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Development and Psychometric Evaluation of the Pediatric Nurse Professional Competence Scale (P-NPCS) for Private Hospitals

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ABSTRACT

Pediatric nurses require specialized competencies to meet the unique physiological and psychosocial needs of children, yet context-specific assessment tools remain limited in India, particularly for the private healthcare sector. This study aimed to develop and psychometrically validate the Pediatric Nurse Professional Competence Scale (P-NPCS) among nurses in private hospitals in selected districts of Punjab, India. A methodological research design was adopted, involving 385 pediatric nurses recruited through a non-probability, total enumerative sampling method from nine private hospitals. The development process followed a three-phase approach, including item generation based on a literature review, content validation using a three-round Delphi technique with a panel of 20 nursing experts, and scale evaluation through a pilot study and final data collection. The results of the psychometric evaluation using Confirmatory Factor Analysis supported a refined 51-item, ten-factor model with satisfactory fit indices (χ^2/df = 2.93, CFI = 0.93, GFI = 0.92, RMSEA = 0.068). The findings further demonstrated high internal consistency, with composite reliability ranging from 0.78 to 0.86 and Average Variance Extracted exceeding 0.50. While 87% of the nurses demonstrated high overall competence, lower scores were identified in the domains of collaboration and professional development. In conclusion, the P-NPCS stands as a robust and reliable instrument for evaluating pediatric nursing competencies within specialized clinical environments. By offering a culturally and contextually validated tool, this study significantly contributes to the field by enabling structured performance evaluations and targeted professional development strategies, ultimately enhancing the quality of pediatric care in the private healthcare sector.

Keywords: Pediatric Nursing, Professional Competence, Scale Development, Psychometric Evaluation, Private Hospitals, Nursing Assessment

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1. INTRODUCTION

Nursing is a dynamic and evolving profession grounded in compassion, scientific knowledge, ethical responsibility, and professional commitment (Eminoğlu et al., 2025; Hosseinzadegan et al., 2024; Yakov et al., 2025; Zarrinkolah et al., 2025). Over recent decades, the scope of nursing practice has expanded beyond traditional caregiving roles to encompass advanced clinical decision-making (Chow et al., 2023), leadership (Fosah & Llahana, 2025), research participation (Ries et al., 2023), quality improvement initiatives (Endalamaw et al., 2024), and policy advocacy (Heck et al., 2022). Contemporary healthcare systems are becoming increasingly complex. According to Junaid et al. (2022), Krishnamoorthy et al.

(2023) and Thacharodi et al. (2024), this complexity is driven by technological advances, the emergence of new diseases, the increasing severity of patient conditions, and rising expectations for safety and quality. Within this evolving environment, professional competence has become a fundamental prerequisite for effective nursing practice.

The World Health Organization Organization (2022) emphasizes that strengthening health workforce competence is essential for improving health outcomes, patient safety, and system efficiency. Similarly, the International Council of Nurses defines nursing competence as the effective integration of knowledge, skills, judgment, and professional attributes to practice safely within established standards (Wood & Adelman, 2025). These global perspectives underscore competence as the foundation of quality nursing care.

Professional competence in nursing refers to the integration of theoretical knowledge, psychomotor skills, clinical reasoning, ethical principles, communication abilities, and professional values applied effectively in real-world clinical settings (Albalawi & Rezq, 2024; Halldorsdottir & Bryngeirsdottir, 2025; Mrayyan et al., 2023; Reaves et al., 2024; Van Horn & Lewallen, 2023). It is not a static trait but a dynamic developmental process shaped by education, clinical exposure, reflective practice, and continuing professional development. Contemporary competency frameworks commonly classify nursing competence into core competencies (ethics, values, communication), technical or functional competencies (clinical procedures and decision-making), behavioral competencies (adaptability and empathy), and leadership competencies (coordination and advocacy). Such structured classifications enable systematic assessment and accountability in professional practice.

Pediatric nursing represents a specialized area requiring competencies distinct from general nursing practice. According to Larcher (2025), children are not merely “small adults”; they possess unique physiological, developmental, and psychosocial characteristics that influence disease presentation, treatment response, and communication patterns. Pediatric nurses must therefore demonstrate expertise in growth and developmental assessment, pediatric pharmacology, weight-based medication calculations, neonatal and pediatric emergency management, and age-appropriate communication strategies. In addition to technical skills, Zheng & Pansier (2022) stated that pediatric nursing demands heightened empathy, cultural sensitivity, patience, and advocacy, as care is delivered within a family-centered framework.

Professional competence directly influences patient safety and quality of care. Heier et al. (2024), Gemmete (2024) and Leszczyńska-Knaga et al. (2025) reported that many healthcare errors arise from deficiencies in clinical knowledge, communication, and assessment skills. In pediatric settings, vulnerability is even greater, particularly regarding medication administration where weight-based dosing increases the risk of error (Procaccini et al., 2022; Ward et al., 2023). Competent nurses are better equipped to anticipate complications, identify early signs of deterioration, and initiate timely interventions. At the organizational level, competent nursing staff contribute to reduced malpractice incidents, improved patient satisfaction, and enhanced institutional credibility. Thus, continuous competence assessment and professional development are essential components of quality assurance.

Theoretical perspectives reinforce the developmental nature of competence. Benner (1982), in Novice to Expert model, conceptualized clinical competence as progressing through stages based on experiential learning and contextual understanding. Likewise, Jose et al. (2022) and Wynne et al. (2024) linked structural preparedness and process competence directly to healthcare outcomes, emphasizing the practical implications of professional capability.

Competence in pediatric nursing can be systematically organized across domains derived from the nursing process and professional standards (Laserna Jiménez et al., 2021). These include assessment, diagnosis, planning, implementation, and evaluation, integrated with ethical practice, evidence-based care, collaboration, leadership, and continuous professional development. Assessment forms the foundation of pediatric care and includes comprehensive data collection through history taking, parental interviews, developmental evaluation, physical examination, and interpretation of diagnostic findings (Duderstadt & Keeton, 2023). Accurate assessment enables early identification of subtle changes, reducing morbidity and preventing complications. Nursing diagnosis involves clinical reasoning and prioritization of identified problems, ensuring individualized and timely interventions (Griffith et al., 2022). Planning requires formulation of measurable goals and selection of appropriate, family-centered interventions (Corkin & Cardwell, 2023). Implementation demands technical proficiency, adherence to safety standards, infection control, safe medication administration, and therapeutic communication (Öz et al., 2024). Evaluation involves continuous monitoring of outcomes, revising care plans when necessary, and maintaining accurate documentation to ensure accountability and continuity of care (Endalamaw et al., 2024).

Ethical competence remains central to pediatric practice (Moynihan et al., 2021). Pediatric nurses frequently address issues of informed consent, confidentiality, advocacy, and cultural sensitivity. Evidence-based practice further enhances care quality by integrating research findings with clinical expertise (Connor et al., 2023). Interprofessional collaboration strengthens patient safety (Keumalasari et al., 2025), while leadership competencies promote effective coordination and resource utilization within

pediatric units. Lifelong learning, reflective practice, and self-care sustain professional growth and prevent burnout.

Despite the global emphasis on competency-based practice, standardized and context-specific assessment tools remain limited in many regions. In India, nurses constitute the largest segment of the healthcare workforce and play a critical role in service delivery. However, challenges such as workforce shortages, variability in training standards, and absence of structured competency assessment mechanisms persist. Although international instruments exist, their direct applicability within the Indian healthcare context is limited due to cultural and systemic differences.

Punjab, with its expanding private healthcare sector, presents diverse clinical demands for nurses. Currently, no validated, context-specific instrument comprehensively assesses nurse professional competence within this setting. The absence of such a tool limits systematic performance evaluation, targeted professional development, and quality improvement initiatives.

While the development of nursing competency instruments has been extensively explored through the Nurse Professional Competence Scale (NPCS) by Chuang et al. (2025), Bartosiewicz et al. (2025), Ivanišević et al. (2022), and Prosen et al. (2021), these studies primarily focus on general competency domains, leaving a significant gap in the literature regarding specialized clinical contexts. The novelty of this study lies in the development and psychometric evaluation of the Nurse Professional Competence Scale for pediatric nurses (P-NPCS), specifically tailored for nurses in private hospital settings. This scale aims to bridge the instrumental void in capturing the unique dynamics of pediatric nursing and the distinct professional demands of the private healthcare sector. By integrating pediatric-specific indicators previously unaddressed in generative competency scales, this research offers a crucial methodological contribution toward ensuring precise, contextual standardization and high-quality pediatric healthcare delivery.

Therefore, the present study aimed to develop and psychometrically validate the Pediatric Nurse Professional Competence Scale in private hospitals in selected districts of Punjab, India The proposed instrument seeks to be comprehensive, culturally appropriate, and psychometrically sound. By providing a reliable and valid measure of professional competence, the P-NPCS will facilitate structured performance evaluation, guide continuing education, support curriculum planning, and ultimately contribute to enhanced patient safety and healthcare quality in pediatric settings.

2. METHOD

The present study adopted a methodological research design with a quantitative approach to develop and evaluate the Nurse Professional Competence Scale for pediatric nurses (P-NPCS). The study was conducted among 385 pediatric nurses recruited through a non-probability, total enumerative sampling method from nine selected private hospitals across various districts of Punjab, registered with the Punjab State Health Department, India. The sample size was estimated using Cochran's formula for an unknown population (Aslam, 2023). Nurses registered with the Punjab Nurses Registration Council and having a minimum of six months of clinical experience in the same hospital were included, while those on long-term leave (more than three months) or unwilling to participate were excluded from the study. The development and evaluation of the P-NPCS were carried out in three phases, as shown in Figure 1.

Phase I (Item development): It focused on item development and included construct conceptualization and domain specification based on extensive literature review, followed by item generation and instrument construction. Content validity was established using the Delphi technique through three rounds with a panel of 20 national nursing experts, including doctoral experts, Associate/Assistant Professors, and Nursing Superintendents from various nursing specialities. During the Delphi process, experts rated item relevance using a 4-point Likert scale (1 = Not Relevant, 2 = Somewhat Relevant, 3 = Quite Relevant, 4 = Highly Relevant). In Round I, expert feedback resulted in 15 items being deleted, 7 items added, and 9 items modified, reducing the preliminary 77 items to 69 items. In Round II, 11 items were deleted, 16 items were added, and 3 items were modified, resulting in 74 items. In Round III, 14 items were deleted and 4 items were modified, with no new items added. After achieving 90% consensus among experts, the final scale consisted of 60 items across ten domains of nurse professional competence, ensuring clarity, relevance, and strong content validity of the instrument

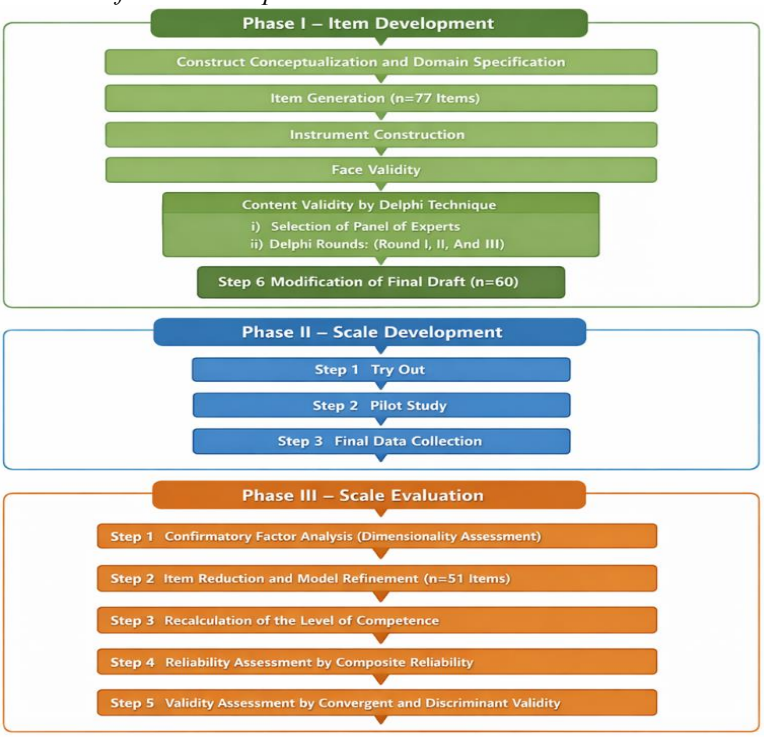
Phase II (Scale development): It included a try-out, pilot study, and final data collection. A try-out was conducted with 10 pediatric nurses at Bhutani Children Hospital, Jalandhar, where three items required minor wording modifications. A pilot study with 40 pediatric nurses from Sigma and Chawla Hospitals assessed feasibility and reliability using a 3-point Likert scale, yielding acceptable internal consistency (Cronbach's alpha = 0.75). Psychometric evaluation included I-CVI, S-CVI, and CVR.

Final data collection was carried out between November 2024 and March 2025 after obtaining institutional permission and ethical clearance from Sri Guru Ram Das Institute of Medical Health Sciences & Research, Sri Amritsar (Reference No.: SGRD/IEC/2022-29, 22.02.2022). The P-NPCS was administered by Head Nurses of pediatric departments, who objectively evaluated staff nurses under their

supervision using a 3-point Likert scale (0 = Never, 1 = Sometimes, 2 = Often). Data were collected during regular duty hours with minimal disruption to clinical care, and regular follow-ups ensured completeness of responses. Informed consent was obtained from all participants, and confidentiality and anonymity were strictly maintained throughout the study.

Phase III (Scale evaluation): Confirmatory Factor Analysis (CFA) was conducted to assess the dimensionality of the scale and the relationship between items and their latent constructs. Item reduction and model refinement were performed, resulting in a final 51-item scale across ten domains. Participants' level of competence was recalculated using a 3-point Likert scale (0 = Never, 1 = Sometimes, 2 = Often), with total scores categorized as low, moderate, or high. Reliability was assessed using Composite Reliability (CR > 0.70), and validity was further confirmed through convergent validity (factor loadings > 0.50, AVE ≥ 0.50) and discriminant validity using the Fornell–Larcker criterion.

Figure 1
Overview of Tool Development and Validation



3. RESULTS AND DISCUSSION

3.1. Results

3.1.1. Participants' Characteristics

Table 1
Frequency and Percentage Distribution of Demographic Variables (N=385)

Variables	Categories	Frequency (f)	Percentage (%)
Age (in years)	≤ 25	156	40.5
	26-35	162	42.1
	36-45	67	17.4
	≥ 46	0	0
Gender	Male	37	9.6
	Female	348	90.4
Marital status	Unmarried	241	62.6
	Married	144	37.4
	Divorced	0	0
	Separated	0	0
	Widow	0	0
Place of Living	Rural	141	36.6
	Urban	244	63.4
Education	General Nursing	189	49.1
	Bachelor of Science in Nursing	162	42.1
	Post Basic Nursing	34	8.8

Total work experience (in years)	1-5	237	61.5
	6-10	62	16.1
	11-15	57	14.8
	> 15	29	7.6
Area of working	PW	262	68
	NICU	77	20
	NICU/ PW	33	8.6
	PICU	13	3.4

Table 1 presents the demographic profile of the nurses. The majority were in the age group of 26–35 years (42.1%), followed by those aged ≤25 years (40.5%), while 17.4% were between 36–45 years; no nurses were aged ≥46 years. The sample was predominantly female (90.4%), with only 9.6% male nurses. A higher proportion of nurses were unmarried (62.6%) compared to those who were married (37.4%), and none reported being divorced, separated, or widowed.

Regarding place of residence, 63.4% of the nurses belonged to urban areas, whereas 36.6% were from rural backgrounds. In terms of educational qualifications, nearly half of the nurses had completed General Nursing and Midwifery (GNM) (49.1%), followed by Bachelor of Science in Nursing (B.Sc. Nursing) (42.1%), and a smaller proportion (8.8%) held Post Basic B.Sc. Nursing degrees.

With respect to professional experience, the majority of nurses (61.5%) had 1–5 years of work experience, 16.1% had 6–10 years, 14.8% had 11–15 years, and only 7.6% had more than 15 years of experience. Concerning their area of work, most nurses were posted in the Postnatal Ward (68%), followed by the Neonatal Intensive Care Unit (NICU) (20%), combined NICU and Postnatal Ward (8.6%), and a small proportion in the Pediatric Intensive Care Unit (PICU) (3.4%).

3.1.2. Content Validity

The content validity evaluation of the 60-item Nurse Professional Competence Scale for pediatric nurses (P-NPCS) demonstrated strong expert consensus across all 10 domains. Out of 60 items, 53 items (88.3%) achieved excellent content validity with I-CVI = 1.00 and CVR = 1.00, while the remaining 7 items (11.7%) showed acceptable values ranging from I-CVI 0.79–0.95 and CVR 0.75–0.90. The overall Scale-Content Validity Index (S-CVI) was 0.90, indicating excellent content validity of the instrument.

3.1.3. Construct Validity

Confirmatory factor analysis (CFA) using Maximum Likelihood Estimation was conducted in AMOS 21.0 to examine the suitability of the ten constructs. The initial model included all 60 items but showed inadequate model fit, with nine items having standardized factor loadings below 0.50. These low-loading items were sequentially removed to improve the model. The revised CFA model comprised 51 items across the original ten constructs. The final model demonstrated improved fit, parsimony, and conceptual clarity while retaining the multidimensional structure of nurse professional competence.

Figure 2

Hypothesized Ten-Factor CFA Measurement Model

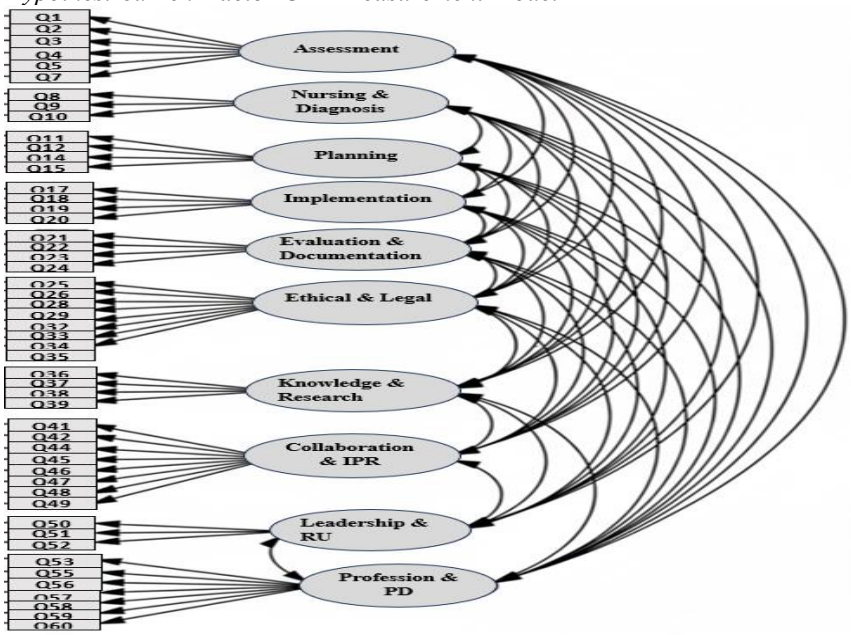


Figure 2 presents the hypothesized ten-factor CFA measurement model, while Table 2 reports the corresponding model fit indices for both the ten-factor and one-factor models.

Table 2
Confirmatory Factor Model Comparisons: Fit Indicators

Model Fit Indicators	Initial Model (60 items)	Modified Model (51 items)
χ^2	27378.934	3448.575
df	1655	1179
(Chi-square/df)	16.44	2.925
Comparative Fit Index (CFI)	0.647	0.928
Goodness of Fit index (GFI)	0.415	0.917
Adjusted Goodness of Fit (AGFI)	0.741	0.833
Normed Fit Index (NFI)	0.674	0.867
RMSEA	0.207	0.068

Table 2 shows that the modified CFA model demonstrates a good overall fit to the data. The chi-square/df value (2.925), CFI (0.928), and GFI (0.917) meet recommended thresholds, while AGFI (0.833) and NFI (0.867) are within acceptable limits for complex models. The RMSEA value (0.068) further indicates an acceptable level of approximation error. Collectively, these fit indices confirm that the modified model is statistically sound and theoretically meaningful.

Table 3
Confirmatory Factor Analysis Results: Items and their Standardized Estimates (Factor Loadings)

Items and Domains (Constructs)	Standardized Estimate (Factor Loadings)
Assessment	
Assess the child's physical, developmental, intellectual, social, spiritual and environmental needs	0.60
Perform systematic clinical examination related to disease condition on assigned child daily.	0.70
Uses of both subjective and objective methods while examining, treating and caring for assigned child.	0.72
Assess child's vital signs (temperature, pulse, respiration, blood pressure and heart rate).	0.65
Collect information of child's health status through interviewing parents, history taking and from diagnostic results.	0.73
Interprets common diagnostic tests report.	0.70
Nursing Diagnosis	
Developing nursing diagnosis as per priority	0.68
Have observational skills in child care to identify	0.70
Able to identify child's need for psychological and emotional support.	0.72
Planning	
Maintain safe and non- threatening environment.	0.69
Using critical thinking for decision making in emergent situations.	0.73
Develop comprehensive care plans for pediatric patients, including setting goals, prioritizing interventions.	0.79
Plans and prioritize nursing as well as medical interventions.	0.66
Implementation	
Capable of implementing clinical procedures for pediatric patients.	0.70
Provides play therapy and diversional therapy during hospitalization.	0.70
Follow safety protocols and infection control measures to protect pediatric patients and healthcare providers.	0.75
Takes preventive actions regarding child's medical problems.	0.79
Evaluation and Documentation	
Monitor and document child's condition constantly.	0.78
Conducts a systematic ongoing evaluation of the expected outcomes as per nursing care plan.	0.66
Revise nursing care plan by using ongoing assessment data.	0.77
Incorporates new knowledge to initiate changes in nursing practice if desired outcomes are not achieved.	0.65

Ethical and Legal Considerations	
Able to handle ethical dilemmas in pediatric care and seek help when needed.	0.70
Maintain professional boundaries with pediatric patients and families to ensure ethical conduct.	0.84
Follow confidentiality policies to protect patient information and maintain trust in healthcare.	0.64
Able to obtain informed consent from child or their legal guardians.	0.68
Answering queries from children and families while offering counseling to both the child and their parents.	0.83
Perform painful procedure in treatment room.	0.68
Adopts ethical approach in relationship with child and their family.	0.74
Respect child's/family's cultural beliefs and values while providing care.	0.77
Knowledge and Research	
Regularly check and maintain all essential equipment.	0.60
Apply research findings to develop effective nursing care plans for pediatric patients.	0.89
Accept feedback from seniors and use it to improve her skills.	0.69
Uses Evidence based knowledge to identify problems/issues in nursing practice	0.74
Collaboration and Interpersonal Relationships	
Conveys information clearly and empathetically to child, family, and interdisciplinary team members.	0.81
Helps parents in providing parental support.	0.74
Behave in a friendly manner with child and family.	0.73
Cooperate with supervisor nurse/ward supervisors.	0.86
Encourage the involvement of family members in their child's care.	0.53
Promote flexible team co-operation in rapidly changing situations e.g. in emergency situations.	0.68
Engage responsibly in meetings and group activities.	0.80
Collaborate with the members of multidisciplinary teams in hospital setting for planning child care.	0.60
Leadership and Resource Utilization	
Creates harmonious work environment.	0.61
Takes full responsibility of her actions.	0.67
Works independently and in an organized manner.	0.61
Professional and Personal Development	
Efficiently managing time and priorities to deliver timely and effective care while balancing multiple responsibilities.	0.65
Maintain Empathy and Compassion which provides comfort and support during challenging times.	0.66
Stays updated with current evidence-based practices and advancements in pediatric healthcare.	0.86
Commitment to ongoing learning.	0.69
Committed to her organizations care philosophy.	0.66
Maintain positive body language, attire and conduct.	0.53
Takes care of her own physical, emotional, and mental well-being to provide high-quality care over the long term.	0.85

Table 3 shows that standardized factor loadings for the 51-item Nurse Professional Competence Scale for pediatric nurses are mostly above 0.60, confirming the statistical adequacy and conceptual clarity of the ten domains. Assessment (0.591–0.971), Nursing Diagnosis (0.649–0.731), Planning, Implementation, and Evaluation & Documentation (0.637–0.711) demonstrate strong representation of clinical skills. Ethical & Legal Considerations, Knowledge & Research, Collaboration & Interpersonal Relationships, Leadership, and Professional & Personal Development also show satisfactory to high loadings. Overall, the results confirm that the scale reliably captures the multidimensional competencies of pediatric nurses.

3.1.4. Reliability Assessment of P-NPCS

The construct reliability and convergent validity of the Nurse Professional Competence Scale for pediatric nurses (P-NPCS) were satisfactory for all latent variables. Composite Reliability (CR) values ranged from 0.78 to 0.86, exceeding the recommended threshold of 0.70, indicating good internal consistency. Average Variance Extracted (AVE) values ranged from 0.50 to 0.61, demonstrating that each construct explains at least 50% of the variance in its indicators. Domains such as Professional Competence (AVE = 0.61), Implementation (AVE = 0.59), and Leadership (AVE = 0.57) showed particularly strong convergent validity. All constructs, including Assessment, Nursing Diagnosis, Planning, Evaluation & Documentation, Ethical & Legal Considerations, Knowledge & Research, Collaboration, and others, met the CR and AVE criteria, confirming that the measurement model is reliable and demonstrates robust convergent validity.

3.1.5. Validity Assessment of P-NPCS

Table 4
Validity Assessment of Nurse Professional Competence Scale for Pediatric Nurses (P-NPCS)

Construct	AS	ND	PL	IM	ED	EL	KR	CI	LR	PP
Assessment (AS)	0.72									
Nursing Diagnosis (ND)	0.33	0.75								
Planning (PL)	0.29	0.33	0.73							
Implementation (IM)	0.27	0.43	0.46	0.77						
Evaluation & Documentation (ED)	0.32	0.45	0.23	0.40	0.72					
Ethical & Legal Consideration (EL)	0.33	0.47	0.44	0.41	0.40	0.75				
Knowledge and Research (KR)	0.30	0.44	0.36	0.32	0.41	0.46	0.73			
Collaboration & IRP (CI)	0.43	0.40	0.32	0.40	0.34	0.41	0.30	0.71		
Leadership & Resource Utilization (LR)	0.40	0.46	0.40	0.34	0.41	0.30	0.41	0.40	0.75	
Profession & Personal Development (PP)	0.51	0.45	0.38	0.34	0.40	0.41	0.40	0.34	0.95	0.78

Table 4 Discriminant validity of the P-NPCS was assessed using the Fornell–Larcker criterion. The square roots of AVE for all constructs: Assessment (0.72), Nursing Diagnosis (0.75), Planning (0.73), Implementation (0.77), Evaluation & Documentation (0.72), Ethical & Professional Attitude (0.75), Knowledge & Research (0.73), Collaboration (0.71), Leadership (0.75), and Professional Competence (0.78), were higher than their inter-construct correlations. Correlations among constructs were low to moderate, indicating meaningful relationships without excessive overlap. Even higher correlations, such as Professional Competence with Assessment (0.51) and Nursing Diagnosis (0.45), remained below the square root of AVE, confirming distinctiveness. Overall, the results establish that all constructs are empirically distinct, demonstrating strong discriminant validity.

3.1.6. Usability of the Nurse Professional Competence Scale

Overall, 87% of nurses demonstrated high competence and 13% moderate competence. Domain-wise analysis revealed the highest competence in Leadership and Resource Utilization (95%), Nursing Diagnosis (93.3%), and Evaluation and Documentation (90%), with comparatively lower scores in Collaboration and Interpersonal Relationships and Professional and Personal Development.

3.2. Discussion

3.2.1. Psychometric Robustness and Dimensionality of the P-NPCS

The structural validation of the Nurse Professional Competence Scale for pediatric nurses (P-NPCS) through Confirmatory Factor Analysis (CFA) confirmed a ten-factor model consisting of 51 items, reflecting the multifaceted nature of pediatric nursing competence. The achievemet of satisfactory fit indices, specifically a χ^2/df=2.93, CFI=0.93, GFI=0.92, and RMSEA=0.068 indicates that the empirical data aligns well with the proposed theoretical framework. Furthermore, the scale demonstrated high internal consistency and convergent validity, with composite reliability (CR) values between 0.78 and 0.86 and an Average Variance Extracted (AVE) exceeding 0.50 across all domains. These results suggest that the instrument is not only statistically stable but also capable of precisely capturing the distinct dimensions of professional competence required in specialized private healthcare settings.

The emergence of these ten distinct factors underscores a significant shift in how nursing excellence is conceptualized in high-acuity environments. This multidimensionality aligns with findings by Joo et al.

(2025) and Hriberšek et al. (2024), modern nursing competencies must transcend basic clinical tasks to include ethical leadership, psychosocial precision, and family-centered advocacy. By isolating ten specific domains, the Nurse Professional Competence Scale addresses the "competency granularity" required in pediatric care, which often involves complex decision-making processes that differ fundamentally from adult nursing. This is consistent with the research of Palermo et al. (2024) and Maffeo et al. (2025), which suggests that pediatric-specific scales are essential because general nursing instruments frequently overlook the unique emotional labor and specialized safety protocols inherent in caring for children. The structural complexity of this scale thus provides a comprehensive "competency architecture" that reflects the actual demands of the pediatric workforce in the 21st century.

The high level of expert consensus (S−CVI=0.90) attained through the three-round Delphi process highlights the critical role of "contextual intelligence" in developing culturally sensitive instruments. Engaging 20 national experts ensured that the items were not only theoretically sound but also ecologically valid within the Indian healthcare landscape. Recent methodological trends in scale development advocate for such rigorous stakeholder engagement to prevent "construct underrepresentation" (O'Daniel et al., 2022), particularly in regions with unique organizational hierarchies and cultural dynamics. Furthermore, the robust reliability and AVE values support the instrument's utility as a strategic tool for professional management. As highlighted by Tran (2025) and Jalali et al. (2025), having a psychometrically validated framework is a prerequisite for standardizing performance evaluations and identifying institutional training gaps. By providing a reliable benchmark, the P-NPCS facilitates a more evidence-based approach to nursing professional development, ultimately contributing to improved patient safety and quality of care in private clinical sectors.

3.2.2. Competence Profiles of Pediatric Nurses in Private Healthcare Settings

The findings of this study reveal that a substantial majority (87.3%) of pediatric nurses in the private hospitals of Punjab, India, demonstrate high levels of professional competence. This high prevalence suggests that the pediatric workforce in this sector possesses a strong foundation in clinical skills and the specialized knowledge required to manage the complex needs of young patients. However, the analysis also highlights a critical discrepancy: while individual clinical tasks and direct patient care scored highly, the domains of interprofessional collaboration and professional development received comparatively lower scores. These results indicate that while the nurses are technically proficient at an individual level, there remain significant systemic and professional hurdles in fostering a more integrated and continuously evolving healthcare practice.

The high level of competence observed in this study aligns with recent global trends in private healthcare, where institutional accreditation requirements and competitive market dynamics often drive higher standards of individual performance. For instance, Gershuni et al. (2023) and Alhojairi et al. (2024) have noted that nurses in the private sector frequently undergo more frequent skill assessments and orientation programs compared to their public sector counterparts to maintain institutional prestige. This "performance-driven" environment in Punjab's private hospitals likely motivates nurses to excel in self-reported clinical tasks. In many Asian healthcare contexts, hierarchical structures between medical professions can stifle the development of interprofessional competencies, leading to the lower scores in collaboration observed in this research.

The identified gaps in professional development and collaboration reflect broader challenges in the modern nursing landscape, where high clinical workloads often act as a barrier to lifelong learning. Research by Beal (2022) and Balakhdar & Alharbi (2023) emphasizes that professional development is not merely an individual responsibility but is heavily influenced by institutional support and the availability of specialized pediatric certification programs. The lower scores in this domain suggest that nurses may prioritize immediate clinical demands over long-term career advancement or research-oriented activities. Furthermore, Chávez-Valenzuela et al. (2025) and Tangpaisarn et al. (2025) suggest that without structured Interprofessional Education (IPE) frameworks within the hospital system, nurses may struggle to navigate complex interdisciplinary communications. To enhance the overall quality of pediatric care, private healthcare institutions must transition from a model of individual proficiency to one of "collective competence," where professional growth and interdisciplinary partnership are integrated into the core operational strategy.

3.2.3. Critical Analysis of Competence Gaps: Collaboration and Professional Development

Although the overall competence of pediatric nurses in this study was high, a critical analysis of the factor scores reveals significant gaps in the domains of interprofessional collaboration and professional development. These two areas consistently received the lowest mean scores compared to clinical technical skills. In the context of private hospitals in Punjab, India, these findings suggest that while nurses are highly capable of performing independent nursing actions, they face substantial challenges in navigating the multidisciplinary team environment and accessing continuous learning pathways. This

"competency imbalance" highlights a potential risk where technical proficiency is not matched by the communicative and developmental agility required for holistic pediatric care.

The lower scores in interprofessional collaboration are particularly noteworthy given the complexity of the pediatric clinical environment. Research by Chew et al. (2019) and Gregoriou et al. (2025) indicates that in many Asian healthcare systems, rigid professional hierarchies often act as a barrier to effective nurse-physician communication. In private sectors, where physician-led models are frequently dominant, nurses may perceive their role more as "task executors" rather than "collaborative partners." This is consistent with Wong et al. (2021), who noted that a lack of formal Interprofessional Education (IPE) in the workplace leads to fragmented care delivery. To bridge this gap, institutional strategies must move beyond individual skill-building and foster a "shared mental model" of care, where pediatric nurses are empowered to engage in assertive advocacy and collaborative decision-making.

Furthermore, the gap in professional development suggests that systemic barriers, such as high patient-to-nurse ratios and the absence of structured career pathways, hinder the pursuit of lifelong learning. According to Abuhammad (2025) and Al-Shammari et al. (2024), pediatric nursing requires constant updates in clinical guidelines and technological integration; however, without dedicated "protected time" for education, professional growth remains stagnant. This stagnancy is a global concern; according to Compton et al. (2023) and Smith et al. (2022), when nurses perceive a lack of institutional investment in their professional evolution, their long-term clinical reasoning and evidence-based practice capabilities diminish. Therefore, for private healthcare providers to sustain high-quality pediatric outcomes, it is imperative to integrate digitized learning platforms and specialized certification programs that align with the evolving demands of modern nursing professionalism.

3.2.4. Implications for Nursing Information Management and Quality of Pediatric Care

The psychometric validation of the Nurse Professional Competence Scale for pediatric nurses (P-NPCS) provides a standardized and robust framework for documenting nursing competence within institutional databases, offering a granular dataset that transcends traditional subjective appraisals. By identifying ten distinct domains of pediatric expertise, this research enables healthcare administrators to convert complex clinical qualities into quantifiable metrics. The findings imply that the P-NPCS can serve as a foundational tool for nursing information management, allowing for the integration of competency data into broader hospital information systems. This structured data approach is essential for modern private hospitals that rely on evidence-based management to monitor the "competence-performance" link and ensure that pediatric departments are staffed with appropriately skilled professionals relative to patient acuity.

The integration of validated competence scales into digital nursing information systems is a critical step toward achieving "data-driven nursing" excellence. Studies by Haakenstad et al. (2022) and Jose et al. (2022) argue that the lack of standardized, digitized competency data is a primary obstacle to effective human resource planning in specialized care units. By utilizing the P-NPCS, institutions can generate real-time competency profiles that inform Electronic Health Records (EHR) and digital nursing dashboards. This digital transformation allows for "precision staffing," where patient complexity is matched with specific nurse competency scores, a strategy that has been shown to significantly reduce clinical errors and improve resource allocation in high-pressure pediatric environments.

Ultimately, the deployment of the P-NPCS directly influences the quality of pediatric care by establishing a clear benchmark for safety and professional accountability. Zhang et al. (2025) and Alsadaan et al. (2023) have noted, pediatric quality of care is contingent upon the nurse's ability to navigate the intersection of medical technology and family-centered psychosocial support. The gaps identified in this study, specifically in interprofessional collaboration provide a targeted roadmap for quality improvement initiatives. By addressing these gaps through data-informed training modules, institutions can enhance "collective competence," which is a known predictor of reduced pediatric mortality and increased parent satisfaction. Thus, the P-NPCS serves as both a diagnostic and developmental instrument, bridging the gap between individual nurse capability and institutional excellence in the pursuit of superior pediatric health outcomes.

4. CONCLUSION

The development and psychometric validation of the Pediatric Nurse Professional Competence Scale (P-NPCS) provide a reliable and culturally sensitive framework for assessing nursing capabilities in specialized clinical settings. This study successfully established a 51-item, ten-factor model that accurately reflects the multidimensional nature of pediatric nursing, ranging from clinical technical skills to ethical advocacy. The strong statistical evidence, including a high content validity (S−CVI=0.90) and satisfactory fit indices from Confirmatory Factor Analysis (χ^2/df=2.93, CFI=0.93, RMSEA=0.068), confirms that the P-NPCS is an empirically sound instrument for producing precise and reproducible data for professional evaluation in the private healthcare sector.

The findings highlight that while pediatric nurses exhibit high levels of individual clinical competence, significant gaps remain in interprofessional collaboration and continuous professional

development. By identifying these specific areas of weakness, the P-NPCS serves as a strategic diagnostic tool for healthcare administrators. It offers a data-driven roadmap to standardize performance appraisals and design targeted training programs that address the unique challenges of the pediatric environment. Integrating this standardized benchmark into nursing information systems can effectively bridge the gap between individual nurse capability and the overall quality of pediatric care.

Despite its contributions, this study has limitations, primarily the use of a non-probability, total enumerative sampling method and its focus on private hospitals within a specific geographic region (Punjab, India), which may limit the generalizability of the results to public sectors or different cultural contexts. Additionally, the reliance on self-reported data introduces the potential for social desirability bias. Future research should involve longitudinal designs and a broader, more diverse sample to further refine the scale's external validity. Integrating the Nurse Professional Competence Scale into digital nursing dashboards is also recommended to facilitate real-time competency monitoring and evidence-based professional development.

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