

The Application of Medical and Nursing Cooperation Scenario Simulation Combined with PBL Teaching Mode in Digestive Endoscopy Nursing Teaching

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Abstract: The purpose of this study is to observe and analyze the actual teaching effect of the combination of medical and nursing cooperation scenario simulation teaching and problem-based teaching model (PBL) in clinical teaching of digestive endoscopy nursing. For this purpose, we selected 60 nursing students who interned in the digestive endoscopy department of our hospital from May 2022 to May 2023 as the research subjects, and randomly divided them into two groups according to the numerical sorting method. 30 nursing students in the control group received traditional teaching mode, while 30 nursing students in the observation group received medical and nursing cooperation scenario simulation teaching combined with PBL teaching mode. The clinical teaching effects of the two groups were compared. The observation results showed that the theoretical, practical and comprehensive scores of the observation group nursing students were significantly higher than those of the control group nursing students, with $P < 0.05$; The overall scores of humanistic care ability and critical thinking ability of the observation group nursing students were higher than those of the control group nursing students, with $P < 0.05$; The satisfaction of observation group nursing students with teaching (93.33%) was significantly higher than that of control group nursing students (80.00%), with $P < 0.05$. Therefore, the conclusion that can be drawn is that the combination of medical and nursing cooperation scenario simulation teaching and PBL teaching mode has a more prominent effect in clinical teaching of digestive endoscopy nursing than the traditional teaching mode, which is worth recommending.

Keywords: Situational simulation teaching; PBL teaching mode; Medical and nursing cooperation; Nursing; Teaching effectiveness; Teaching quality

1. Introduction

As a progressively medical means, digestive endoscopy plays an increasingly important role in the diagnosis and treatment of digestive system diseases, and is widely used and recognized in major hospitals [1]. As a subject with strong operability and technicality, digestive endoscopy technology not only brings convenience to medical practice, but also poses challenges to the teaching of digestive endoscopy nursing. Digestive endoscopy nursing teaching is different from clinical nursing teaching. It belongs to a course that combines theory and practice. In teaching, it is necessary to cultivate both theoretical knowledge of endoscopy and practical skills, and there are difficulties in the teaching process. The traditional teaching of digestive endoscopy nursing usually adopts a one-way method of imparting knowledge, which greatly limits the subjective initiative of nursing students and makes it difficult to adapt to and meet the development and needs of endoscopy [2], and cannot keep up with clinical practice [3]. Medical and nursing cooperation scenario simulation teaching and PBL teaching mode are two teaching modes that are suitable for the current teaching environment. The former can simulate the process of digestive endoscopy examination and surgery for intuitive teaching, which is beneficial for improving the practical nursing operation ability of nursing students; The latter is based on problem-based learning, guided by the supervising teacher, highlighting the subjectivity of nursing students, which helps to improve their self-learning ability, cultivate their self-learning ability and problem-solving ability [4]. To investigate the impact of medical and nursing cooperation scenario simulation combined with PBL teaching mode on the effectiveness of digestive endoscopy nursing teaching, this study selected 60 nursing students from May 2022 to May 2023 as the research objects, and implemented traditional teaching and medical and nursing cooperation scenario simulation combined with PBL teaching mode. The results of the two teaching groups were analyzed, and the

application value of medical and nursing cooperation scenario simulation combined with PBL teaching mode in digestive endoscopy teaching was summarized.

2. Materials and methods

2.1 Research data

Sixty nursing students who underwent internships in the digestive endoscopy ward of our hospital from May 2022 to May 2023 were selected as the research subjects. They were randomly divided into two groups using a numerical sorting method. The control group of 30 cases includes 4 males and 26 females; Age range from 20 to 25 years old, with an average of (21.23 ± 2.78) years old; According to educational background, there are 13 college students and 17 undergraduate students. The observation group consists of 30 cases, including 5 males and 25 females; Age range from 20 to 25 years old, with an average of (21.32 ± 2.56) years old; According to educational background, there are 14 college students and 16 undergraduate students. The comparison of basic data such as gender, age, and education level between two groups of nursing students showed $P > 0.05$, indicating comparability.

2.2 Research methods

(1) Traditional Neurosurgical Teaching Model

The control group adopts a traditional teaching mode, led by senior teaching teachers with nursing experience of more than 5 years and specialized nursing experience [5]. Week 1: Under the guidance of the teaching teacher, familiarize oneself with the hospital environment, including the environment of the digestive ward, common diseases, work processes, etc., further review relevant digestive nursing knowledge, and consolidate the foundation. Week 2: The teaching teacher will give a lecture and provide theoretical teaching on gastrointestinal endoscopic nursing through demonstration materials. Week 3: Nursing students participate in lectures under the guidance of the teaching teacher and discuss the selection of lecture topics with the teacher. Week 4: Conduct professional theoretical and skill tests, and record the results [6].

(2) Medical and nursing cooperation scenario simulation teaching combined with PBL teaching mode

The observation group implemented a medical nursing cooperation simulation teaching combined with PBL teaching mode, as follows: ① The internship content in the first week of the internship was the same as that in the control group. ② Based on the actual situation of nursing students (basic mastery level, skill mastery level, learning ability, etc.), develop a reasonable PBL teaching plan and simulate teaching scenarios for medical and nursing cooperation. Before teaching, nursing students should self-study nursing knowledge related to gastroenterology endoscopy, surgery, etc., and independently develop learning cases, allowing nursing students to refer to materials and analyze cases with questions. On the day of teaching, nursing students and teaching instructors jointly participate. Nursing students first answer the relevant questions raised by the teaching instructor before class, and then the teaching instructor provides feedback, combined with the demonstration courseware to teach the content of the courseware [7]. For nursing operation skills related to item preparation, sewage treatment, instrument storage, digestive endoscopy diagnosis and treatment preparation and surgical operation, patient discharge disposal, etc., a situational simulation teaching plan can be designed to design accidents such as aspiration, heavy bleeding, respiratory and cardiac arrest, instrument failure, etc. that occur before and after endoscopic examination for patients. The teaching teacher will first demonstrate the operation, and the nursing students will play different roles for drills. During the nursing operation, the supervising teacher is present to guide and the teachers and students cooperate to complete the relevant nursing operations [8]. On site discussion and analysis of special cases, teachers and students jointly discuss and develop relevant nursing plans. Then, under the guidance of the teaching teacher, the nursing students complete the relevant nursing operations. Medical and nursing cooperative teaching: The teaching teacher collaborates with the medical staff in the gastroenterology ward to teach. Nursing students follow the attending gastroenterologist and department nurse to the ward for ward rounds every morning, recording relevant ward rounds information, including general information, condition, treatment and nursing points of the patient [9]. Based on the results of endoscopic examination, they learn the etiology, pathogenesis, clinical manifestations, and treatment points of the case [10]. Finally, the teaching teacher points out the problem, and the nursing student first develops a treatment plan with the problem, and then the teaching teacher comments, points out

errors, and puts forward suggestions. The internship content in the third and fourth weeks is the same as that in the control group.

2.3 Observation indicators

Both groups of nursing students were divided into four groups, with each group interning for four weeks. At the end of the internship, both groups of nursing students underwent theoretical, practical, and comprehensive competency assessments, as well as overall patient care evaluations. Record two sets of grades. Each item is scored 0-100 points.

(1) Comparison of humanistic care ability scores between two groups of nursing students

The scale for measuring the humanistic care ability of nursing students was selected, which was mainly evaluated from 5 dimensions (instilling beliefs and hopes, humanitarian altruistic values, assisting in meeting basic requirements, providing a good environment, and emotional communication). There were a total of 20 items, and each item was scored using Likert 5 [11]. The total score of the scale was the sum of the scores of each item, with a score range of 0-100 points. The higher the score, the stronger the humanistic care ability of nursing students [12].

(2) Comparison of critical thinking ability scores between two groups of nursing students

The Critical Thinking Trait Scale was selected to evaluate 45 items from 5 dimensions (curiosity, analytical ability, systematization ability, self-confidence in critical thinking ability, and cognitive maturity). Each item was scored using Likert 5, and the total score of the scale was the sum of the scores of each item, with a score range of 0-225 points. The higher the score, the stronger the critical thinking ability of nursing students [13].

(3) Comparing the satisfaction of two groups of nursing students with teaching

We used a self-made satisfaction questionnaire from our hospital, with a maximum score of 100 points. A score of 85-100 indicates very satisfied, 70-85 indicates relatively satisfied, and below 70 indicates dissatisfied. Total satisfaction=very satisfied rate+relatively satisfied rate [14].

2.4 Statistical methods

SPSS 26.0 statistical software was used for data processing. The count data was expressed as [n (%)] and tested with χ^2 ; Quantitative data is represented by (mean \pm standard) and t-test, with $P < 0.05$ indicating statistical significance [15].

3. Results

3.1 Comparison of internship performance between two groups of nursing students

The theoretical, practical and comprehensive scores of the observation group nursing students were significantly higher than those of the control group nursing students, with $P < 0.05$. As shown in Table 1.

Table 1: Comparison of Assessment Scores between Two Groups

	Written test score	Skill operation score	Teaching quality rating
Experimental group	54.23 \pm 3.29	36.23 \pm 1.72	90.43 \pm 2.45
Control group	48.11 \pm 3.23	34.22 \pm 2.23	83.44 \pm 3.12
T	7.270	3.909	9.651
P	0.000	0.000	0.000

3.2 Comparison of humanistic care abilities between two groups of nursing students

The overall humanistic care ability score of the observation group nursing students is higher than that of the control group nursing students, with $P < 0.05$. As in shown in Table 2.

Table 2: Comparison of humanistic care abilities between two groups of nursing students

	Instilling beliefs and hopes	Humanistic altruistic values	Assist in meeting basic needs	Provide a good environment	Emotional communication	Total score
Experimental group	22.56±3.12	16.66±3.45	18.29±3.34	14.22±2.18	18.43±3.18	90.16±8.74
Control group	18.66±3.02	13.29±2.19	15.28±3.11	10.27±2.09	13.28±3.02	70.78±6.56
T	4.919	4.517	3.612	7.163	6.432	9.713
P	0.000	0.000	0.000	0.000	0.000	0.000

3.3 Comparison of critical thinking abilities between two groups of nursing students

The overall critical thinking ability score of the observation group nursing students is higher than that of the control group nursing students, with $P < 0.05$. As in shown in Table 3.

Table 3: Comparison of critical thinking abilities between two groups of nursing students

	Appetite	Analytical ability	Systematic capability	Confidence in critical thinking	Cognitive maturity	Total score
Experimental group	42.26±5.22	42.21±5.45	38.21±4.64	42.32±5.21	41.23±4.78	206.23±15.32
Control group	37.22±4.54	35.42±4.11	35.26±3.88	37.31±4.54	36.33±4.55	181.54±12.87
T	3.990	5.448	2.671	3.970	4.066	6.758
P	0.000	0.000	0.009	0.000	0.000	0.000

3.4 Comparison of satisfaction evaluations of teaching between two groups of nursing students

The satisfaction of observation group nursing students with teaching (93.33%) was significantly higher than that of control group nursing students (80.00%), with $P < 0.05$. As in shown in Table 4.

Table 4: Comparison of critical thinking abilities between two groups of nursing students

	Satisfied	Basically satisfied	Dissatisfied	Degree of satisfaction
Experimental group	15(50.00)	13(43.33)	2(6.67)	28(93.33)
Control group	8(26.67)	16(53.33)	6(20.00)	24(80.00)
T	11.512	2.002	7.687	7.687
P	0.000	0.157	0.005	0.005

4. Discussion

The nursing of the digestive endoscopy ward mainly focuses on the nursing content before and after digestive endoscopy examination and digestive endoscopy surgery [16]. Digestive endoscopy technology is a new type of technology currently used to examine or treat digestive system diseases in the human body. With the continuous updating and improvement of this technology, the work requirements for nursing staff in digestive endoscopy wards are increasing, and new requirements are also proposed for clinical teaching of digestive endoscopy nursing [17]. The traditional teaching mode mainly focuses on teaching relevant digestive endoscopy nursing theoretical knowledge to the teacher. This teaching mode ignores the subjectivity of nursing students, makes it difficult to mobilize their learning initiative, limits their thinking development, and makes it difficult to achieve teaching objectives [18]. In order to adapt to the current environment, the PBL teaching model combined with the medical and nursing cooperative situational teaching model has been promoted to clinical teaching of digestive endoscopy nursing, and has achieved good teaching results [19].

The combination of medical and nursing cooperation scenario simulation teaching and PBL teaching is an innovative teaching model that effectively combines medical and nursing cooperation, scenario simulation, and PBL (problem-based learning) teaching methods to improve the clinical practice ability, problem-solving ability, and teamwork ability of nursing students [20]. Medical and nursing cooperation scenario simulation teaching is a teaching method that simulates the real clinical environment, aiming to enable nursing students to practice and experience in the atmosphere of medical and nursing cooperation by simulating clinical scenarios [21]. This method emphasizes close

cooperation between medical staff, simulates the real operation of medical teams, and enables nursing students to learn effective communication and collaboration with medical team members such as doctors and nurses in practice. In the simulation teaching of medical and nursing cooperation scenarios, the teaching teacher can design different clinical scenarios based on the teaching content and objectives, such as patients experiencing aspiration, massive bleeding, respiratory and cardiac arrest, instrument failure, etc. during endoscopic examination. Nursing students are divided into different roles, such as doctors, nurses, patients, etc., and engage in practical operations and role-playing in simulated scenarios [22]. Through this approach, nursing students can gain a deeper understanding of the operation of medical teams and the collaborative relationship between medical staff, and improve their adaptability and coping ability in clinical practice. PBL teaching method is a problem oriented teaching method that emphasizes the initiative and autonomy of nursing students in the learning process. In PBL teaching, the lead teacher will present a real problem or case, while the nursing students will seek answers or solutions to the problem through group discussions, research, and other methods [23]. This method helps to cultivate the problem-solving ability, critical thinking, and teamwork ability of nursing students [24].

The situational simulation teaching adopted by the observation group provides nursing students with a realistic and vivid clinical environment, allowing them to experience and participate in clinical practice firsthand [25]. In such an environment, nursing students can combine their theoretical knowledge with practical operations, thereby gaining a deeper understanding and mastery of relevant knowledge. At the same time, simulated emergency situations, complex cases, and other scenarios also require nursing students to quickly respond and make decisions, which undoubtedly enhances their memory and application ability of theoretical knowledge. Secondly, the PBL teaching method emphasizes problem oriented learning and encourages nursing students to solve problems through group discussions, literature review, and other means [26]. This approach not only exercises the problem-solving ability of nursing students, but also encourages them to actively consult and learn relevant theoretical knowledge, thereby expanding their knowledge base and improving learning effectiveness. In addition, group discussions can also facilitate communication and cooperation among nursing students [27]. By sharing each other's insights and experiences, they can more comprehensively grasp and understand relevant knowledge. The combination of medical and nursing cooperation scenario simulation teaching and PBL teaching also focuses on cultivating the clinical thinking and practical abilities of nursing students [28]. In simulated scenarios, nursing students need to apply their theoretical knowledge and clinical skills to solve practical problems, which helps them form correct clinical thinking and improve their proficiency and accuracy in clinical operations. At the same time, through cooperation and communication with doctors, nursing students can also learn more clinical experience and skills, further improving their professional level [29].

This teaching model also emphasizes feedback and evaluation. After the simulation teaching is completed, the teaching teacher will provide feedback and guidance on the performance of the nursing students, point out their shortcomings in theory and operation, and propose improvement suggestions [30]. This timely feedback helps nursing students understand their problems in a timely manner, and make targeted improvements and learning, thereby improving their assessment results.

The experimental group requires nursing students to not only apply medical knowledge but also pay attention to the psychological and social issues of patients in the process of problem-solving, which helps them develop comprehensive and caring abilities [31]. At the same time, group discussions also facilitate communication and cooperation among nursing students. By sharing each other's insights and experiences, they can have a deeper understanding of the connotation and importance of humanistic care. The combination of medical and nursing cooperation scenario simulation teaching and PBL model emphasizes communication and collaboration between medical staff [32]. In a simulated scenario, nurses and doctors need to work together to address the patient's issues and needs, and develop the best nursing plan through cooperation and communication. This kind of cooperation and communication helps nurses better understand the working methods and ideas of doctors, so as to better cooperate with their work and provide more comprehensive and detailed care for patients. This model also emphasizes the education and guidance of humanistic care for nursing students [33]. In the process of simulated teaching and PBL learning, teachers can guide nursing students to pay attention to the emotional, psychological, and social needs of patients, teach them how to establish good communication relationships with patients, and provide effective psychological support and emotional comfort. These education and guidance help nursing students form correct humanistic care concepts and behavioral habits [34].

In summary, the combination of medical and nursing cooperation scenario simulation teaching and

PBL teaching is an innovative and practical teaching model. It can effectively improve the clinical practice ability, problem-solving ability, and teamwork ability of nursing students, providing strong support for cultivating high-quality medical talents. The PBL teaching model is a new type of teaching model that is based on problems and aims to give full play to the subjectivity of nursing students and the leading role of teaching teachers. Compared with traditional teaching models, its advantages lie in: firstly, utilizing and improving the self-learning ability of nursing students; Secondly, it is beneficial to improve the critical thinking ability of nursing students [35]. This model emphasizes the cultivation of independent learning and thinking abilities among nursing students. Before teaching, nursing students are asked to search for information with questions, actively learn and understand relevant content, and guided by teachers to explain in class, deepen details, help nursing students internalize knowledge, and help strengthen memory [36].

The scenario simulation teaching model of medical and nursing cooperation is a teaching model that combines interdisciplinary cooperation with scenario simulation to teach nursing students. Compared with traditional teaching models, its advantages lie in: firstly, improving the humanistic care ability of nursing students; Secondly, to improve the critical thinking ability of nursing students; Thirdly, to enhance the endoscopic practical skills of nursing students and increase their clinical nursing experience [37]. This teaching model can effectively stimulate the learning enthusiasm of nursing students. By allowing interns and medical students to collaborate and combine theory and skills to analyze, diagnose, and treat cases, it can not only cultivate independent thinking and humanistic care abilities of nursing students, but also improve their teamwork and comprehensive nursing abilities [38].

In this study, the control group received traditional teaching mode, while the observation group received medical and nursing cooperation scenario simulation teaching mode combined with PBL teaching mode. The results showed that the theoretical, practical and comprehensive scores of the observation group nursing students were significantly higher than those of the control group nursing students; The overall scores of humanistic care ability and critical thinking ability of the observation group nursing students were higher than those of the control group nursing students; The satisfaction of observation group nursing students with teaching (93.33%) was significantly higher than that of control group nursing students (80.00%); The combination of medical and nursing cooperation scenario simulation teaching mode and PBL teaching mode has outstanding teaching effects. The medical and nursing cooperation scenario simulation teaching mode and PBL teaching mode complement each other, each leveraging their advantages and having high combined value.

However, this study also has certain limitations, such as small sample size and short observation time. Future research can further expand the sample size and extend the experimental time to comprehensively evaluate the application effect of medical nursing cooperation scenario simulation combined with PBL teaching mode in digestive endoscopy nursing teaching.

5. Conclusion

In summary, the application of medical cooperation scenario simulation combined with PBL teaching mode in digestive endoscopy nursing teaching has achieved significant results, improving the learning effectiveness and comprehensive quality of nursing students. Therefore, it is recommended to promote and apply this teaching model in future digestive endoscopy nursing teaching, in order to cultivate more excellent nursing talents.

Author contributions

All authors have designed the study, developed the methodology, performed the analysis, and written the manuscript. All authors have read and agreed to the published version of the manuscript.

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