved healthcare strategies [42]. Furthermore, the CNS can identify which patients require participation in a rehabilitation program or continuous therapeutic interventions, and can develop patient-specific follow-up protocols [43]. A study by Leary et al. found that CNSs spent 68% of their time performing complex clinical work, highlighting the importance of the clinical specialist role [38].

3.2. Educator and consultant

Education is a major role for the CNS, as they provide varying levels of instruction to diverse groups, such as patients, staffs, family and caregivers, students and colleagues. The increased amount and availability of healthcare information from newspapers, websites and medical clubs often leaves patients confused and in fear. The CNS can educate clients and direct them towards relevant information, which fosters a sense of empowerment over their own healthcare and that of their families [20].

The consultant role of the CNS overlaps to some extent with the role of educator [20]. Not to be confused with the ‘consultant nurse’, the role of the CNS as a consultant encompasses the specialized expertise to assist the client, staff, or healthcare system to resolve problems that arise.

3.3. Researcher

The CNS is in a key position to ascertain deficiencies in any nursing practice stage. Subsequently, the majority of nursing questions are solved and resolutions optimized within the evidence-based nursing practice [43]. For example, to significantly reduce the infection rates of patients receiving central venous catheters or ventilators to assist respiration, CNSs developed the Central Line Associated Blood Stream Infection Bundle and Ventilator Associated Pneumonia Bundle programs [44,45]. The role of the CNS as a researcher enables them to read, critique and implement relevant evidence-based research to improve their specialized nursing practice [20].

3.4. Leader and manager

Although the clinical nursing manager and leader encompass different spheres, they are frequently linked in the CNS literature [20,46,47]. Nevertheless, within this role, the CNS manages changes and empowers others to influence the practice of clinical nursing and political processes within and across various healthcare systems.

3.5. Collaborator and innovator

The role of collaborator is similar to the role of consultant, in that it classifies the CNS as a resource for staff and patients for knowledge concerning not only health/disease-related problems, but also for the promotion and maintenance of overall health [20]. The CNS works in collaboration with others to optimize clinical nursing outcomes by using constructive patient-focused problem solving. In order to implement such evidence-based nursing practices, the CNS must act as an innovator and entrepreneur by creating new options for both patients and other nurses.

4. Practice spheres of the CNS

4.1. Patient care

The practice sphere is based on the specification of a functional role to achieve a target goal. The goal of the practice sphere is to provide expert care to individual patients with chronic or acute and complex illnesses (e.g. trauma, diabetes mellitus, heart failure, osteoporosis, and cancer), as well as their families, and communities [48]. The CNS develops a nursing plan and performs direct nursing service to meet the needs of the patient and provide cost-effective care within the hospital, community, or at home [49].

4.2. Nursing

The goal in this sphere is to influence evidence-based care by providing expert and care-related information [49]. The CNS is also positioned to optimize the nursing process, improve the quality of nursing service, and drive the development of specialty nursing.

4.3. Healthcare system

The CNS is also poised to aid in the development and implementation of educational programs in order to optimize the management and performance of nursing practices, carry out nursing research, improve the nursing outcomes, and lead healthcare teams according to the organization of the healthcare system [49]. In this capacity, the CNS drives the structuring and optimization of healthcare organizations [50].

5. Competences of the CNS

In the 1960s, the core competence theory of nurses was formulated in America, and those from various levels within the healthcare system gradually realized the importance of developing individual, organizational, and nursing specialties. Considered the key to patient-care outcomes, core competences are defined as having the knowledge, skill, and confidence to generate the best nursing practice with the highest possible level of job performance, the importance of which reaches far beyond the domain of nursing regulation and licensing [51]. Core competence of nurses is influenced by experience and education, and is continuously modified through initial development, maintenance of knowledge and skills, educational consultation, remediation and redevelopment, and is solely responsible for maintaining a high-quality workforce [52]. The acquisition of core competence does not end when the basic education is finished [53]. Frances Reiter suggested that nurse clinician clinical competences have three dimensions: 1) range of function, inclusive of care, cure, and counseling; 2) depth of understanding; and 3) breadth of services including coordination, continuity, and collaboration [16].
Descriptions of CNS competences were initially vague and lacked clarity. Some scholars thought that clinical competencies of the CNS could be self-taught through relevant literature, whereas others proposed that it could be gained by attending medical rounds with physicians provided the CNS had high self-expectations to advance nursing knowledge [16]. Johnson et al. claimed that the competence of the CNS could be measured in three ways: 1) the proportion of correct diagnoses and treatment decisions; 2) the proportion of errors in decision making; and 3) the effectiveness of nursing care as assessed by patient welfare and progress [14]. However, the authors acknowledged that these measures of clinical competency were more subjective than objective. In 2003, the American Nurse Credentialing Center produced a CNS core certification program to measure competencies, which was later abandoned due to low turnout and the unsustainability of the examination. By 2010, the National Association of Clinical Nursing Specialists (NACNS) and CNS stakeholders were committed to ensuring that CNSs are prepared to provide expert and independent nursing service to patients and influence nursing practice and system changes to improve patient outcomes. Thus, CNS curricula are expected to prepare students for national certification examinations. This requires students to know and understand the seven current CNS core competences: direct practice, consultation, leadership, collaboration, coaching, research and evidence-based practice, and ethical decision-making [46].

5.1. Direct practice

Competence in direct practice involves the integration of contemporary nursing theories, research results, knowledge of clinical practice, and the ability to apply these to patient care and to interactions with patients and families, or groups of patients. The purpose is to promote health and well-being and to improve quality of life, which is characterized by a holistic perspective of health and disease.

5.2. Consultation

Consultation competence encompasses the ability to provide skillful nursing guidance to patients and families, and the expertise to facilitate interactions between professionals, patients, and staff to assist with problem solving.

5.3. Leadership

Competency in leadership refers to the ability of the CNS to manage, change, and empower others in order to influence clinical nursing practice, improve nursing quality, increase the degree of satisfaction, and affect political processes both within and across healthcare systems.

5.4. Collaboration

The CNS is expected to work jointly with others to optimize clinical outcomes. These collaborations occur at an advanced level by committing to authentic engagements and constructive patient, family, system, and population-focused problem solving.

5.5. Coaching

The CNS should be skilled in providing guidance and instruction to advance the care of patients and their families, as well as the nursing profession as a whole.

5.6. Research and evidence-based practice

Competency in research and evidence-based practice concerns thorough and systematic inquiry, which includes the searching, interpretation, and use of evidence for improving the practice and quality of clinical nursing.

5.7. Ethical decision-making

The CNS should be proficient in identifying, articulating, and taking action on ethical concerns at the patient, family, healthcare provider, system, community, and public policy levels.

6. Education level of CNS

At the turn of the 20th century, a nurse named Bedford Fenwick began a movement for nurse registration [54]. The establishment of formal training and the move to registration of nurses led to nurse training and education becoming standardized [20]. After the Second World War, mental nursing science was listed as the core major specialty in America, as many returning soldiers suffered from mental health issues [55]. Subsequently, Hildegard Peplau developed the first education curriculum at the master’s level to train psychiatry CNSs at Rutgers University [21]. This program advanced the level of education for the CNS and the specialization of nursing majors, which drove the development of CNS roles.

In the late 1960s, the preliminary education of the CNS was minimal, inconsistent, and often limited to long periods of nursing preparation using a variety of formal and informal learning experiences, and clinical competency was acceptably obtained through a variety of methods. At this time, the development of the CNS practice was driven, in part, by the fact that certified nurses outnumbered clinical supervisors [20]. Frances Reiter stated in her article in 1966 that the most economical way to rapidly prepare CNSs was through organized programs of professional graduate education. Still, she did not believe that a master’s or doctorate degree automatically made a nurse into a clinician, but felt the role developed from desire, motivation, familiarity with medical and nursing principles and goals, and extensive clinical practice in a wide variety of settings [56]. Specific criteria for the practice and education of specialty nursing were not released until the mid 1990s by the NACNS [57,58].

The need for higher levels of preparation for designing and assessing care resulted in a looming nursing shortage that was exacerbated by the shortages of faculty with doctoral preparation. To address this, a practice-focused doctorate and terminal degree for professional nursing practice (DNP) was established [59,60]. The American Association of Colleges of Nursing recommended that the DNP degree replace current...
Masters degrees as the minimum preparation for advanced nurse practitioners by the year 2015, a point that has been hotly debated in the literature [60]. Despite the controversy, an interest in offering the DNP is gaining momentum in universities in the US, where currently more than 90 universities offer DNP education programs, with another 50 with programs under development [61]. Criteria for evaluating these programs were outlined by a validation panel of the NACNS in 2011. These criteria include the minimum number of hours required for educational and clinical practice within existing national accreditation standards [62].

7. The necessity and feasibility for training of osteoporosis (OP) CNSs in China

7.1. Necessity

7.1.1. Epidemiologic status and burden of OP in China

OP is a systemic skeletal disease characterized by deterioration of bone tissue that results in bone fragility and increases the susceptibility to fracture [63]. OP is ranked as the seventh leading noninfectious, chronic disease that compromises a patient’s health and quality of life. OP is often accompanied by diabetes mellitus, hypertension, and carcinoma/tumors, which can directly affect the quality of life in the elderly. OP affects almost 70 million Chinese over the age of 50 [64], corresponding to 22.5% of men and 50.1% of women in this age group [65]. OP is becoming a serious health problem with significant economic impact, attributed to 687,000 hip fractures in China each year [66]. The average direct cost of a hip fracture in 2007 was 3603 USD and statistics from different cities indicate that the cost has been increasing at a rate of 6% per year. In 2006, China spent close to 1.5 billion USD treating hip fractures, a cost which is estimated to increase to 12.5 billion in 2020, and to more than 264.7 billion USD by 2050 [67,68]. Moreover, the average hospital stay for a hip fracture (19–24 nights) exceeds that for treating breast, ovarian or prostate cancer, or heart disease [64]. As a result, CNSs specialized in OP are a valuable resource for addressing imbalanced distribution of medical sources, inadequate numbers of doctors, and higher medical care expectation of patients.

7.1.2. Nursing science development

The progression of medical science combined with diverse patient preferences necessitates the adaptation and modification in the development of nursing science [43]. The importance and necessity of nursing science and training programs for nurses was affirmed by the leaders of China during the May 12th, Nursing Day in 2001. Li and Ma asserted that clinical nursing practice is vital and noble vocation, and thus the nursing discipline should rejoin the International Nursing Council [69]. CNS training is the path towards scientific, systematic, specialized and international progress in nursing science.

7.1.3. Patient care quality

China is currently undergoing extensive changes in the healthcare system and progress in the High Quality Nursing Service Demonstration Project is increasingly strained. Moreover, there is an imbalance in the distribution of medical sources, such that rural patients do not have ready access to medical care and cannot afford rising medical costs. Consequently, evidence-based nursing practice is indispensable for restoring patient trust in the healthcare system, improving the degree of patient satisfaction and compliance. Furthermore, evidence-based nursing is vital to ensure that medical care needs are met, for nursing in the hospital or at home, and to ultimately reduce the admission and readmission rates, and minimize hospital stays. Training of CNSs is crucial for improving nursing quality and ensuring the safety of patients.

7.2. Feasibility

7.2.1. Effectiveness of CNS

CNS training in areas such as oncology, ophthalmology, intensive care, and surgery, is more developed in Western countries, and has been shown as a valuable resource with beneficial impacts on patient care [20,70–73]. Studies have consistently shown the effectiveness of nurse-led healthcare teams in improving community health. The value of the CNS in primary care and home care as both an independent practitioner and a member of the primary care team has been described by the NACNS. The contributions of CNS tertiary prevention, nursing service and follow-up for chronic patients (e.g. with cardiovascular disease, diabetes mellitus, OP, chronic pain) have been well documented [74–76].

With an increasingly older population, along with the associated alterations in disease spectrum and management, the CNS will increasingly occupy a principal role in secondary prevention [6]. The emergence of the patient-centered medical home reorganizes primary care to improve access, coordination, quality, satisfaction, and comprehensive care. The CNS will have a key role in implementing this change at multiple levels [22]. The impact of the CNS-led healthcare team on medical nursing in the community was recently described by Rosenberg [77].

7.2.2. Practice effectiveness of OP CNS in Western countries

First described in 1998, the OP CNS has since lagged behind other advanced practice nursing roles. Recent studies have shown that the OP CNS provides cost-effective nursing service to patients, while at the same time, reducing the strain on inadequate numbers of physicians and imbalanced distribution of medical sources [78–80]. Moreover, an assessment of falls in OP patients by an OP CNS was approved in 2004 by Darent Valley Hospital [78]. These examples demonstrate that the OP CNS has competence to deal with many tasks, including bone mass tests, risk assessments on falls and fractures in OP patients, and performing nursing interventions. Therefore, the OP CNS role can be developed in China by following these experiences described in other countries.

7.2.3. Promotion of education level and quality

The education level of higher nursing has significantly progressed alongside reforms of the education system in China. This translates into advancements of the systematic, scientific and specialized levels of clinical nursing practice, as well as in the increased number of high-level nursing colleges and educators. These beneficial developments are at the heart of the development of specialty nursing and OP CNS. A great
many specialized nursing staffs are characterized by a wealth of specialty knowledge and front-line practical experience that differs from physicians and general nurses. They provide cost-effective clinical nursing practice services to patients consistent with an international CNS role [81]. In addition, the training of CNSs benefits from promotion of the quality of holistic nursing and the educational experience of the nursing team. Nursing science was classified as an independent first-class discipline by the Academic Degree Commission of the State Council in 2011 in order to provide a solid foundation for the development of specialized nursing [82].

7.2.4. Beneficial policies and legislation
The development program of nursing of the Ministry of Health and Family Planning in China (2005–2010) declared that a core group of nurses should be cultivated to promote professional standards of the entire nursing team [83]. The same program subsequently (2011–2015) documented that a CNS post should be identified as the basis of improvement for the nursing profession. At the same time, the healthcare system should establish and improve training regulations according to need. Moreover, the document emphasized that nursing profession, including clinical nursing and the educational system, should explore and endorse the establishment of models for long-term patient care, such as elderly, chronic disease and end-of-life care, by 2015 [84].

8. Outlook
There are currently about 69000 CNSs in the United States, which is insufficient to meet the demand [6]. The simultaneous occurrence of healthcare system reform, the Institute of Medicine report, and the consensus model of nursing competencies and educational level, along with the proliferation of institutions seeking magnet status, have placed the demand for the CNS role at an all-time high [39], increasing the strain on the already burdened nursing education system. The CNS is an indispensible resource available to meet the increasingly complex medical care needs. The specialization of many healthcare disciplines, including oncology, intensive care, hematology and others, necessitates the training and education of qualified, specialized nursing personnel. Some provinces within China have begun training orthopedic CNSs, however, there are no reports on training of OP CNSs. There is only one paper reporting the effectiveness of the orthopedic CNS for the intervention of OP patients [85]. Research concerning concepts, entry criteria, core competences, curriculum settings, training plans and models, and role identification are still lacking. Furthermore, the increasing prevalence of OP indicates that the development of the OP CNS role should be a priority in the expansion of specialized nursing sciences.

Contributions

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