

The Current Situation of Pediatric Nurse Practitioners in the United States and Its Enlightenment to China

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Abstract: With more attention paid to children's health problems, higher requirements have been put forward for children's early development and pediatric construction. Pediatric nurse practitioners in the United States have a perfect education, certification and supervision system, which promotes the development of medical and health services. However, the pediatric nursing system in China is uneven and needs to be further developed. This article reviews the historical origin, role evolution, training and certification system, practice scope and effect of pediatric nurse practitioners in the United States by searching relevant literatures in domestic and foreign databases, in order to open up a new field for the development of pediatric nursing in China.

Keywords: Nurse Practitioners; Pediatric Nurse Practitioners; Pediatric Nurse; Review

1. Introduction

According to the World Health Organization, children's health is currently facing a series of risks such as climate change, pollution, unhealthy lifestyles and diets, injuries, and violence^[1], which has led to increasing attention and concern for children's health issues. The State Council of China issued the "Healthy China 2030" plan^[2], proposing a plan to implement healthy children, and calling for strengthening early childhood development and pediatric care. Meanwhile, the National Health Commission issued the "National Nursing Career Development Plan (2021-2025)", pointing out the shortage of pediatric nursing professionals and the need to strengthen training for specialized pediatric nurses^[3]. The issuance of these guidelines potentially raises higher requirements for improving the quality of pediatric nursing and developing advanced pediatric nursing talents. However, the training of pediatric specialized nurses in China began in 2017^[4]. Compared to the development of pediatric nurse practitioners (PNPs) in the United States, it started late and is immature in various aspects. After analyzing the development status of pediatric specialized nurses in China, Liu Juanqin et al. pointed out a series of problems, including the incomplete training system, inadequate certification assessment and re-certification standards, and inadequate position management^[5]. In addition, due to the particularity of the pediatric nursing environment, there is a serious phenomenon of pediatric nurse turnover. A cross-sectional survey of 6,673 pediatric nurses revealed that 9.93% of them reported an intention to resign^[6]. The inadequate development of pediatric specialized nurses and the turnover of pediatric nurses have made the development of pediatric nursing human resources one of the current key hot issues. PNPs are certified advanced practice registered nurses (APRNs) with specialized education and a focus on caring for all children^[7]. PNPs have a development history of nearly 60 years in the United States, and the system is well-established, making significant contributions to the U.S. healthcare industry. This article aims to provide references for exploring new fields of development in pediatric nursing in China by describing the current development status of PNPs in the United States and referencing the successful experiences of PNP programs in the United States.

2. The Historical Origin and Role Evolution of PNPs

In 1965, Dr. Loretta Ford, along with pediatrician Dr. Henry Silver from Colorado, and a team of pediatric nurses, developed a training program to increase healthcare services for rural and urban impoverished children. This training program is considered the birth of the nurse practitioners (NPs) movement, with the earliest NPs being PNPs^[8]. According to a position statement by the National

Association of Pediatric Nurse Practitioners (NAPNP)^[9] in 2011, the initial role of PNPs was to provide comprehensive primary care for children as primary care providers. As the healthcare system continued to evolve, the role of PNPs has evolved since its inception, transitioning from providing primary healthcare to practicing in the complex environment of pediatric acute care and pediatric subspecialty care. A study in 2001 indicated that 77% of PNPs reported frequently caring for critically ill children while also caring for children with chronic conditions^[10]. In 2005, the Pediatric Nursing Certification Board (PNCB) established the certification exam for acute care pediatric nurse practitioners (ACPNPs)^[11]. With further role definition, the name for PNPs practicing within primary care shifted to pediatric primary care nurse practitioners (PPCNPs) to distinguish their role from ACPNPs. Additionally, PNPs serve crucial roles in pediatric subspecialty areas such as pediatric trauma centers^[12], acute pain management^[13], pediatric asthma^[14], cardiology^[15], pediatric portal hypertension^[16], and orthopedics^[17]. As the role of PNPs continues to evolve, they have become integrated as primary providers in pediatric healthcare in the United States, striving to improve the health of children in primary care, acute care, and specialty care environments. As of December 2022, there are over 25,000 PNPs holding valid certification from the PNCB^[18]. The emergence of PNPs effectively addressed the shortage of primary healthcare personnel and has led to significant changes in the healthcare system in the United States.

3. Training and Certification of PNPs

3.1 Education Requirements for PNPs

Studies have shown that nursing professionals with higher levels of education possess greater empathy, which can enhance the quality of nursing care, promote interdisciplinary collaboration, and improve healthcare outcomes^[19,20]. As one of the certification bodies for PNPs, the American Nurses Credentialing Center (ANCC) stipulates that the minimum educational requirement for PNPs is a Master of Nursing degree^[21]. However, in 2018, the National Organization of Nurse Practitioner Faculties (NONPF) pointed out that by 2025, all entry-level nurse practitioner education requirements would be raised to a Doctor of Nursing Practice degree^[22].

3.2 Core Competencies and Curriculum Arrangements

Currently, the core competency requirements for PNPs mainly stem from the "Population-Focused Nurse Practitioner Competencies" published by the NONPF, which elaborates on the core competency requirements for PPCNPs and ACPNPs in nine aspects: basic science skills, leadership skills, quality control skills, practice research skills, information technology literacy, policy analysis skills, health service system integration skills, ethical assessment skills, and independent practice skills^[21]. Observing the two major core competency frameworks, it can be seen that the core competency of PPCNPs emphasizes providing healthcare for children and families in primary care, that is, providing child care from birth to young adulthood, with special and extensive knowledge and experience in pediatric healthcare, including good child care and prevention, health promotion, and the management of acute and chronic pediatric diseases. ACPNPs, on the other hand, emphasize providing care for patients with acute and critical illnesses who experience exacerbations of episodic or chronic illnesses or require end-of-life care, possessing professional clinical skills for assessing, diagnosing, and managing pediatric patients.

The curriculum of PNP provides a scientific basis for advanced pediatric nursing practice. The focus of PPCNP courses is on promoting health and managing common childhood diseases, while ACPNP courses concentrate on treating patients with acute, critical, and chronic diseases^[22]. PNP courses generally include three aspects: fundamental core courses, advanced nursing practice core courses, and PNP specialized courses. Among them, the advanced nursing practice core courses are mandatory for all PNP students pursuing a nursing master's degree, comprising three core courses: advanced physiology and pathophysiology, advanced health assessment, and advanced pharmacology^[23]. The specific requirements and implementation methods of PNP courses vary depending on the institutions and the courses chosen by the students^[24]. For instance, the Master of Science in Nursing (MSN) program at Duke University in the United States offers two tracks: PPCNP and ACPNP. Each track includes graduate foundational core courses, advanced nursing practice core courses, and specialized clinical courses. The main difference between PPCNP and ACPNP courses lies in the clinical courses. The clinical courses for PPCNP primarily focus on training for advanced nursing practice in primary care pediatric patients, while those for ACPNP concentrate on cultivating advanced

nursing practice for pediatric acute patients^[25,26]. Although the University of Pennsylvania also offers two Master's degree programs, PPCNP and ACPNP, the PPCNP program includes advanced nursing practice core courses, theoretical courses, clinical practice courses, and 2 credits of elective courses. Additionally, the university offers three different courses for ACPNP: pediatric acute and chronic care nursing, pediatric critical care nursing, and oncology nursing, allowing students to choose and enabling them to receive graduate-level education in specific clinical areas^[27]. Furthermore, studies have found that introducing interdisciplinary education and training for PNP students, such as dental course training and specialized training in child developmental behavior, can promote the development of PNP^[28,29]. Whether this research outcome will be integrated into curriculum reform in the future remains an exploratory stage.

3.3 The Certification Assessment

In terms of certification, the PNP certification examination is accredited by both the PNCB and ANCC. The certificates obtained are Certified Pediatric Nurse Practitioner - Primary Care (CPNP-PC) and Certified Pediatric Nurse Practitioner - Acute Care (CPNP-AC). Additionally, dual certification in pediatric primary care and acute care is possible, resulting in the certificate named Certified Pediatric Nurse Practitioner - Primary and Acute Care (CPNP-PC/AC), with all certificates valid for five years. Starting from December 31, 2018, the ANCC Certification Committee decided to discontinue the certification examination for PPCNP, but it can be renewed^[30].

The initial certification requirements of PNCB are as follows: ① Possess a currently valid, unrestricted registered nurse license; ② Complete a master's degree, doctoral degree, or post-doctoral certificate program accredited by the Accreditation Commission for Education in Nursing (ACEN) or the Commission on Collegiate Nursing Education (CCNE), with a focus on pediatric primary or acute care; ③ Hold an APRN program or official transcript sent by the school; ④ Complete at least 500 hours (PNCB strongly recommends 600 hours^[31]) of clinical practice in pediatric primary or acute care; ⑤ Complete graduate courses in advanced physiology or pathophysiology, health assessment, and pharmacology.

The PNCB recertification is held annually from November 1 to January 31, with the specific requirements as follows: ① Hold a currently valid, unrestricted registered nurse license; ② Complete 15 hours of continuing education related to CPNP-PC^[32], CPNP-AC^[33], or CPNP-PC/AC^[34] practice, with clinical practice time counting as part of it; ③ Complete 15 hours of pediatric pharmacology practice within 7 years; ④ Complete 4 PNCB pediatric update modules within 7 years. As of the end of 2021, 83% of PNP certified by PNCB obtained certification in pediatric primary care, and 17% obtained certification in pediatric acute care^[18].

Since ANCC has canceled the initial certification for PPCNP, only recertification is possible, which requires: ① Holding a current ANCC certification for PPCNP that will expire within 1 year. ② Holding a currently valid registered nurse license. ③ Completing 75 hours of clinical practice and one of the 8 continuing education update categories in pediatric specialty within 5 years after submitting the recertification application^[35]. ④ Of the 75 hours of clinical practice, 25 hours must be in pharmacotherapy.

The education and certification of PNP adhere to the APRN Regulatory Model Consensus developed jointly by the 2008 APRN Consensus Workgroup and the National APRN Committee, which includes licensure, accreditation, certification, and education. This model ensures uniform education requirements, practice standards, and regulatory bodies, enabling the provision of high-quality nursing care for pediatric patients nationwide.

4. Scope and Effectiveness of PNP Practice

4.1 Scope of PNP Practice

The scope of PNP practice varies depending on the healthcare institution and certification category. According to NAPNAP, it mainly includes primary care and acute care. Primary care nursing mainly involves the following aspects: ① Pediatric healthcare: child health checks, developmental screenings, physical assessments (vision, hearing, and dental) ② School physicals and vaccinations. ③ Diagnosis and treatment of common childhood illnesses, including allergies, respiratory infections, and skin

diseases.④Diagnosis and management of common childhood chronic diseases, including asthma, diabetes, and allergies.⑤Providing advice to parents on common child health issues, including nutrition, obesity, and weight management.⑥Providing behavioral counseling for children and caregivers, such as children with attention deficit hyperactivity disorder (ADHD) ⑦Screening and managing childhood mental health disorders, prescribing medication, and referral for treatment.⑧ Providing guidance on family safety, prevention of accidents, sports injuries, and vehicle safety. Acute care nursing primarily involves the following aspects:①Diagnosing and differentiating acute and complex diseases and complications.②Managing acute, chronic, complex, and critical pediatric health conditions.③Prescribing medication and assessing treatment (based on both pharmacological and non-pharmacological approaches)④Applying patient- and family-centered developmental approaches. ⑤ Managing acute, chronic, and critical pediatric diseases and injuries. ⑥ Collaborating with interdisciplinary teams to provide high-level evidence-based care for children with life-threatening diseases, organ dysfunction, or failure.⑦Managing complex and ongoing intensive therapies in various settings, including outpatient clinics, inpatient units, emergency rooms, and home care environments.

4.2 The Effectiveness of PNP Practice

The practical effects of PNP in the healthcare system have been fully confirmed, demonstrating significant clinical value. Survey research^[37,38] confirms that PNP plays an important role in providing health education to the parents of patients and receives high satisfaction. An American children's hospital found that after introducing PNP into the primary pediatric trauma center, the care provided by PNP to traumatized children significantly reduced their hospital stay and increased satisfaction^[12]. Another study^[39] also indicates that PNP can provide inpatient care for children with bronchiolitis, pneumonia, and asthma at a lower cost. The study by Mason et al.^[17] also confirmed that embedding a PNP in the medical team not only increased patient satisfaction but also rapidly reduced readmission rates after discharge. In primary care, PNPs serve as consultants in daycare centers to address children's primary healthcare needs^[40]; they also play an important role in preventing child abuse, bullying, and improving children's oral health; in addition, they contribute to follow-up care for premature infants and promoting breastfeeding for late preterm infants. On the other hand, ACPNPs provide high-quality care for various critically ill patients. Furthermore, due to the Accreditation Council for Graduate Medical Education (ACGME) limiting doctors' weekly work hours to 80, the reliance on PNPs in pediatric nursing has increased, making PNPs valuable resources in managing pediatric nursing.

5. Conclusion

The United States has nearly 60 years of development in PNP, with a well-established education, certification, and regulatory system. However, such a position is currently lacking in China. Therefore, considering the current reality of pediatric development in China, it is feasible to initiate PNP education programs based on the successful experiences of the United States. This initiative could facilitate the development of pediatric nursing in China.

5.1 Challenges and Barriers to Developing PNP in China

Despite the World Health Organization declaring 2020 as the International Year of Nurses and Midwives, elevating the status of nurses, introducing new nursing roles within the broader healthcare environment remains challenging, fraught with numerous difficulties and obstacles. Firstly, there is low awareness. Research indicates that in China, only 11.1% of residents have heard of "advanced practice nursing"^[49]. Healthcare management, including physicians and other healthcare teams, lack a clear understanding of nursing curriculum, training, and the role of advanced practice nurses, leading to a lack of trust in nursing abilities and concerns regarding the acceptance of NPs by patients, legislative issues, and conflicts with physician roles^[50-52]. Secondly, there are functional barriers. Despite recent attention and development in the area of nurse prescribing rights, progress remains largely theoretical and has not been widely implemented in clinical practice^[53]. Additionally, there is ambiguity in the roles of advanced practice nurses compared to physicians, leading to unclear job scopes and role conflicts. Finally, there is a lack of unified certification systems and legal protections^[54]. Pediatric specialty nurse training in China began in 2017, relatively late, with an incomplete and relatively immature training system lacking a unified management system, thus affecting the overall professional

standards^[54]. Furthermore, the lack of clear policy and regulatory support may introduce legal and policy uncertainties for the implementation of pediatric nurse practitioners in practical work.

5.2 Inspiration

5.2.1 Unified Training and Certification System

Firstly, it is necessary to establish training objectives. PNP is a type of advanced nursing practice talent, and the training objectives need to integrate the training objectives of nursing postgraduates and specialist nurses in China. The aim is to cultivate nursing talents that meet the characteristics of China, which is also the prerequisite and basis for formulating the PNP training model. Secondly, based on the clarification of training objectives, nursing education and curriculum reform should be carried out, drawing on the curriculum settings and core competency development of American PNP. A sound infrastructure should be established to enhance the capacity building of PNP personnel. Nursing education levels vary in China, so personalized education is appropriate: experienced senior nurses with rich work experience should undergo PNP education through on-the-job training and continuing education; nursing postgraduates with higher academic qualifications should choose pediatric sub-specialties during their graduate studies, refer to the American PNP curriculum arrangement, engage in pediatric sub-specialty course learning and clinical practice to cultivate PNP talents. Finally, establish a unified certification and supervision system. China has established a sound system for the certification of registered nurses and the licensing of registered nurses, providing strong references for the establishment of PNP certification and licensing systems. In addition, the training and certification of advanced practice nurses in the United States achieve the connection between academic education and specialist positions, with high requirements for both theory and practice. For the training and certification of PNP talents in China, it should also be effectively connected with local nursing master's degree education, unify the academic admission criteria and qualifications certification of PNP, enhance the practical capabilities of pediatric specialists while improving the academic level, strengthen the strength of PNP talents, cultivate PNP talents who have a solid foundation, are proficient in specialties, and serve clinical practice, ensuring the quality of the training process.

5.2.2 Clarify Job Responsibilities and Scope of Practice

Pediatric nursing has its unique characteristics. Combining clinical needs, it is essential to clarify the responsibilities and scope of practice of PNPs. Firstly, led by professional health organizations or specialized nursing associations, detailed professional standards for PNPs should be established, covering responsibilities, skill requirements, and practice areas, to ensure that PNPs possess necessary professional qualities and practice capabilities. Secondly, through certification programs, PNPs' professional levels and practice capabilities should be comprehensively assessed to ensure their suitability for the position. The certification system can also be a dynamic process, where nurses can update their certification status through re-certification as they accumulate practice experience. Lastly, interdisciplinary collaboration should be conducted to determine the specific roles of PNPs in nursing, aiding in forming a comprehensive pediatric team. Clarifying the responsibilities and scope of practice of PNPs provides them with a clear career development path and professional positioning, laying a solid foundation for improving the quality of pediatric nursing services.

5.2.3 Establishing a Sound Assessment and Evaluation Mechanism

To initiate the PNP program, it is essential to establish a standardized assessment and evaluation mechanism. Assessment and evaluation are indispensable processes for any form of talent development, serving to gauge the effectiveness of the training. As PNP falls within the category of high-level nursing professionals, the assessment mechanism should align with higher nursing education in China, incorporating experiences from the assessment of advanced practice nurses in the United States. The PNP assessment and evaluation body should be jointly designated by the health department and the education department. Individuals who pass the examination and meet the required clinical practice hours should be awarded authoritative practice certificates, providing legal protection. By implementing a rigorous professional qualification assessment mechanism, the competency of PNP professionals can be ensured, thereby enhancing the overall quality of pediatric nursing care.

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