International Journal of Nursing and Health Care Research

OPEN ACCESS

Yang SL, et al. Int J Nurs Health Care Res 8: 1625

www.doi.org/10.29011/2688-9501.101625

www.gavinpublishers.com

GAVIN PUBLISHERS

Research Article

Application of the BOPPPS Teaching Model in the Training of Nursing Students Interning in Operating Rooms

Shu-Lin Yang[#], Xiao-Jun Chen[#], Liu-Fang Huang[*], Xiao-Fang Chen, Hua Deng, Feng-Qiu Gong, Qiu-Hong Pan

Department of Operating Room, The First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China

[#]These authors contributed equally to this work

[*]**Corresponding author:** Liu-fang Huang, Department of Operating Room, The First Affiliated Hospital, Sun Yat-sen University, Guangzhou, China

Citation: Yang SL, Chen XJ, Huang LF, Chen XF, Deng H, et al. (2025) Application of the BOPPPS Teaching Model in the Training of Nursing Students Interning in Operating Rooms. Int J Nurs Health Care Res 8:1625. DOI: https://doi.org/10.29011/2688-9501.101625

Received Date: 10 March 2025; **Accepted Date:** 17 March, 2025; **Published Date**: 19 March, 2025

Abstract

Objective: To explore the application effects of the Bridge-in, Objective, Pre-Assessment, Participatory Learning, Post-assessment, Summary (BOPPPS) teaching model in the training of nursing students interning in operating rooms. **Methods:** Sixty nursing students interning at the Surgical Anaesthesia Centre of The First Affiliated Hospital of Sun Yat-sen University from July 2023 to October 2024 were randomly divided into a control group (traditional teaching group, n=30) and an observation group (BOPPPS group, n=30). The control group received traditional "demonstration-imitation" teaching, while the observation group adopted the BOPPPS teaching model, incorporating case video introductions, phased goal setting, participatory simulation training, and immediate feedback. The teaching effects of the two groups were evaluated through comparative analysis of post-internship exams (including theoretical and operational scores), teaching satisfaction surveys, and student teaching effectiveness. **Results:** The theoretical and operational scores of the observation group were significantly higher than those of the control group ($t/z = 10.101, 10.269$, both $P<0.001$). The teaching satisfaction and clinical teaching effectiveness scores of the observation group were also significantly better than those of the control group ($z = 18.060, 12.289, 16.951, 19.517, 12.442, 15.861$, $P<0.001$). **Conclusion:** The BOPPPS teaching model can significantly improve the sterile operation skills and comprehensive literacy of nursing students interning in operating rooms, and it is recommended for promotion and application in clinical teaching.

Keywords: BOPPPS teaching model; Operating room nursing; Sterile operation; Teaching reform; Nursing student training

Introduction

Operating room nursing is a critical component of clinical nursing practice for nursing interns. Among its various aspects, sterile technique stands out as a pivotal element that pervades every surgical procedure. Upon their arrival in the operating room, nursing students are immediately exposed to the emphasis placed on sterile concepts and techniques by their mentors [1]. The complexity and high-risk nature of these operations demand exceptional professional skills and adaptability from the students. However, the traditional "demonstration-imitation" teaching model often falls short, with its vague objectives and limited student engagement, making it inadequate for modern clinical needs [1].

Enter the BOPPPS teaching model, an effective, student-cantered approach grounded in constructivism and the communicative method [2,3]. Developed and implemented by the British Columbia Institute of Technology in Canada [4], BOPPPS revolves around objective-oriented and participatory learning [5]. Depending on the knowledge points, the teaching process is segmented into six parts: Bridge-in, Objective, Pre-assessment, Participatory Learning, Post-assessment, and Summary. These six essential elements, represented by their initial letters, form the acronym "BOPPPS," symbolizing a cohesive and effective classroom experience [6]. The six-step framework of "introduction-objective-pre-test-participation-post-test-summary" enhances the systematic and interactive nature of teaching [7].

Studies both domestically and internationally [8,9] have attested to BOPPPS's efficacy in bolstering knowledge internalization and practical skills in medical education [10]. However, its application in operating room nursing training remains sparse. This study aims to design and validate the use of the BOPPPS model in training nursing interns on sterile operating techniques. The ultimate goal is to elevate teaching quality and enable nursing interns to swiftly adapt to the operating room environment, fortify their understanding of sterility, and reduce the time required to master essential operating room nursing skills.

Subjects and Methods

Subjects

Sixty nursing interns from Guangdong Medical University, Guangzhou Nanfang College, Guangzhou Xinhua College, and Guangzhou University of Chinese Medicine, who were interning in the operating room of Zhongshan Hospital Affiliated to Sun Yat-sen University from July 2023 to October 2024, were selected. They were randomly divided into an observation group and a control group, with 30 people in each group. Inclusion criteria: nursing students who have completed the nursing courses prescribed in the college syllabus and passed all assessments before internship in the operating room; exclusion criteria: students who were unable to participate in the entire internship training due to sick leave or personal leave. All students provided informed consent for the research content before participating in the training study. The control group consisted of 5 males and 25 females, aged between 21 and 23, with an average age of (21.60±0.67) years. The observation group had 1 male and 29 females, aged between 19 and 23, with an average age of (21.23±0.89) years. There were no significant differences in age and gender between the two groups (P=0.08).

Methods

Control Group

Our hospital's surgical anaesthesia centre has a weekly training plan for operating room nursing interns. Both the experimental and control groups had a four-week internship, with teaching content based on the operating room internship plan developed by our hospital's nursing department and surgical anaesthesia centre. Before class, the department's chief instructor assigns teaching tasks, outlines the syllabus, and prepares homogenized lessons. Apart from teaching methods, the internship content and syllabus are the same for both groups. The control group adopts traditional teaching, focusing on "sterile technique training" for interns rotating into the operating room. The control group follows the traditional "demonstration-imitation" teaching model, where students learn, practice, and are assessed under the guidance of a mentor's operational demonstration.

Observation Group

The observation group receives a "comprehensive training course on sterile operation skills in the operating room" designed based on the BOPPPS model. The core content of the course includes: **(1) Bridge-in:** Two days before class, the instructor establishes a Ding Talk study group and shares learning materials. These mainly cover operating procedures and precautions for surgical preparation beds, surgical hand disinfection, putting on and taking off sterile surgical gowns, putting on sterile gloves without contact, properly laying sterile surgical drapes, and passing surgical instruments (such as scalpels, scissors, forceps, hemostatic clamps, etc.). The introduction uses excerpts from the teaching video "Two Hundred Years of Surgery" (BBC documentary, 2019), specifically the "Birth of Sterilization" segment (5 minutes), and a scene from "Grey's Anatomy" (Season 12, Episode 5, 2015) where an infection occurs due to glove damage (2 minutes).

These videos aim to raise students' awareness of sterilization principles. Additionally, real-life cases are introduced, such as a report on a postoperative infection caused by improper incision drape placement in a hospital. These cases prompt nursing students to reflect and stimulate their interest in learning. During class, the instructor addresses topics of interest to the students based on their pre-class discussions. **(2) Objective:** The knowledge objective is to recite the steps of surgical hand disinfection, methods of putting on and taking off surgical gowns, and the scope of the sterile area. The skill objective is to independently complete surgical hand disinfection (with a score of ≥85) and collaborate to lay incision drapes (meeting the requirements of "4-layer coverage and 3cm

spacing"). The attitude objective is to reinforce the operational awareness of "hands not crossing the shoulders or the sterile area." **(3) Pre-assessment:** This includes quick question-and-answer sessions in the Ding Talk group (such as "What is the direction of water flushing during surgical hand disinfection?") and situational simulation tests (identifying incorrect operation pictures). **(4) Participatory Learning:** This involves group practice (3 people per group) for surgical hand disinfection using fluorescent hand wash and UV light detection of missed areas. Role-playing (surgeon, instrument nurse, circulating nurse) is used for putting on and taking off surgical gowns, with scenarios such as "glove damage." For incision drape placement, a competition mode is adopted, using fluorescent powder to detect contamination and video playback to analyse errors. **(5) Post-assessment:** This includes assessments of surgical hand disinfection, putting on a surgical gown, a theory test (10 multiple-choice questions), and a reflection report (300 words). **(6) Summary:** A mind map is used to review the "Four Cores of Sterilization," and an extended discussion on "Balancing Rescue Speed and Sterilization Principles" is conducted. The assignment of an internship diary task concludes the course.

Observation Indicators

1. A comparative analysis of the assessment scores of the two groups is conducted. The evaluation indicators include objective indicators such as final grades (out of 100) and operational performance (out of 100).

2. Subjective evaluation indicators are used to investigate and analyse the two groups of students. After the course ends, teaching satisfaction is rated (out of 100).

3. A comparative analysis of the teaching effectiveness of the two groups is conducted. Operating room nursing interns self-evaluate by recalling the teaching process, including five dimensions: learning interest, autonomous learning ability, course participation, clinical thinking ability, and operation and communication skills. Each dimension accounts for 20 points, totalling 100 points.

Statistical Methods

SPSS 25.0 is used for data analysis. Data that meets the normal distribution is analysed using an independent samples t-test, while non-normally distributed data is analysed using the Mann-Whitney test. Data that follows a normal distribution is presented as mean ± standard deviation, while non-normally distributed data is presented as median (interquartile range).

Results

Comparison of Skill Assessment Scores between the Control Group and the Observation Group

The observation group achieved significantly higher scores in both theoretical knowledge (92.93±2.54 vs. 86.20±2.65) and operational assessment (93.9±2.5 vs. 86.7±2.8) compared to the control group ($t/z = 10.101, 10.269$; both $P < 0.001$). The difference was statistically significant (Table 1)

Group	n	Theoretical Score	Operational Score
Control Group	30	86.20±2.65	86.74±2.85
Observation Group	30	92.93±2.54	93.91±2.55
t/z		10.101	10.269
p		<0.001	<0.001

Table 1: Comparison of Scores Between Two Groups of Operating Room Nursing Students.

Comparison of Teaching Satisfaction between the Control Group and the Observation Group

The average score of teaching satisfaction in the observation group reached 98.8, which was significantly higher than the average score of 86.33 in the control group ($z=18.060$, $P<0.001$). The difference was statistically significant (Table 2).

Group	n	Teaching Satisfaction
Control Group	30	86.33±3.45
Observation Group	30	98.87±1.60
z		18.06
p		<0.001

Table 2: Comparison of Teaching Satisfaction between Two Groups of Nursing Students.

Comparison of clinical teaching effects between the control group and the observation group

Both the control group and the observation group issued and retrieved 60 electronic surveys each. The observation group scored higher than the control group in terms of learning interest, autonomous learning ability, course engagement, clinical thinking skills, and operational and communication abilities. The differences were statistically significant (z=12.289, 16.951, 19.517, 12.442, 15.861, all P<0.001) (Table 3).

Group	n	Study Interest	Self-learning Ability	Course Participation	Clinical Thinking Ability	Operational and Communication Skills
Control Group	30	13.90±1.09	13.11±1.12	13.07±1.23	13.40±1.35	13.10±1.24
Observation Group	30	17.97±1.45	17.84±1.04	18.63±0.96	17.23±1.01	17.90±1.10
z		12.289	16.951	19.517	12.442	15.861
p		<0.001	<0.001	<0.001	<0.016	<0.001

Table 3: Comparison of teaching effects between the two groups of nursing students.

Discussion

As one of the core departments in a hospital, the operating room has a profound and multidimensional impact on nursing interns during their internship. This influence extends from shaping personal professional abilities to contributing to the development of the social healthcare system, highlighting the unique value of practical education in medical training. The high-intensity and high-standard operational environment of the operating room forces interns to transcend the two-dimensional understanding of book knowledge [11,12]. In scenarios such as surgical hand disinfection, putting on and taking off sterile surgical gowns, sterile draping, and cooperation in sterile techniques, nursing operations are elevated from mere "knowledge" to actual "practice".

Compared to the traditional "demonstration-imitation" teaching mode, the BOPPPS teaching mode has the following advantages in training sterile operation skills for nursing interns in the operating room [7]: Firstly, the structured design precisely identifies knowledge weaknesses through pre-tests, and participatory learning, including role-playing and immediate feedback, significantly reduces the operation error rate (observed in the operational performance of the experimental group). Secondly, the contextual substitution strategy (such as combining film and television cases with real-life situations) concretizes abstract sterile principles, increasing the learning interest score of the observation group to (17.97±1.45 vs 13.90±1.09). Thirdly, the multi-dimensional feedback mechanism (including peer review, teacher guidance, and self-reflection) systematically optimizes operational details. The clinical thinking ability score of the observation group is significantly higher than that of the control group (P<0.001). The limitation of this study lies in the small sample size (n=60) and the short intervention period (4 weeks). Future studies need to expand the sample size and extend the follow-up time to verify skill retention rates.

In summary, the BOPPPS teaching mode can significantly improve the sterile operation skills and comprehensive qualities of nursing interns in the operating room. It is recommended to promote and apply this teaching mode in comprehensive nursing teaching of sterile techniques in the operating room, and optimize course design based on clinical needs.

Acknowledgments

Funding

This work was supported by The Sun Yat-sen University Teaching Quality and Teaching Reform project (2023). The authors wish

to sincerely thank all of the participants without whom this study would have not been possible and editor teacher ‘s assistance in reviewing and editing this article.

Author Contributions

Study Conception and Design: SLY, LFH, XJC. Data Collection: XFC, HD, FQG, QHP. Data Analysis and Interpretation: All authors. Drafting of the Article: All authors. Critical Revision of the Article: SLY

Ethical Approval

Ethical issues are not involved in this paper.

Conflicts of Interest

All contributing authors declare no conflicts of interest.

References

1. Yongchao Q, Shengyun L, Junxue Y (2022) Development status of clinical teaching models for nursing interns in operating rooms. Tianjin Nursing. 30: 369-371.
2. Wang S, Wu Z, Chen J, Zhang M, Sun L, et al. (2025) Application of a dual-track teaching model combining CBL and TBL based on the BOPPPS model in trauma care nursing training. Nurse Educ Pract 84: 104295.
3. Wang Y, Chen Y, Wang L, Wang W, Kong X, et al. (2024) Assessment of the effectiveness of the BOPPPS model combined with case-based learning on nursing residency education for newly recruited nurses in China: a mixed methods study. BMC Med Educ 24: 215.
4. Yu F, Chunyu H, Xing D, et al. (2021) Application of BOPPPS combined with scenario simulation in the teaching of internal medicine nursing. Journal of Nursing Science. 36: 80-84.
5. Danping C, Xingyao Y (2016) The BOPPPS teaching model in Canada and its implications for higher education reform. Research and Exploration in Laboratory. 35: 196-200, 249.
6. Shuang L, Li F (2020) A review of the development of the BOPPPS teaching model in domestic universities. Teaching in Forest Areas. 2: 19-22.
7. Tan X, Zhang MJ, Wu HY (2024) Application of BOPPPS Combined with Simulated Surgical Teaching Mode in the Training of Specialized Nurses for Laparoscopic Surgery in the Operating Room. 42: 100-102.
8. Feng X, Wu W, Bi Q (2024) Reform of teaching and practice of the integrated teaching method BOPPPS-PBL in the course “clinical haematological test technique”. BMC Med Educ 24: 773.
9. Shen B, Chen Y, Wu Y, Lan Y, Heet X, et al. (2024) Development and effectiveness of a BOPPPS teaching model-based workshop for community pharmacists training. BMC Med Educ, 24: 293.
10. Ye G, Lei L (2017) Exploration of the BOPPPS model in clinical practice teaching. Medical Education Research and Practice. 25: 963-966.
11. Yu F Application of BOPPPS combined with scenario simulation in the teaching of internal medicine nursing.
12. Ran W, Lin W, Peng C, et al. (2024) The influence of the BOPPPS teaching model on the autonomous learning ability and critical thinking ability of nursing interns in the operating room. Health Vocational Education. 42: 86-90.