

Clinical Practice Ability and Related Factors Among Senior Undergraduate Nursing Students Post-Clinical Internship: A Latent Profile Analysis

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ABSTRACT

The shortage of nurses and inadequate clinical practice abilities among senior undergraduate nursing students has raised significant concerns globally. The discrepancy between nursing education and practical skill requirements in hospitals is the primary contributor to this issue. Objectives: This study aimed to (1) explore potential classifications for assessing the clinical practice abilities of senior undergraduate nursing students in clinical practice, (2) identify distinct subgroups based on their clinical practice abilities, and (3) analyze the factors influencing these subgroups. Design: This was a cross-sectional study using latent profile analysis. Participants: A total of 336 fourth-year nursing students who had recently completed clinical practice were included in this study. Methods: Data were collected using a structured questionnaire that included sociodemographic factors, the Nursing Professional Attitude Questionnaire (NPAQ), and the Environmental Assessment Scale for Nursing Clinical Practice. The Clinical Ability Scale for Undergraduate Nursing Students (CCSUNS) measures clinical practice abilities. Latent profile analysis was used to identify subgroups of students based on their clinical practice abilities. Multinomial logistic regression analysis was used to analyze the factors influencing these subgroups. Results: Three profiles of clinical practice ability were identified: (1) "low level - guidance dependent" (51.79%), (2) "intermediate - response improvement" (33.85%), and (3) "high level - autonomous decision-making" (16.37%). Key influencing factors included gender, academic performance, professional nursing attitude, and the clinical practice environment. Conclusions: More than half of the senior nursing students demonstrated poor clinical practice abilities. Enhancing the clinical practice environment, increasing practical opportunities, fostering professional attitudes, and addressing gender equality are critical for improving clinical practice abilities. Future multicenter longitudinal studies are recommended to explore changes in clinical practice abilities over time and across different stages of clinical practice.

KEYWORDS

Clinical practice ability; Nursing students; Clinical Internship; Latent profile analysis; Nursing education

1. INTRODUCTION

The shortage of nurses in numerous countries and limited clinical practice ability among senior nursing students have raised significant concerns in nursing education (Amsalu et al., 2020; Matlhaba et al., 2019). Simultaneously, there is an increasing demand for skilled nursing professionals in the healthcare sector, necessitating senior nursing students to acquire adequate clinical practice abilities before transitioning to clinical nursing roles (Kirkman et al., 2018). The disparity between the training curriculum of nursing higher education and the skill requirements of hospital nursing staff is a

significant factor contributing to the insufficient clinical practice ability of senior nursing students post-clinical training (Li J et al., 2020). Currently, the clinical practice abilities of newly graduated nurses are concerning. An assessment of competence revealed that only 23% met entry-level standards (Kavanagh & Szveda, 2017). It is crucial for nursing educators and practice managers to analyze the factors influencing nursing students' clinical practice abilities and adequately prepare them for clinical settings (Almarwani & Alzahrani, 2023).

Clinical practice is the pivotal phase of nursing education, in which theoretical nursing knowledge is translated into practical skills. Throughout this stage, nursing students adapt to clinical environments and the role of nurses and progress from students to fully fledged clinical professionals (Carless-Kane & Nowell, 2023). Through hands-on practice, effective communication, and systematic training in a clinical environment, nursing students gradually master essential nursing skills, clinical reasoning, and emergency response abilities, thereby laying a solid foundation for their future career development (Morrison & Brennaman, 2016). Due to insufficient clinical guidance and lack of reflective practice, coupled with the disconnection between theory and practice and significant psychological pressure, nursing students often lack the fundamental competencies of clinical nurses, even after completing their clinical training (Mæland et al., 2021). Evidently, nursing students encounter challenges with inadequate clinical practice abilities after completing their clinical placement, which in turn detrimentally impacts both their career development and the quality of clinical nursing in hospitals (Alshehry et al., 2021). However, research on the potential classification of nursing students' clinical practice abilities post-placement has not yielded consistent findings. The underlying levels of clinical practice ability along with demographic and student-related characteristics remain largely unexplored. Understanding the potential classifications and influencing factors of clinical practice ability among senior undergraduate nursing students is crucial for identifying those with insufficient clinical skills and designing targeted interventions tailored to students with varying levels of clinical practice ability.

The clinical practice ability of nursing students is defined as their capability to integrate knowledge, skills, and attitudes in clinical settings to provide safe and effective nursing care, which is crucial for their professional development and essential for ensuring patient safety and improving nursing care quality (Wu et al., 2015). An essential objective of nursing education is to develop students' clinical practice proficiency (Mohammadi-Shahboulaghi et al., 2021). Clinical competence entails adeptly integrating cognitive, emotional, and psychological skills in healthcare delivery, thereby ensuring high-quality care and fulfilling a critical requirement for nurses in clinical settings (Almarwani & Alzahrani, 2023; Prosen & Ličen, 2023). Current research on nursing students' clinical practice competence primarily encompasses qualitative and quantitative methodologies (Goudreau et al., 2015) (Chen et al., 2017). Compared with qualitative studies and cross-sectional analyses, latent profile analysis offers the advantage of identifying hidden categories or subgroups within the data (Choi et al., 2022), thereby refining population analysis and enabling the development of more targeted intervention strategies.

Latent Profile Analysis (LPA) is a statistical method used to identify hidden subpopulations or categories within data based on individual explicit responses at a single point in time (Love & Durtschi, 2021). Latent Profile Analysis is widely used in nursing education to study the psychology, behavior, and attitudes of nursing students.

A latent profile analysis of emotion regulation characteristics among 578 undergraduate nursing students identified three distinct profiles: low inhibition and medium reappraisal, medium inhibition and high reappraisal, and high inhibition and high reappraisal, indicating that most nursing students possess strong emotion regulation abilities (Zeng et al., 2023). A latent profile analysis of nursing students' volunteer motivation during the COVID-19 pandemic identified three distinct categories: low-protection volunteer motivation (9.3%), medium-high occupational value volunteer motivation (37.5%), and high occupational value volunteer motivation (53.2%), with perceived social support, perceived stress, gender, and academic year significantly influencing volunteer motivation within

these categories (He et al., 2024). Latent profile analysis of nursing undergraduates' professional commitment revealed that most students exhibited a "moderate" level. Enhancing the practice environment and focusing on cultivating professional values among students with lower commitment levels is recommended to improve their satisfaction with clinical nursing experiences (Zhang et al., 2023). The inherent advantage of latent profile analysis lies in its ability to discern nuanced patterns and variations within complex datasets, thus enabling a more nuanced understanding of individual differences and facilitating targeted interventions that optimize learning and professional growth in nursing education.

This study aimed to achieve three objectives: (1) explore potential classifications for assessing the clinical practice abilities of senior undergraduate nursing students post-clinical practice, (2) identify distinct subgroups based on their clinical practice abilities, and (3) analyze the factors influencing these subgroups to address gaps in the current literature. This study aimed to enhance the understanding of clinical practice abilities among senior undergraduate nursing students, inform practice management strategies in nursing colleges and hospitals, and facilitate seamless transition into clinical nursing practice for nursing students.

The research questions were as follows.

- (1) How many categories of clinical practice abilities among senior nursing undergraduates?
- (2) What are the characteristics of nursing students with low levels of clinical practice ability?
- (3) How do sociodemographic characteristics, clinical settings, and professional nursing attitudes influence different subgroups of nursing undergraduates?

2. METHODS

2.1. Study Design and Participants

A cross-sectional study design was utilized, employing a convenience sampling method to select nursing students who had completed clinical practice at a Grade III Class A general hospital in Nanning, China, from July 2024 to August 2024. According to Kendall's rough sample-size estimate, the sample size should be at least 10-20 times the number of variables. A minimum of 240 samples were required for the 12 variables in this study. However, foreign studies recommend a sample size of 300 for latent profile analysis (Ferguson et al., 2019). Considering a 10% attrition rate, the target sample size was set at a minimum of 330 participants. Ultimately, a total of 336 valid samples were obtained. The inclusion criteria for participants were as follows: (1) Fourth-year full-time nursing undergraduate interns enrolled in national medical colleges and universities; (2) Recently completed clinical practice (within the last 2 weeks); and (3) Provided informed consent and voluntarily agreed to participate in the study. The Exclusion Criteria for participants were as follows: (1) History of previous or current mental illness; (2) Previous participation in similar research studies.

2.2. Measures

To explore the characteristics of nursing students with relatively low levels of clinical practice ability, we considered several sociodemographic factors. These factors include gender, place of birth, only child status, student leadership roles, voluntary choice of nursing, nursing career intention, academic performance, having a family member who is a healthcare worker, and participation in volunteer healthcare activities (Hailu et al., 2021). Additionally, this study utilized the Competence in Professional Education Model (CPEM) (Mikkonen et al., 2022) as its theoretical framework, revealing that the formation and development of nursing students' clinical practice abilities are influenced by professional attitudes and the clinical environment. Drawing on previous studies (Alshehry et al., 2021; Hailu et al., 2021), the Nursing Professional Attitude Questionnaire (NPAQ)

was employed to assess professional nursing attitudes (Yao et al., 2020), while the clinical environment (Hu et al., 2019) was evaluated using the Environmental Assessment Scale for Nursing Clinical Practice.

The Clinical Ability Scale for Undergraduate Nursing Students (CCSUNS), developed by Yao (Yao et al., 2020), was used to measure the clinical practice ability of nursing students. The scale consists of 44 items across seven dimensions: "clinical nursing" (9 items), "communication and coordination" (6 items), "health education" (5 items), "scientific research and innovation" (7 items), "emergency cooperation" (5 items), "humanistic care" (8 items), and "clinical teaching" (4 items). Responses were scored on a 5-point Likert scale, with higher scores indicating better clinical practice ability. The scale demonstrated good reliability and validity with a Cronbach's α coefficient of 0.923.

2.3. Data Collection

The investigator and four clinical nursing teaching administrators were responsible for collecting questionnaire data. The researchers conducted unified training on investigation and evaluation, ensuring strict adherence to the inclusion and exclusion criteria when selecting participants. Before the investigation, the investigators explained the purpose and significance of the research to nursing students and obtained their informed consent. Nursing students were informed about the contents of the questionnaire and how to complete it.

All participants were gathered at the hospital's conference center and seated separately to prevent communication during the questionnaire. Paper questionnaires were distributed and collected 15 min later. If any items were missing in the returned questionnaires, the investigator reviewed and supplemented the responses with the participants on-site.

2.4. Ethics Consideration

The study was approved by the Ethics Committee (No.2024-69-IMA-CNAHS). Nursing students volunteered to participate in the study and signed informed consent prior to completing the questionnaire. The investigators managed the survey data under the supervision of the hospital ethics committee and signed a confidentiality agreement to ensure data confidentiality.

2.5. Data Analysis

The latent profile analysis (LPA) was conducted using Mplus 8.3 to identify the maps. The clinical practice abilities of nursing students were treated as continuous variables. The analysis began with the assumption of a single category to establish the data model and incrementally increasing the number of categories. The optimal fitting model was selected based on the results of the fit tests, classification indices, and difference tests. (1) Model Fit Indicators: These include Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and adjusted Bayesian Information Criterion (aBIC). Smaller values indicate better model fit (Nylund-Gibson & Choi, 2018). (2) Classification Index: Entropy was used to assess the model classification accuracy, with an overall entropy value of ≥ 0.90 , indicating accurate classification (Tein et al., 2013). (3) Difference Tests: These included the Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) and bootstrap-based likelihood ratio test (BLRT) to compare model fit differences. A p-value of less than 0.05 indicates that the k-1 model fits better than the k model (Nylund-Gibson et al., 2019). All subsequent analyses were conducted using the most likely class membership.

Data were analyzed using SPSS 24.0 Measurement data following a normal distribution or nearly normal distribution were described as mean \pm Standard Deviation ($\bar{X} \pm S$). Measurement data not following a normal distribution were described as medians (P25, P75). Categorical data were described by case number and component ratio. The t-test, non-parametric test, chi-square test, and one-way analysis of variance were used to compare the latent profiles of clinical practice ability

among senior nursing students with different characteristics. Individual characteristics of different categories of clinical practice ability were analyzed using multinomial logistic regression, with latent profile types as the dependent variable and statistically significant variables as independent variables. A two-tailed test was used, with a significance level of $\alpha = 0.05$.

3. RESULTS

3.1. Participants Characteristics

A total of 342 questionnaires were distributed, and 336 were valid, resulting in an effective response rate of 98.25%. Among the 336 senior undergraduate nursing students, 50 (14.88 %) were male and 286 (85.12 %) were female. Of these students, 217 (64.58%) were born in urban areas, and 119 (35.42%) were born in rural areas. Regarding academic performance, 61 (18.15%) students were qualified, 187 (55.65%) were good, and 88 (26.19%) were excellent. Thirty students (8.93%) were the only children of their families. There were 176 student leaders (52.38%), 235 students (69.94%) voluntarily pursuing a nursing career, 242 students (72.02%) who planned to enter the nursing profession, and 106 students (31.55%) from healthcare worker families. In addition, 219 students (65.18%) participated in volunteer activities.

3.2. Scores of Clinical Practice Ability

The overall score for nursing students' professional attitude was (123.33 ± 20.71) points, and the score for the clinical practice environment was (90.01 ± 8.45) points. The total score for clinical practice ability was (151.15 ± 27.48) points. Among the seven dimensions of clinical practice competence, the score for "Clinical Nursing" was (30.69 ± 5.67) points, the score for "Communication Ability" was (21.48 ± 4.44) points, the score for "Health Education" was (17.34 ± 3.54) points, the score for "Scientific Innovation" was (21.25 ± 5.11) points, the score for "Emergency Response" was (15.62 ± 3.74) points, the score for "Humanistic Care" was (30.30 ± 6.70) points, and the score for "Clinical Teaching" was (14.47 ± 3.15) points.

3.3. Profile Model Selection and Naming

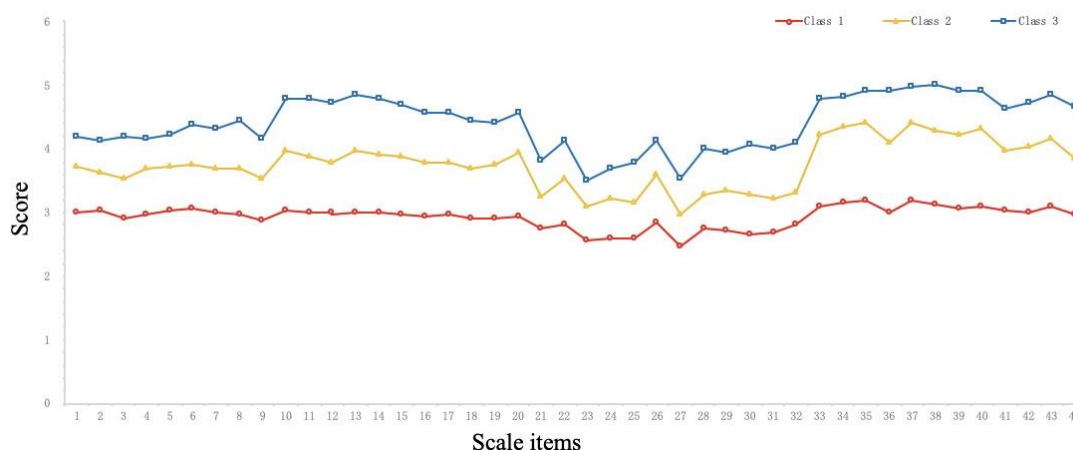
In this study, the model was sequentially fitted to potential profiles 1–5 using the total score of the clinical practice ability scale as the indicator. The AIC, BIC, and aBIC values gradually decreased with an increase in the number of profile models. The P-values of the LMR and BLRT indicate that the two-profile model is better than the single-profile model, the three-profile model is better than the two-profile model, and the three-profile model is better than the four-profile model. Meanwhile, in the three-profile model, the entropy was maximized with an entropy value of ≥ 0.90 . Based on the above information, the fitting effect of the three-profile model is the best.

The scores of the 44 items of clinical practice ability in the three profiles selected based on model selection are shown in Fig. 1. The three profiles were named according to the characteristics of the score levels of each latent profile. Profile 1 had the largest proportion (51.79%) and exhibited a low level of overall clinical practice ability (128.97 ± 11.50), requiring extensive guidance and supervision. Thus, it was named the "low level - guidance dependent." Profile 2 had a moderate proportion (33.85%) with an intermediate level of overall clinical practice ability (165.07 ± 10.92). However, this group was insufficient in dealing with complex problems and emergencies, so it was named the "intermediate-response improvement". Profile 3 had the smallest proportion (16.37%) and demonstrated a high level of overall clinical practice ability (194.24 ± 12.91), with outstanding autonomy and decision-making ability in clinical practice. Therefore, it was named the "high level - autonomous decision-making."

Table 1. Model fitting indexes for LPA in Clinical practice ability

Model	AIC	BIC	aBIC	LMR (p)	BLRT (p)	Entropy	Probabilities of classes
One-class	36683.644	37019.550	36740.404				
Two-class	28598.323	29105.999	28684.107	0.000 0	0.000 0	0.992	57.14% /42.86 %
Three-class	26930.830	27610.276	27045.639	0.026 9	0.000 0	0.993	51.79% /31.85% /16.37%
Four-class	25906.914	26758.129	26050.747	0.758 3	0.000 0	0.991	48.81% /18.78% /16.37% /16.07%
Five- class	25070.389	26093.374	25243.247	0.406 9	0.000 0	0.985	13.39%/39.29%/16.3 7%/16.67%/12.29%

Note. Boldface indicates the selected model



Note: Class 1: Low Need - Self-care, Class 2: Moderate Need - Partial Care, and Class 3: High Need - Comprehensive Care.

Figure 1. Latent profile analysis result of Clinical practice ability of Senior undergraduate nursing students

3.4. Influencing Factors of Clinical Practice Ability Profiles

The univariate analysis results for the different profiles of clinical practice ability among senior undergraduate nursing students are shown in Table 2. The findings showed that gender, only child status, student leadership, nursing career intention, academic performance, healthcare volunteer participation, professional attitude towards nursing, and the clinical practice environment significantly influenced the clinical practice ability of senior undergraduate nursing students ($p < 0.05$) (Table 2).

Multiple logistic regression analysis was conducted with the clinical practice ability profile as the dependent variable and variables with statistically significant differences in the univariate analysis as the independent variables, as shown in Table 3. Using profile 1 as the reference group, factors influencing the "high level - autonomous decision-making group" were gender (male), academic performance (pass), practice environment, and professional attitude. Using profile 1 as the reference group, the factors influencing the "intermediate-response improvement group" were practice environment and professional attitude. Using profile 2 as the reference group, factors influencing the "high level-autonomous decision-making group" were gender (male), academic performance (pass and good), and practice environment.

Table 2. Descriptive statistics in each Latent Profiles of Clinical practice ability

Variables	Profile 1 (n=174)	Profile (2n=107)	Profile 3 (n=55)	F/ χ^2	p
Gender, n (%)				6.241	0.044
Male	29(8.6%)	22(6.5%)	3(0.9%)		
Female	145(43.2%)	85(25.3%)	52(15.5%)		
Place of Birth, n (%)				0.946	0.623
Urban	64(19.0%)	34(10.1%)	21(6.3%)		
Rural	110(32.7%)	73(21.7%)	34(10.1%)		
Only child, n (%)				25.877	<0.001
No	152(45.2%)	95(28.3%)	33(9.8%)		
Yes	22(12.6%)	12(3.6%)	22(12.6%)		
Student leader, n (%)				18.575	<0.001
No	144(42.9%)	88(26.2%)	31(9.2%)		
Yes	30(8.9%)	19(5.7%)	24(7.1%)		
Voluntarily choose nursing, n (%)				3.359	0.186
No	60(17.9%)	27(8.0%)	14(4.2%)		
Yes	114(33.9%)	80(23.8%)	41(12.2%)		
Nursing career intention, n (%)				7.230	<0.001
No	56(16.7%)	17(5.1%)	5(1.5%)		
Yes	118(35.1%)	90(26.8%)	50(14.9%)		
Academic performance, n (%)				88.769	<0.001
Pass	57(17.0%)	7(2.1%)	2(0.6%)		
Good	96(28.6%)	69(20.5%)	16(4.8%)		
Excellent	21(6.3%)	31(9.2%)	37(11.0%)		
Health care worker family, n (%)				1.479	0.477
No	152(45.2%)	89(26.5%)	45(13.4%)		
Yes	22(6.5%)	18(5.4%)	10(3.0%)		
Healthcare volunteer participation, n (%)				14.566	0.001
No	129(28.4%)	66(19.6%)	26(7.7%)		
Yes	45(13.4%)	41(12.2%)	29(8.6%)		
Nursing Professional Attitude, mean \pm SD	111.30(16.66)	132.21(15.53)	144.09(15.46)	110.37	<0.001
Clinical Practice Environment, mean \pm SD	83.56(5.03)	94.04(2.47)	102.58(4.90)	465.84	<0.001

Note: * indicates Fisher's exact test

Table 3. Multivariate Logistic Regression Analysis of the Latent Profiles of Clinical practice ability of Senior undergraduate nursing students

Variables	β	SE	Wald χ^2	P	OR	95%CI
C1~ C2 ^a						
Practice Environment	2.687	0.727	13.643	<0.001	14.682	3.529~61.085
Professional Attitude	0.090	0.035	6.689	<0.001	1.094	1.022~1.171
C1 ~ C3 ^a						
Practice Environment	3.917	0.782	25.083	<0.001	50.235	10.847~232.642
Professional Attitude	0.133	0.046	8.409	0.004	1.142	1.044~1.250
Gender (ref, female)						
Male	-6.072	2.542	5.705	0.017	0.002	0.000~0.336
Academic performance (ref, Excellent)						
Pass	-6.177	2.558	5.832	0.016	0.002	0.000~.312
Good	-2.376	1.709	1.932	0.164	0.093	0.003~2.648
C2 ~ C3 ^b						
Practice Environment	1.230	0.287	18.364	<0.001	3.422	1.949~6.006
Gender (ref, female)						
Male	-5.244	1.942	7.288	0.007	0.005	0.000~0.238
Academic performance (ref, Excellent)						
Pass	-4.245	1.981	4.593	0.032	0.014	0.000~0.696
Good	-2.902	1.109	6.847	0.009	0.055	0.006~0.483
Note: SE, standard error; OR, odds ratio; B, unstandardized coefficient; CI, confidence interval; C1: Low level - guidance dependent, C2: Intermediate - response improvement, and C3: High level - autonomous decision-making; a: C1 was assigned as the reference class, b:C2 was assigned as the reference classy; *, p < 0.05.						

4. DISCUSSION

This study identified distinct profiles for nursing students' clinical practice abilities. The results indicated that the total score of nursing students' clinical practice ability could be divided into a low-level guidance-dependent group (51.79%), an intermediate-response improvement group (33.85%), and a high-level autonomous decision-making group (16.37%). The low-level guidance-dependent group comprised the majority, which was slightly lower than the rate reported by Hailu (Hailu et al., 2021) at Midwifery University and Yezengaw (Yezengaw et al., 2024) at Bahir Dar University for underachieving clinical practice ability among undergraduate nursing students.

More than half of the nursing students in this study had a low level of clinical practice ability, which should arouse great concern among nursing educators and hospital nursing administrators.

Multiple logistic analysis showed that gender and academic performance of nursing students were significant influencing factors for the low level - guidance dependent group and the intermediate - response improvement group. The clinical practice ability of male nursing students was more likely to be classified as "low level - guidance dependent group" (OR=0.002, p=0.017) and "intermediate - response improvement group" (OR=0.005, p=0.007). Consistent with other studies, the clinical practice ability of male nursing students was lower than that of female students (Yip et al., 2021). Male nursing students are often seen in clinical settings as manual laborers or safety assistants rather than as nursing professionals, and this role expectation reduces their professional identity and practice opportunities (Prosen, 2022). Additionally, male nursing students may experience a gender bias or discrimination in clinical settings, which can lead to a lack of confidence and motivation (Liu et al.,

2022). Nursing education institutions should enhance their curriculum on gender equality and diversity while training educators and clinical mentors to help students understand and eliminate gender stereotypes. Include male mentors and role models for male nurses in nursing education and clinical settings and conduct lectures or activities on the gender of nurses to help students address gender-specific challenges.

Nursing students with qualified academic performance and good clinical practice ability are more likely to be classified in the "low level - guidance dependent group" (OR=0.002, p=0.016) and "intermediate - response improvement group" (OR=0.014, p=0.032; OR=0.055, p=0.009). According to the research results by Chewaka at Mizan-Tepi University (Chewaka Gamtessa, 2021), academically successful students usually have a solid foundation of theoretical knowledge that is essential for understanding and applying a wide range of skills and methods in clinical practice. Additionally, students with high academic performance tend to have good study habits such as time management, critical thinking, and effective study strategies, which are equally applicable to clinical practice, enabling them to learn and apply new knowledge and skills more effectively (Shirazi & Heidari, 2019). Furthermore, students with good academic performance usually possess better coping and problem-solving skills, and their effective stress management abilities can help them to remain calm and efficient in complex and urgent situations (Kim & Shin, 2021). Nursing schools should increase practical opportunities for students with qualified or good academic performance, allowing them to use clinical simulation training to improve practical skills without clinical pressure. At the same time, students are encouraged to engage in reflective learning, reflecting on their experiences and shortcomings in the practice process through journals, case discussions, and other methods (Ibrahim Khalil & Abou Hashish, 2022).

At the same time, a good professional attitude among nursing students contributes to a high level of clinical practice ability in clinical practice. Ten studies confirmed a positive correlation between professional attitudes and clinical practice ability (Ten Hoeve et al., 2017). This may be related to the fact that nursing students with a good attitude are usually enthusiastic about their nursing careers and have a sense of mission, which makes them more proactive in learning and practicing. This may also be related to the fact that a positive professional attitude helps students develop a strong professional identity, which enables them to behave more confidently and professionally in clinical practice. A study by Smith and Yang on nursing students in China found that nursing students with a good professional attitude showed higher mental resilience in the face of clinical stress and challenges, were better able to cope with stress and uncertainty at work, and thus performed better in clinical practice (Smith & Yang, 2017). Therefore, nursing colleges should add courses on professional attitudes and spirit to the curriculum to help students understand the importance and significance of the nursing profession and stimulate their professional enthusiasm and sense of mission (Lundell Rudberg et al., 2022). When necessary, courses on stress management and emotional regulation should be offered to teach students how to remain calm and positive in the face of clinical stress (Wang et al., 2022). Simultaneously, nursing students should be encouraged to engage in early clinical practice, increasing interactions with patients, nurses, and other members of the healthcare team to help them build professional identities (Ewertsson et al., 2017).

The clinical environment imperceptibly influenced the formation and development of nursing students' clinical practice abilities, which is consistent with the conclusions of Rudberg (Lundell Rudberg et al., 2022). The clinical environment provides nursing students with hands-on opportunities to apply their knowledge in real situations and train their communication skills (Flott & Linden, 2016). Nursing students learn to make rapid and effective clinical decisions in a real clinical environment, which is complex and uncertain (Papastavrou et al., 2016). Simultaneously, a good clinical environment can provide timely feedback and guidance for nursing students, allowing them to recognize their strengths and weaknesses and make timely adjustments and improvements. Through imitation and interaction, nursing students can form correct professional attitudes and behavioral norms, which are crucial to their future career development (Mikkonen et al., 2016).

Clinical practice hospitals and teaching managers should create a positive clinical practice atmosphere and a good learning environment by establishing a supportive and encouraging culture, selecting and training excellent clinical tutors, setting clear clinical practice goals and evaluation criteria, providing rich practice opportunities, paying attention to the mental health of nursing students, and encouraging continuous professional development.

5. LIMITATIONS

There are several limitations to this study. First, this study classified and named the clinical practice ability of senior undergraduate nursing students at the individual level using latent profile analysis for the first time, and the suitability of the naming needs further discussion. Second, the nursing students in this study mainly came from colleges and universities in Guangxi, China, and the sample size was rather small, with significant economic and cultural differences between different regions in China. In the future, multi-center studies with more samples from more regions should be conducted to verify the extrapolation of the research conclusions. Additionally, this study was a cross-sectional study, making it challenging to explore causal relationships between variables; more sophisticated research designs are needed in the future to clarify causal relationships between variables.

Despite these limitations, this study uses Latent Profile Analysis (LPA) to identify nursing students with insufficient clinical practice ability, highlight which groups nursing educators should be concerned about, and point to potential strategies to improve their clinical practice ability.

6. CONCLUSION

The results of this study, which used Latent Profile Analysis (LPA) for statistical analysis, revealed three potential characteristics of clinical practice ability in senior undergraduate nursing students after completing clinical practice. More than half of the undergraduate nursing students belonged to the group with low clinical practice abilities. Gender, academic achievement, professional nursing attitude, and clinical practice environment were the main factors influencing the classification of nursing students' clinical practice ability. The clinical practice environment should be further improved while increasing practice opportunities, cultivating professional attitudes, strengthening gender equality education, providing psychological support, and introducing male mentors and role models to enhance the clinical practice ability of nursing undergraduates. In the future, multi-center longitudinal studies can be carried out to explore the trajectory of changes in the clinical practice ability of nursing students at different clinical practice stages and further clarify the changes and development of their clinical practice ability during clinical practice.

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