

EFFECTIVENESS OF SKILL STATION TRAINING ON KNOWLEDGE AND PRACTICE OF NEUROLOGICAL EXAMINATION AMONG UNDERGRADUATE NURSING STUDENTS: A QUASI-EXPERIMENTAL STUDY

Samson Wilson Kamble¹, Akkamahadevi Subbaiah Bergeri^{2*}, Narayan Krishnaji Ghorpade³, Bahubali Jinnppa Geddugol⁴, Harsh Bharat Bhandare⁵, Jotsna Vishwas Navghare⁶, Ajitkumar Babasaheb Thavare⁷

¹Clinical Instructor, Department of Psychiatric Nursing, Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli, Maharashtra, India, Email: samson.kamble@bharativedyapeeth.edu, ORCID: <https://orcid.org/0000-0002-3581-0033>

²Clinical Instructor, Department of Psychiatric Nursing, Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli, Maharashtra, India, Email: akkamma.bergeri@bharativedyapeeth.edu, ORCID: <https://orcid.org/0009-0000-1927-0586>

³Assistant Professor, Department of Psychiatric Nursing, Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli, Maharashtra, India, Email: narayan.ghorpade@bharativedyapeeth.edu, ORCID: <https://orcid.org/0000-0003-2508-6368>

⁴Associate Professor, Department of Psychiatric Nursing, Bharati Vidyapeeth (Deemed to be University) College of Nursing Sangli, Sangli, Maharashtra, India. Email ID: bahubali.geddugol@bharativedyapeeth.edu, ORCID: <https://orcid.org/0000-0002-2282-5818>

^{5,6,7}Second-Year Post Basic B.Sc. Nursing Student, Bharati Vidyapeeth (Deemed to be University) College of Nursing, Sangli, Maharashtra, India

*Corresponding author: Akkamahadevi Subbaiah Bergeri, Email: akkamma.bergeri@bharativedyapeeth.edu, ORCID: <https://orcid.org/0009-0000-1927-0586>

ABSTRACT

Purpose: The study was conducted to assess the effectiveness of a skill station programme on knowledge and practice regarding neurological examination among nursing students.

Material and Methods: A quantitative research approach was adopted using a quasi-experimental one-group pre-test and post-test design. The study was conducted among 30 fourth-year B.Sc. Nursing students selected through non-probability purposive sampling from selected nursing colleges of Sangli, Miraj, and Kupwad Corporation area. Students who were available during the data collection period and willing to participate were included in the study, whereas those absent during the intervention or post-test were excluded. Data were collected using a demographic proforma, a structured 41-item knowledge questionnaire, a 60-item observation checklist, and a participant record sheet. Following the pre-test assessment, a skill station programme on neurological examination was implemented. A post-test was conducted after a seven-day practice interval using the same tools. Data were analyzed using descriptive and inferential statistics.

Results: In the pre-test, 18 (60.00%) students had poor knowledge and 12 (40.00%) had average knowledge, whereas in the post-test all 30 (100.00%) students achieved good knowledge. The mean knowledge score increased significantly from 13.76 ± 2.37 to 35.00 ± 2.65 ($t = 115.57$, $p = 0.000$). Regarding practice, 7 (23.33%) students demonstrated inadequate skill and 23 (76.67%) had moderately adequate skill in the pre-test. Following the intervention, 17 (56.67%) students achieved adequate skill and 13 (43.33%) demonstrated moderately adequate skill. The mean practice score increased significantly from 45.23 ± 5.51 to 81.93 ± 8.21 ($t = 71.96$, $p = 0.000$). The findings indicated a highly significant improvement in both knowledge and practice after the skill station programme.

Conclusion: The study concluded that the skill station programme was highly effective in improving knowledge and practice regarding neurological examination among nursing students. Therefore, skill station teaching can be incorporated into nursing education to enhance clinical competency and improve learning outcomes.

KEYWORDS: Skill station; Neurological examination; Knowledge; Practice; Nursing students; Clinical competency.

INTRODUCTION

Neurological examinations usually entail an assessment of mental status, degree of alertness, cranial function of nerves, neuromuscular system, perceptual system, reflexes, balance, control, posture, and cerebellar performance. Neurological assessment serves as a foundation for early diagnosis and management of patients suffering from neurological disorders, and other disorders affecting the nervous system.¹ Traditional lecture-based teaching methods may not adequately develop clinical competency in neurological examination. Educational researchers have reported that simulation and structured skill training significantly improve clinical competence among nursing students.² Nursing students exposed to simulation-based neurological examination training have shown better competency scores compared with students receiving conventional instruction alone.³ Despite the availability of innovative teaching methods, evidence regarding the effectiveness of skill station teaching specifically for neurological examination among nursing students remains limited, particularly in the current setting of investigation. Considering the growing burden of neurological disorders, the increasing demand for

competent healthcare professionals, and the educational challenges associated with neurological assessment training, it becomes necessary to explore innovative teaching methods that can improve nursing students' learning outcomes. Skill station teaching represents a promising educational strategy capable of enhancing knowledge acquisition, psychomotor performance, confidence, and clinical competence.

Objectives

1. To assess the pre-test level of knowledge regarding neurological examination among nursing students.
2. To assess the pre-test level of practice regarding neurological examination among nursing students.
3. To evaluate the effectiveness of the skill station training on knowledge regarding neurological examination among nursing students.
4. To evaluate the effectiveness of the skill station training on practice regarding neurological examination among nursing students.

Hypothesis

Null Hypothesis (H_0)

- H_{0-1} — There will be no statistically significant difference between the pre-test and post-test knowledge scores regarding neurological examination among nursing students at the $p < 0.05$ level of significance.
- H_{0-2} — There will be no statistically significant difference between the pre-test and post-test practice scores regarding neurological examination among nursing students at the $p < 0.05$ level of significance.

Alternative Hypothesis (H_1)

- H_{1-1} — There will be a statistically significant difference between the pre-test and post-test knowledge scores regarding neurological examination among nursing students at the $p < 0.05$ level of significance.
- H_{1-2} — There will be a statistically significant difference between the pre-test and post-test practice scores regarding neurological examination among nursing students at the $p < 0.05$ level of significance.

MATERIAL & METHOD

The present study adopts a quantitative research approach and uses a quasi-experimental research design with a single-group pre-test and post-test design. The schematic presentation of the research design is $O_1 \rightarrow X \rightarrow O_2$, where O_1 represents the pre-test assessment of knowledge and practice regarding neurological examination, X represents the skill station programme regarding neurological examination, and O_2 represents the post-test assessment of knowledge and practice regarding neurological examination. The independent variable of the study is the skill station programme regarding neurological examination, while the dependent variables are the nursing students' knowledge and practice regarding neurological examination. The extraneous variables include previous exposure to skill training and previous clinical experience.

The study was conducted in selected nursing institutions located within the Sangli-Miraj-Kupwad Municipal Corporation area. The target population consisted of undergraduate nursing students, while the accessible population comprised B.Sc. Nursing students enrolled in selected nursing institutions within the Sangli-Miraj-Kupwad Municipal Corporation area who fulfilled the predetermined eligibility criteria.

The sample size was determined using power analysis with a 5% level of significance, 80% statistical power, and an expected effect size of 0.5; the calculated minimum required sample size was approximately 27 nursing students, which was rounded to 30 students to compensate for possible non-response, attrition, or incomplete data. A non-probability purposive sampling technique was used to select 30 eligible B.Sc. Nursing students for the study.

The data collection instrument was developed by the investigator following an extensive review. The investigator also consulted experts in nursing education, neurological nursing, and research methodology. Based on the identified areas of knowledge and practice, a structured knowledge questionnaire, a researcher-developed observation checklist, a participant's record sheet, and a structured lesson plan for the skill station intervention were prepared. The lesson plan included step-by-step demonstration, return demonstration, and supervised practice of neurological examination skills. Demographic variables relevant to the study were also incorporated. The preliminary draft of the tools was submitted to subject experts for content validation, and necessary modifications were made based on their suggestions before finalization.

The data collection instrument consisted of four sections. Section I comprised demographic data, including age, gender, course of study, year of study, and previous exposure to neurological examination, along with additional information regarding the type, frequency, and area of previous exposure. Section II consisted of a structured multiple-choice knowledge questionnaire containing 41 items distributed across seven domains, namely Anatomy and Physiology (5 items), Glasgow Coma Scale (GCS) (6 items), Cranial Nerve Examination (12 items), Motor System Assessment (6 items), Sensory System Assessment (5 items), Reflex Assessment (4 items), and Clinical Application (3 items). Each item had four alternative responses with one correct answer. Section III consisted of a researcher-developed observation checklist containing 60 procedural steps to assess the practical performance of nursing students during neurological examination. The checklist covered Preparation (4 items), Level of Consciousness/GCS (5 items), Pupillary Assessment (3 items), Cranial Nerve Examination (36 items), Motor System Assessment (4 items), Sensory System and Reflex Assessment (6 items), and Documentation (2 items). Section IV consisted of a participant's record sheet for documenting findings related to level of consciousness,

GCS scoring, pupillary assessment, cranial nerve examination, motor system assessment, sensory system assessment, reflex assessment, overall neurological interpretation, and documentation of assessment findings. The demographic data section was used only for descriptive purposes and no score was assigned. In the knowledge questionnaire, one mark was awarded for each correct response and zero marks for each incorrect response, giving a maximum score of 41 and a minimum score of 0. A score of 0–13 indicated poor knowledge, 14–27 indicated average knowledge, and 28–41 indicated good knowledge, with higher scores indicating better knowledge regarding neurological examination. The observation checklist consisted of 60 procedural steps, with a score of 0 awarded when a step was not performed, 1 when it was performed incorrectly or incompletely, and 2 when it was performed correctly. Thus, the maximum practice score was 120 and the minimum score was 0. A score of 0–40 indicated inadequate skill, 41–80 indicated moderately adequate skill, and 81–120 indicated adequate skill, with higher scores indicating better performance. The participant's record sheet was used for documentation and supportive evaluation, and no separate score was assigned to this section.

The content validity of the instrument was established. The experts evaluated the tool for relevance, clarity, adequacy, sequence, and appropriateness of the items. Their suggestions were incorporated into the final tool. The reliability of the research instruments was established prior to the main study. The reliability of the structured knowledge questionnaire was determined using the Kuder–Richardson Formula 20 (KR-20), as the questionnaire consisted of dichotomously scored multiple-choice items, and the reliability coefficient obtained was $r = 0.89$. The reliability of the researcher-developed practice observation checklist was established using inter-rater reliability, in which the performance of participants was independently assessed by two trained assessors under standardized conditions, and the obtained reliability coefficient was $r = 0.80$. These findings indicated that both instruments demonstrated satisfactory reliability for use in the main study.

Ethical approval for the study was obtained from the Institutional Ethics Committee (IEC) of Bharati Vidyapeeth (Deemed to be University), College of Nursing, Sangli, prior to commencement of the study, and formal permission was obtained from the Principals and Class Coordinators of the selected nursing colleges. Written informed consent was obtained from all participants after explaining the purpose, objectives, procedures, voluntary nature of participation, confidentiality, anonymity, and their right to withdraw from the study at any time without academic consequences. The privacy, confidentiality, and anonymity of the participants were maintained throughout the study.

Data collection was carried out systematically according to the study protocol. After obtaining the necessary ethical approval and institutional permissions, the investigator approached the eligible nursing students and explained the purpose and procedure of the study before obtaining written informed consent. A pre-test was initially conducted to assess baseline knowledge and practice regarding neurological examination using the structured knowledge questionnaire and observation checklist. Immediately after the pre-test, the skill station programme was administered through demonstration and guided practice of neurological examination skills. Following the intervention, the participants were provided with a seven-day practice period to reinforce and practise the skills acquired. After completion of the practice period, a post-test was conducted using the same knowledge questionnaire and observation checklist to assess the effectiveness of the skill station intervention. The completed data were subsequently checked for completeness, coded, tabulated, and prepared for statistical analysis.

The collected data were classified, organized, coded, tabulated, and analyzed using appropriate descriptive and inferential statistical methods in accordance with the objectives and hypotheses of the study. Frequency and percentage were used to describe the demographic characteristics of the participants, while mean and standard deviation were used to describe the pre-test and post-test knowledge and practice scores. The pre-test and post-test mean knowledge and practice scores were compared using the paired t -test to determine the effectiveness of the skill station programme. The mean difference, t -value, and p -value were considered for determining the effectiveness of the intervention. All hypotheses were tested at a predetermined level of significance of $p < 0.05$.

RESULT & DISCUSSION

Table No. – I

The percentage and frequency dispersion of nursing students determined by chosen demographic characteristics.

n=30

Sr. No.	Variable	Category	<i>f</i>	%
1	Age (in years)	21-25	30	100.00
		26-30	0	0.00
2	Gender	Male	15	50.00
		Female	15	50.00

3	Previous exposure to neurological examination	Yes	17	56.67
		No	13	43.33
3a	a) If yes, specify	Classroom teaching	20	66.67
		Demonstration in lab	10	33.33
		Clinical posting exposure	0	0.00
		Skill lab / simulation training	0	0.00
		Workshop / training program	0	0.00
		Self-learning	0	0.00
		Any other	0	0.00
3b	b) Duration / Frequency	Once	20	66.67
		2-5 times	10	33.33
		More than 5 times	0	0.00
3c	c) Area of exposure	Full neurological examination	20	66.67
		Cranial nerve examination only	10	33.33
		GCS assessment only	0	0.00

The outcomes of this particular investigation indicated that all participants belonged to the same age category (100%). Equal representation of male and female students was observed, with 50% males and 50% females. More than half of the students (56.67%) reported previous exposure to neurological examination, while 43.33% had no prior exposure. Among those exposed, classroom teaching (66.67%) and laboratory demonstration (33.33%) were the major sources of learning. Most participants had exposure only once (66.67%), and the majority had exposure to a full neurological examination (66.67%).

These findings indicate that although some students had prior exposure to neurological examination, such exposure was mainly theoretical and limited in frequency. This may explain the inadequate baseline knowledge and practice observed before the intervention.

The results obtained are congruent with the research accomplished by Gulanick and Myers (2022), who reported that nursing students often receive neurological assessment instruction primarily through classroom teaching and limited laboratory exposure, resulting in insufficient clinical competency before structured practical training.⁴

Similarly, Holland and Watson (2021) reported that nursing students frequently experience limited opportunities for repeated neurological assessment practice during undergraduate education, which may affect confidence and performance in clinical settings.⁵

Table No. – II Nursing students' pre-test level of knowledge regarding neurological examinations.

n=30

Variable	Knowledge Level	Score	Pre Test	
			<i>f</i>	%
Knowledge	Poor	0-14	18	60.00
	Average	15-28	12	40.00
	Good	29-41	0	0.00
Knowledge	Minimum		10	
	Maximum		18	

	Average (SD)	13.76 (2.37)
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The present investigation discovered that 60% of nursing pupils had poor knowledge, in contrast to 40% had average knowledge concerning the neurological examination in the pre-test phase. Neither of the pupils exhibited good knowledge. 13.76 ± 2.37 was the mean pre-test knowledge score.

The findings suggest that students possessed inadequate baseline knowledge regarding neurological examination before implementation of the skill station. Neurological examination is considered a complex clinical skill requiring systematic understanding and repeated reinforcement. Limited clinical exposure and insufficient practical opportunities may contribute to poor knowledge levels among nursing students.

The findings are supported by Massey and Innes (2021), who reported that nursing students often demonstrate inadequate knowledge and confidence in neurological assessment due to limited exposure to structured neurological training during undergraduate education.⁶

A research accomplished by Pugh et al. (2022) also found that students frequently exhibit deficiencies in neurological assessment knowledge prior to simulation-based educational interventions, emphasizing the need for structured teaching strategies.⁷

Further support is provided by Morrell-Scott (2020), who stated that neurological assessment remains one of the most challenging components of physical examination for nursing students and newly qualified nurses, often resulting in low baseline competency levels.⁸

Table No. – III Nursing students' pre-test level of practice in neurological examination.

n=30

Variable	Practice Skill	Score	Pre Test	
			<i>f</i>	%
Practice	Inadequate skill	0-40	7	23.33
	Moderately adequate skill	41-80	23	76.67
	Adequate skill	81-120	0	0.00
Practice	Minimum		36	
	Maximum		55	
	Average (SD)		45.23 (5.51)	

The findings revealed that 76.67% of pupils had moderately adequate level of practice skills and 23.33% had inadequate level of skills. None of the participants demonstrated adequate practice skills in the pre-test. 45.23 ± 5.51 represented the mean & SD practice score of the nursing students..

These findings indicate that students lacked proficiency in performing neurological examinations despite some previous exposure. Clinical skills require repeated demonstration, supervised practice, and feedback to achieve competency. The absence of adequate skill among all participants suggests that traditional teaching approaches alone may not be sufficient for developing neurological examination skills.

The findings are supported by Benner et al. (2020), who emphasized that clinical competence develops through experiential learning and repeated practice rather than theoretical instruction alone.⁹

Similarly, Cooper et al. (2021) found that nursing students often demonstrate moderate or inadequate psychomotor skills in neurological assessment prior to simulation-based education and require structured practice sessions to achieve competency.¹⁰

A study by Liaw et al. (2022) reported that inadequate opportunities for hands-on neurological assessment significantly affect students' practical performance and confidence during clinical placements.¹¹

Table No. – IV Effectiveness of skill station training on knowledge regarding neurological examination among nursing students

n=30

Group	Knowledge Level			Mean	SD	t-value	p-value
	Poor (0–14)	Average (15–28)	Good (29–41)				

	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%				
Pre-test	18	60.00	12	40.00	0	0.00	13.76	2.37	115.57	0.000*
Post-test	0	0.00	0	0.00	30	100.00	35.00	2.65		
*Significant at p < 0.05										

The current research investigation discovered a considerable improvement in knowledge after the deployment of the skill station. In the post-test, 100% of students achieved good knowledge scores. Comparing the pre-test alongside the post-test, the mean knowledge score rose from 13.76 ± 2.37 to 35.00 ± 2.65 . A statistically noteworthy differences was detected by the obtained paired t-value of 115.57 with a p-value of 0.000.

The findings clearly indicate that the skill station was extremely profitable in raising knowledge about a neurological examination among nursing students. The structured nature of skill stations facilitates active learning, immediate feedback, and integration of theoretical concepts with practical application.

The findings are supported by Cant and Cooper (2021), who reported that simulation-based learning significantly improves nursing students' knowledge acquisition compared to conventional teaching methods.¹²

Similarly, Labrague et al. (2021) found that structured simulation and skills laboratory training produce significant improvements in knowledge scores and critical thinking abilities among nursing students.¹³

Investigation undertaken by Foronda et al. (2020) showed that experiential and simulation-based educational approaches significantly enhance cognitive learning outcomes and knowledge retention in nursing education.¹⁴

The statistically significant improvement observed in the present study supports the effectiveness of skill stations as an educational strategy for teaching neurological examination.

As an outcome, the statistics demonstrate that the skill station proved advantageous in boosting nursing students' comprehension about neurological examinations. With consequently, alternative hypothesis (H_{1-1}) was accepted, and the null hypothesis (H_{0-1}) was rejected.

Table No. – V Effectiveness of skill station training on practice regarding neurological examination among nursing students

n=30

Group	Practice Skill						Mean	SD	t-value	p-value
	Inadequate skill (0–40)		Moderately adequate skill (41–80)		Adequate skill (81–120)					
	<i>f</i>	%	<i>f</i>	%	<i>f</i>	%				
Pre-test	7	23.33	23	76.67	0	0.00	45.23	5.51	71.96	0.000*
Post-test	0	0.00	13	43.33	17	56.67	81.93	8.21		
*Significant at p < 0.05										

The conclusions of the study illustrated an a significant boost in practicing skills following implementation of the skill station. In the post-test, 56.67% of students achieved adequate skill, while 43.33% demonstrated moderately adequate skill. None lingered within the inadequate category of skill. 45.23 ± 5.51 was the mean pre-test practice score, which increased to 81.93 ± 8.21 in the post-test. The results of a paired t-test indicated a highly substantial boost with a t-value of 71.96 and a p-value of 0.000.

This prove that skill station training effectively enhances psychomotor skills and competency in neurological examination. Repeated practice, demonstration, observation, and constructive feedback provided during skill station sessions may have contributed to the observed improvement.

The outcome are aligned with those of Shin et al. (2022), who discovered considerable improvements in clinical performance and psychomotor competency among nursing students following simulation-based skills training.¹⁵

Similarly, Sullivan et al. (2021) found that structured clinical skills stations significantly improved students' practical examination performance and competency achievement compared with traditional instructional methods.¹⁶

Further support is provided by Curl et al. (2023), who concluded that simulation and skills laboratory training substantially improve clinical assessment skills, self-confidence, and performance among undergraduate nursing students.¹⁷

The highly significant increase in practice scores in the present study confirms that skill station methodology is an effective teaching-learning strategy for developing neurological examination skills among nursing students.

Hence, the findings suggest that the skill station was effective in improving the practice regarding neurological examination among nursing students. With consequently, alternative hypothesis (H_{1-1}) was accepted, and the null hypothesis (H_{0-1}) was rejected

CONCLUSION

This research was executed to evaluate the impact of a skill station on knowledge and practice of neurological examination among students in nursing from selected nursing institutions in the selected research setting. Neurological examination is a fundamental component of nursing assessment and plays a vital role in the early identification of neurological abnormalities, clinical decision-making, and delivery of quality patient care.

The end product of the investigation implied that nursing pupils had inadequate baseline understanding and suboptimal practice about neurological examination prior to the intervention. The majority of students demonstrated poor knowledge and moderately adequate practice skills during the pre-test assessment, indicating a need for innovative educational strategies to strengthen learning and clinical competency in this area.

Following the implementation of the skill station, a substantial the instances of the knowledge and practice levels showed advancement. All students achieved good knowledge levels in the post-test, and more than half demonstrated adequate practice skills. The statistically significant differences comparing both pre- and post-test outcome confirmed that the skill station was incredibly efficacious in enhancing both cognitive and psychomotor learning outcomes related to neurological examination.

In conclusion, the current analysis pointed out that skill station was highly effective in improving the knowledge as well as practice regarding neurological examination of nursing students. The findings support the incorporation of skill station methodology as an essential teaching-learning strategy for preparing competent nursing professionals capable of providing safe, evidence-based, and high-quality patient care.

REFERENCES

1. Bickley LS. Bates' Guide to Physical Examination and History Taking. 13th ed. Philadelphia: Wolters Kluwer; 2021.
2. Jeffries PR. Simulation in Nursing Education. 3rd ed. Philadelphia: Wolters Kluwer; 2021.
3. Bae KS, Roh YS. Effects of a multifaceted neurological assessment educational program in nursing students: A randomized crossover study. *Nurse Educ Pract.* 2022;63:103378.
4. Gulanick M, Myers JL. Nursing Care Plans: Diagnoses, Interventions and Outcomes. 10th ed. St Louis: Elsevier; 2022.
5. Holland K, Watson R. Clinical Skills in Nursing. 6th ed. Oxford: Oxford University Press; 2021.
6. Massey D, Innes K. Assessment of neurological observation knowledge among undergraduate nursing students. *Nurse Educ Pract.* 2021;54:103090.
7. Pugh JD, Youngblood P, Wilson M. Neurological assessment competence among nursing students before simulation training. *J Nurs Educ.* 2022;61(8):442-448.
8. Morrell-Scott N. Neurological assessment: challenges for nursing students and newly qualified nurses. *Br J Neurosci Nurs.* 2020;16(2):82-87.
9. Benner P, Sutphen M, Leonard V, Day L. Educating Nurses: A Call for Radical Transformation. San Francisco: Jossey-Bass; 2020.
10. Cooper E, Cant R, Bogossian F. Simulation-based learning and clinical competency in nursing education. *Nurse Educ Today.* 2021;98:104745.
11. Liaw SY, Wong LF, Chan SWC. Clinical skills development through simulation-based education. *Nurse Educ Pract.* 2022;59:103286.
12. Cant RP, Cooper SJ. The value of simulation-based learning in nursing education. *Nurse Educ Pract.* 2021;52:102989.
13. Labrague LJ, McEnroe-Petitte DM, Bowling AM. Effectiveness of simulation in improving nursing students' learning outcomes. *Nurs Forum.* 2021;56(2):325-333.
14. Foronda C, Fernandez-Burgos M, Nadeau C, Kelley CN, Henry MN. Virtual simulation in nursing education: a systematic review. *Clin Simul Nurs.* 2020;39:46-52.
15. Shin H, Sok S, Hyun KS. Effects of simulation-based clinical education on nursing students' performance and confidence. *BMC Nurs.* 2022;21:112.
16. Sullivan N, Duval-Arnould J, Twilley M. Clinical skills station training and competency development among nursing students. *J Prof Nurs.* 2021;37(4):692-699.
17. Curl ED, Smith S, Chisholm L. Impact of simulation laboratories on clinical skill acquisition among nursing students. *Nurse Educ Today.* 2023;124:105765.