

Research Progress of Clinical Reasoning Ability of Nurses

Jiayan Sun¹, Min Zhang¹, Jiancun Li¹, Yunxia Shen², Guilan Zhang^{2*}

¹ School of Nursing, Yunnan University of Traditional Chinese Medicine, Kunming, Yunnan, China

² Kunming Hospital of Traditional Chinese Medicine, Kunming, Yunnan, China

Abstract: Nurses' clinical reasoning ability is a core cognitive skill in nursing practice, which is directly related to the accuracy of clinical judgment, patient safety, and the improvement of nursing quality. With the in-depth advancement of China's medical and health system reform and the extensive implementation of high-quality nursing services, higher requirements have been put forward for nurses' professional qualities and decision-making abilities. However, due to the current lack of a systematic and contextualized clinical reasoning training framework in domestic nursing education and clinical training, nurses, especially those with less work experience, face problems such as lack of confidence in judgment and delayed decision-making in actual work. Therefore, this study conducts a review on the concept, assessment tools, influencing factors, and research status of nurses' clinical reasoning ability, aiming to provide a reference for relevant research on the cultivation of domestic nurses' clinical reasoning ability.

Keywords: clinical reasoning ability of nurses, reasoning ability, critical thinking, clinical decision making

1. Introduction

Clinical Reasoning (CR) is a cognitive process for medical staff to integrate patients' individual characteristics, preferences and background factors for clinical evaluation, diagnostic decision-making and nursing management through this activity. It runs through the whole process of collecting information, interpreting clues, forming judgments and formulating nursing measures. It is the key link[1,2] of carrying out clinical evaluation and making and implementing nursing plans. As one of the core competencies of nurses' nursing practice, the level of clinical reasoning ability directly affects the quality of nursing safety and patient outcomes[3]. With the increasing complexity of disease spectrum, the increasing comorbidity rate of patients and the increasing diversity of medical scenarios, the requirements for nurses to reason efficiently and make independent decisions in uncertain situations are constantly increasing. However, a number of studies have shown that the current development of clinical reasoning ability of new registered nurses is not optimistic, and it has not yet fully reached the level required for safe and independent practice. A large-scale survey has shown that about 54% of new registered nurses have significant difficulties[4] in recognizing changes in patients' condition and responding to sudden clinical problems. This lack of ability has become an important factor leading to clinical errors and adverse events. Another survey of 619 newly recruited nurses also showed that their total score of critical thinking was at a medium level, especially in the ability[5] to analyze and infer and solve problems systematically. This situation not only increased the incidence of nursing risks, but also posed a continuous threat[6] to the overall quality of nursing and patient safety. In this context, systematic improvement of nurses' clinical reasoning ability has become an urgent problem to be solved in nursing education and clinical training. Therefore, this article describes the overview, assessment tools, influencing factors and research status of nurses' clinical reasoning ability, in order to provide a reference for the construction of a systematic clinical reasoning ability training model.

2. Evaluation tools for nurses' clinical reasoning ability

2.1 The Script Concordance Test (SCT)

The Script Concordance test (SCT) is an assessment tool developed by Charlin et al.[10], based on the Script Theory. At first, it is used to evaluate the clinical reasoning ability of students by comparing the decision-making patterns of students and experts in real clinical situations. Later, it was used to simulate the decision-making process of clinical workers in real medical situations to evaluate the performance [11,12] of clinical reasoning in the face of missing information or uncertainty in the clinical environment. There were 20 cases and 60 items in the tool. The Cronbach's α coefficient of the tool was 0.855, which had high internal consistency. At present, no scholar has introduced it into the field of nursing education in China.

2.2 Critical Thinking Instruments (CTI)

There are high correlations between multiple dimensions of the critical thinking inventory and clinical diagnostic

thinking questionnaire, indicating that it is an important part[13] of the clinical reasoning process. Therefore, the critical thinking inventory can also be used to evaluate clinical reasoning. Common tools include: The California Critical Thinking Skill Test (CCTST), Watson Glaser Critical Thinking Scale Appraisal (WGCTA), Watson Glaser Critical Thinking Appraisal (WGCTA), Halpern Critical Thinking Assessment, HCTA) and the California Critical Thinking tendency questionnaire (California Critical Thinking Dispositions Inventory, CCTDI), etc., which is generally more recognition CCTDI. Facione et al. [14] developed CCTDI in 1992, which has seven dimensions and 75 items. The scale uses Likert 6-point scoring method, and its Cronbach's α coefficient is 0.90. The higher the score, the better the critical thinking ability of the subject. In 2004, Peng Meici et al. [15] revised the Chinese version of CCTDI. The revised version contained 70 items, the maximum total score was 470, and the total Cronbach's α coefficient was 0.90. The higher the score, the stronger the critical thinking ability. However, due to the large number of items and complex structure of the scale, it is not conducive to effectively evaluate students' critical thinking ability. Therefore, Yang Guangmei et al. [16] simplified the scale on this basis, and finally formed six dimensions and 31 items. The Likert 6-point scoring method was used. The total score ranged from 31 to 186, and Cronbach's α coefficient was 0.865.

2.3 The Lasater Clinical Judgment Rubric (LCJR)

The scale was developed by Lasater[17] et al in 2007 on the basis of "clinical judgment model" and "novice to expert model". It is used to evaluate the clinical judgment ability of nursing students in simulated nursing situations. It contains 4 dimensions and 11 items. The scale has good reliability in measuring the clinical judgment ability of nursing undergraduates, and its Cronbach's α coefficient is 0.974, and the test-retest reliability is 0.908. In recent years, the scale has been widely used in the training of clinical judgment ability carried out by nursing undergraduates or clinical nurses, and has been translated into Dutch, Spanish and other versions[18][19]. In 2019, Chinese scholar Wang Min and other scholars translated the scale into[20] Chinese. The Chinese version of LCJR has 11 items, including four dimensions of observation, interpretation, reaction and reflection. The overall Cronbach's α coefficient of the scale was 0.896, which was greater than 0.8. Although there were some differences[17] in the reliability measurement results between this study and Lasater et al.'s study, the reliability of each item was greater than 0.8, and the correlation coefficient between each dimension was also within an acceptable range.

2.4 Self-Assessment of Clinical Reflection and Reasoning (SACRR)

The scale was first developed by Royeen et al.[21], and then revised by Seif et al.[22] It is mainly used to evaluate the clinical reasoning ability of students. The scale contains 26 items, Likert 5-point scoring method is used, the highest score is 180 points, the higher the score, the stronger the clinical reasoning and self-reflection ability of students. The higher the score, the stronger the clinical reasoning and self-evaluation ability of students. Cronbach's α coefficient was 0.92. Subsequently, Yu Jie et al. [3] translated the SACRR into Chinese, and finally formed four dimensions: information system, problem analysis, truth seeking and reflection ability. The Cronbach's α coefficient of the Chinese version of SACRR was 0.754, and the test-retest reliability was 0.785, which provided an effective tool for the evaluation of clinical reasoning ability of nursing students. It has the advantages of avoiding inter-rater bias, saving time, being efficient and easy to operate.

2.5 The Clinical Reasoning Evaluation Simulation Tool (CREST)

In 2018, Liaw et al.[23] compiled the CREST based on the clinical reasoning model, which is mainly used to evaluate the ability of nursing students to identify and process changes in patients' condition in simulated clinical situations. The CREST tool includes eight steps, including information collection, data analysis, problem confirmation, planning, implementation, effect evaluation and summary and reflection, with a total of 11 items. The Cronbach's α coefficient of the scale was 0.92, which had certain feasibility. However, no multi-center and large sample size empirical study has been conducted to test the reliability and validity of the instrument, and its validity and reliability need to be further verified. At present, the scale has not been systematically translated into Chinese, and its cross-cultural applicability still needs to be verified.

2.6 Nurse Clinical Reasoning Scale (NCRS)

The scale was compiled by Taiwan scholar Shwu-Ru Liou[24] in 2016. The scale includes 15 items and uses a 5-point Likert scoring method. The higher the total score, the stronger the clinical reasoning ability of nurses. At present, the scale has been translated into Italian[25], Persian [26] and other versions. Subsequently, Wang Yujing and other scholars [27] adapted NCRS locally. The item validity index of the scale was between 0.8 and 1.0, the reliability was 0.867, and the overall validity coefficient was 0.987, indicating that the scale had ideal psychometric properties.

2.7 The Clinical Reasoning Scale (CRS)

The scale was compiled by Huang et al.[28] in 2023. It has four domains and 16 items. The Cronbach's α coefficient of different domains is between 0.789-0.839, and the Cronbach's α coefficient of the total scale is 0.894, which has good reliability and validity. The scale can comprehensively and systematically evaluate the clinical reasoning ability of nursing students, and at the same time provide a basis for educators to improve teaching, so as to better meet the learning needs of nursing undergraduates. At present, the scale has not been translated into Chinese.

2.8 Clinical Reasoning Competency Scale (CRCs)

CRCs was compiled by Bae et al.[29], a Korean scholar, in 2023. The scale consisted of 22 items in 3 dimensions, including plan making, intervention strategy adjustment and self-guidance. The Cronbach's α coefficient of the total scale was 0.92. At present, the scale has only been used in clinical nurses in Korea, and the Chinese version has not been introduced or reported in China. Therefore, the applicability of the scale in the context of Chinese culture still needs to be further tested and evaluated.

3. Influencing factors

The formation and development of nurses' clinical reasoning ability is a complex process affected by multiple factors. Existing studies have shown that its influencing factors can be roughly summarized into two dimensions: individual factors and organizational environment factors.

3.1 Individual factors

At the level of individual factors, several studies have shown that age, working years, graduation time and professional title are significantly and positively correlated with clinical reasoning ability. Senior nurses usually show more mature clinical reasoning ability, which may be due to their richer clinical practice experience. They can identify clinical patterns faster, predict disease changes and form more accurate judgments[28,30]. In addition, self-directed learning ability has also been identified as a key influencing factor by a number of studies, which is directly related to whether nurses can actively acquire new knowledge, adapt to new technologies and complex clinical situations, so as to continuously optimize their reasoning process[27]. Other personal traits such as communication skills, information exchange between nurses and patients and teams, psychological resilience and professional autonomy perception are related to the correct judgment and decision-making independence of nurses under the pressure of clinical work. At the same time, age, the frequency of going out to study or participating in academic activities were also confirmed to be related to reasoning ability. [26,31] In addition, the cognitive habits and learning engagement of nurses are very important. The frequency of reading professional literature and the number of participating in continuing education each year have been identified as key predictive variables by a number of studies, which may be related to the high frequency of academic[27] reading and continuous professional learning, which can help to constantly update the knowledge system and contact with cutting-edge clinical evidence. In order to enhance their ability to analyze and judge in complex situations.

3.2 Organizational and environmental factors

Organizational and environmental factors play a key role in the development of nurses' clinical reasoning ability. The structural characteristics and cultural atmosphere of the workplace together constitute important contextual factors affecting clinical reasoning practice. Existing studies have shown that there is a significant correlation between the professional characteristics of the nurses' departments and their clinical reasoning performance. There are differences in the complexity of work and the characteristics of the patient population in different specialties, which will directly affect the content and method[27] of clinical reasoning. The study also points out that the effects of "overall analysis of patients' health status with colleagues" and "the number of continuing education per year" on clinical reasoning ability are not the personal habits of nurses, but the performance of the collaborative culture and mechanism of the department organization.

Clinical reasoning focuses on the internal cognitive process, and clinical decision-making is its external action. Therefore, the core elements that constitute the basis of clinical reasoning also extend and reflect in the level[31] of clinical decision-making. Therefore, the research on the influencing factors of clinical decision-making ability provides an important reference for understanding the formation and restriction of clinical reasoning ability. A number of studies on junior nurses have shown that their clinical decision-making ability is affected by factors[32-35] such as educational background, professional title, and the frequency of participating in academic activities, which also restrict the quality of information acquisition, integration and judgment in the process of clinical reasoning.

In conclusion, the clinical reasoning ability of nurses is complicated by many factors such as seniority, professional title,

clinical experience, communication ability, age, psychological characteristics, professional autonomy and the frequency of going out to study and so on. However, most studies focus on undergraduate nursing students or newly recruited nurses, and in-depth research on mature nurses, especially nurses in different specialized fields, is relatively scarce. Moreover, most studies use cross-sectional surveys, which is difficult to reveal the dynamic causal relationship between influencing factors and ability development. Further research is needed to explore the interaction mechanism between individual and organizational factors, so as to provide a basis for formulating targeted intervention strategies.

4. Research status

4.1 Foreign research status

At present, the research on clinical reasoning ability of nurses at home and abroad has shown significant differences. Foreign research started early and has formed a relatively mature research system. Its focus is no longer limited to the discussion of basic concepts, but goes deep into the cognitive characteristics and differences of clinical reasoning of nurses in different specialist fields, and carries out the investigation of the influencing factors of clinical reasoning ability of nurses in different specialist fields, the development[31,36] of assessment tools, and the integration[37] of technologies. Atalla ADG et al.[37] explored the relationship between the attitude towards artificial intelligence (AI), creative self-efficacy and clinical reasoning ability of intensive care nurses. The results showed that nurses generally had a positive attitude towards AI, and their clinical reasoning ability was high, but their creative self-efficacy was medium. Further analysis showed that positive AI attitude was significantly positively correlated with creative self-efficacy and clinical reasoning ability, which had a promoting effect. In addition, a study on the ability of three big language models, DeepSeek R1, ChatGPT-o1 and Llama 3.1-405B, to evaluate clinical reasoning and knowledge application pointed[38] out that the three models have great potential and value in the medical field. These models can provide solutions for structured medical tasks in terms of general medical knowledge and clinical reasoning, but the problems in summary and repeatability need to be further solved. This conclusion is consistent with the findings of Sandmann S[39] et al.

4.2 Domestic research status

At present, the domestic research on nurses' clinical reasoning ability is still in the development stage. There are obvious limitations in the existing research objects, which mainly focus on nursing students and focus on their teaching strategy exploration in school education and clinical practice. In terms of teaching model innovation, a variety of teaching methods were introduced to improve the clinical reasoning level of nursing students. Zhao Wenxiao et al.[40] discussed the effect of virtual patients combined with simulation practice teaching on improving nursing students' clinical reasoning ability and satisfaction with teaching effect. Liu Hui et al. [41] improved the evaluation ability and clinical reasoning ability of higher vocational nursing students through rapid cycle deliberate practice. In terms of training courses, Li Wencui et al. [42] verified the effectiveness of clinical reasoning ability training courses based on dual system model. In addition, a large number of studies have conducted the debugging and reliability and validity test [3,16,17,19,43] of foreign assessment tools in Chinese. Compared with teaching optimization for nursing students, how to improve the clinical reasoning ability of clinical nurses is an urgent problem to be solved. However, the research in this field is still relatively scarce and lack of systematic. In this context, Zhang Xinli [44] and other scholars formed a training system of clinical reasoning ability of emergency standardized training nurses through literature review and expert letter consultation, including five dimensions of basic emergency knowledge, critical thinking ability, communication and coordination ability, reflection ability and humanistic quality. A total of 86 emergency nurses were selected as the research objects. Through diversified training mode, every three months, Through diversified training mode, every 3 months, the clinical reasoning ability scale was used to test the training effect. The study found that the scores of each dimension after training were better than those before training.

5. Summary

Clinical reasoning is the core skill of nurses to face the complex clinical environment and ensure the safety of patients. Systematic research on clinical reasoning is an inevitable requirement to improve the value and quality of nursing. This paper summarizes the overview, assessment tools, influencing factors and research status of nurses' clinical reasoning ability, and suggests that future researchers carry out large sample investigation and research according to the influencing factors of clinical reasoning ability of nurses in different specialties and different levels, formulate targeted training and assessment programs, so as to improve the clinical reasoning ability of nurses.

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References

- [1] Chai LS, Lim L, Yusoff MSB, et al. Clinical reasoning assessment methods in prelicensure undergraduate nursing education: A scoping review. *Nurse Educ Pract.* 2025, 86:104423.
- [2] Li Wencui, Li Shengyun, Wang Yu, et al. Design and application of clinical reasoning ability training course based on dual system model for nursing postgraduates [J]. *Chinese Journal of Nursing*, 2017, 24(15):13-16.
- [3] Yu J, Wang J L, WANG M Y, et al. Reliability and validity of Chinese version of Self-rating Scale for Clinical Reasoning and Reflection in nursing students [J]. *Chin J Medical Education*, 2019, 39(7): 539-544.
- [4] Kavanagh JM, Szweida C. A Crisis in Competency: The Strategic and Ethical Imperative to Assessing New Graduate Nurses' Clinical Reasoning. *Nurs Educ Perspect.* 2017, 38 (2): 57-62.
- [6] Gao Meihua. Current Situation and Influencing factors of clinical nurses' critical thinking [J]. *China Nursing Management*, 2011, 11(12):35-37.
- [7] Feng Mengxuan, Qiao Yuanjing, Li Dandan, et al. Application status of script consistency test and its enlightenment to domestic nursing education [J]. *Nursing Research*, 2023, 37(13):2370-2374.
- [8] Simmons B. Clinical reasoning: concept analysis[J]. *J Adv Nurs*, 2010, 66(5):1151-8.
- [9] Tanner CA. Thinking like a nurse: a research-based model of clinical judgment in nursing. *J Nurs Educ.* 2006, 45 (6): 204-11.
- [10] Mohammadi-Shahboulaghi F, Khankeh H, HosseinZadeh T. Clinical reasoning in nursing students: A concept analysis. *Nurs Forum.* 2021, 56 (4): 1008-1014.
- [11] Charlin B, Brailovsky C, Leduc C, et al. The Diagnosis Script Questionnaire: A New Tool to Assess a Specific Dimension of Clinical Competence. *Adv Health Sci Educ Theory Pract.* 1998, 3 (1): 51-58.
- [12] Ganesan S, Bhandary S, Thulasingham M, et al. Developing Script Concordance Test Items in Otolaryngology to Improve Clinical Reasoning Skills: Validation using Consensus Analysis and Psychometrics. *Int J Appl Basic Med Res.* 2023, 13 (2): 64-69.
- [13] Hamui M, Ferreira JP, Torrents M, et al. Prueba de concordancia de script: primera experiencia en pediatria de alcance nacional [Script Concordance Test: first nationwide experience in pediatrics]. *Arch Argent Pediatr.* 2018, 116(1):e151-e155.
- [14] Hu Jing. Revision and application of the Chinese version of Clinical Diagnostic Thinking Questionnaire [D]. Central South University, 2012.
- [15] FACIONEPA, FACIONE N C. The California critical thinking skills test[M]. California Academic Press, 1992:1.
- [16] Peng Meici, Wang Guocheng, Chen Jile, et al. Reliability and validity of the Critical Thinking Disposition Inventory [J]. *Chinese Journal of Nursing*, 2004, (09):7-10.
- [17] Yang G M, Wei H Y, Wan L P, et al. Reliability and validity of Critical thinking inventory in medical students [J]. *Journal of Zhengzhou University (Medical Edition)*, 2021, 57(03):330-335.
- [18] Lasater K. Clinical judgment development: using simulation to create an assessment rubric. *J Nurs Educ.* 2007, 46 (11): 496-503.
- [19] Vreugdenhil J, Spek B. Development and validation of Dutch version of Lasater Clinical Judgment Rubric in hospital practice: An instrument design study. *Nurse Educ Today.* 2018, 62:43-51.
- [20] Roman-Cereto M, Garcia-Mayor S, Kaknani-Uttumchandani S, et al. Cultural adaptation and validation of the Lasater Clinical Judgment Rubric in nursing students in Spain. *Nurse Educ Today.* 2018, 64:71-78.
- [21] Wang Min, Chen Jie, Chen Chen. Revision and evaluation of Lasater Clinical Judgment Scale [J]. *Nursing Practice & Research*, 2020, 17(06):8-10.
- [22] ROYEENCB, MU K, BARRETT K, et al. Pilot investigation: Evaluation of clinical reflection and reasoning before and after workshop intervention[J]. *Innovations in Occupational Therapy Education*, 2001:107-114.
- [23] SEIFG A, BROWN D, ANNAN-COULTAS D. Fostering clinical-reasoning skills in physical therapist students through an interactive learning module designed in the moodle learning management system[J]. *Journal of Physical Therapy Education*, 2013, 27 (3): 32-40.
- [24] Liaw SY, Rashasegaran A, Wong LF, et al. Development and psychometric testing of a Clinical Reasoning Evaluation Simulation Tool (CREST) for assessing nursing students' abilities to recognize and respond to clinical deterioration. *Nurse Educ Today.* 2018, 62:74-79.

- [25] Liou SR, Liu HC, Tsai HM, et al. The development and psychometric testing of a theory-based instrument to evaluate nurses' perception of clinical reasoning competence[J]. *J Adv Nurs*,2016,72(3):707-17.
- [26] Notarnicola I, Rocco G, Iacorossi L, et al. Psychometric Evaluation of the Nurse Clinical Reasoning Scale: A Validation Study Among Italian Nurses. *J Nurs Meas*. 2024, 32 (2): 183-193.
- [27] Hosseinzadeh T, Mirfarhadi N, Pouralizadeh M, et al. Psychometric properties of the persian version of the nursing clinical reasoning scale. *Nurs Open*. 2024, 11(1):e2041.
- [28] Wang Y J. Current status of clinical reasoning ability and its correlation with self-directed learning ability of nurses in Class Grade A hospitals in Shenyang [D]. China Medical University,2018.
- [29] Huang HM, Huang CY, Lin KC, et al. Development and Psychometric Testing of the Clinical Reasoning Scale Among Nursing Students Enrolled in Three Types of Programs in Taiwan. *J Nurs Res*. 2023, 31(2): e263.
- [30] Bae J, Lee J, Choi M, et al. Development of the clinical reasoning competency scale for nurses. *BMC Nurs*. 2023, 22 (1): 138.
- [31] Liu Z, Sun N, Chen C, et al. Comparative study of clinical reasoning competence and self-directed learning competence in nurses across varied years of experience. *J Clin Nurs*. 2025, 34 (3): 836-848.
- [32] Noh S, Kang Y. The Relationships among communication competence, professional autonomy and clinical reasoning competence in oncology nurses. *Nurs Open*. 2024 Aug; 11(8):e70003.
- [33] Zhang Sa-Le, LI Ying, Niu Lulu, et al. Current status and Influencing factors of nurses' Clinical decision-making ability [J]. *Chinese Medical Ethics*,2024,37(7):798-806.
- [34] Wang S, Ma J J, Zhao H, et al. Status quo and influencing factors of shared decision-making ability of 608 clinical nurses [J]. *Chinese Journal of Nursing*, 2020,32(12):68-73.
- [35] Zhang Zhang, Kuang Qi-hua, Huang Xu-xia. Influencing factors and countermeasures of clinical decision-making ability of junior nurses [J]. *General Nursing*,2018,16(29):3596-3598.
- [36] Chen Yue, Chen Cuiping, Xu Shuaishuai, et al. Current status analysis and countermeasures of nursing clinical decision-making consciousness of junior nurses in emergency and critical care Department [J]. *Evidence-based Nursing*,2020,6(12):1382-1387.
- [37] Mohammadi F, Hosseini SK, Khazaei S, et al. Psychometrics assessment of clinical reasoning competency scale in nurses of critical care units. *BMC Nurs*. 2024, 23 (1): 733.
- [38] Atalla ADG, El-Gawad Mousa MA, Hashish EAA,, et al. Embracing artificial intelligence in nursing: exploring the relationship between artificial intelligence-related attitudes, creative self-efficacy,and clinical reasoning competency among nurses. *BMC Nurs*. 2025, 24 (1): 661.
- [39] Tordjman M, Liu Z, Yuce M, et al. Comparative benchmarking of the DeepSeek large language model on medical tasks and clinical reasoning. *Nat Med*. 2025, 31 (8): 2550-2555.
- [40] Sandmann S, Hegselmann S, Fujarski M, et al. Benchmark evaluation of DeepSeek large language models in clinical decision-making. *Nat Med*. 2025, 31 (8): 2546-2549.
- [41] Zhao Wen-xiao, Liu Yan-Li. Effects of virtual patients combined with simulation practice teaching on the cultivation of clinical reasoning ability of nursing undergraduates [J]. *Nursing Research*,2021,35(19):3511-3513.
- [42] Liu Hui, Zhang Ruixia, Jing Mengjuan, et al. Teaching practice of rapid cycle deliberate practice to improve clinical reasoning ability of higher vocational nursing students: Taking health assessment course as an example [J]. *Health Vocational Education*, 2020,43(12):78-82.
- [43] Li Wencui, Li Shengyun, Wang Yu, et al. Design and application of clinical reasoning ability training course based on dual system model for nursing postgraduates [J]. *Chinese Journal of Nursing*,2017,24(15):13-16.
- [44] Feng M X. Development of script consistency test tool and its application in the assessment of clinical reasoning ability of nursing undergraduates [D]. Shandong University of Traditional Chinese Medicine,2024.
- [45] Zhang Xin-li, Yang Xia, Feng Xia, et al. Construction and practice of clinical reasoning ability training system for standardized training nurses in emergency department [J]. *Evidence-based Nursing*,2024,10(11):1985-1989.