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The Application Effect of Question Teaching Method Combined with PDCA Circular Teaching Method in the Teaching of Surgical Nursing Students

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Abstract

Objective: To explore whether the application effect of question-based teaching method combined with PDCA circular teaching method in the teaching of surgical practice nursing students can provide effective teaching methods for clinical nursing teaching practice and improve the satisfaction of nursing interns in our hospital. **Methods:** 124 nursing interns who practiced in a surgical department of our hospital from October 2020 to April 2021 were selected by convenience sampling and randomly divided into two groups: the problem teaching group combined with PDCA circular teaching group (observation group) and the traditional teaching group (control group), with 62 students in each group. Observing the core competence, practice performance and satisfaction with two different teaching methods of interns in the two groups. **Results:** The core competence of interns in the observation group was higher than that in the control group ($P<0.05$), and so was the satisfaction ($P<0.05$). **Conclusion:** The application of problem-guided PDCA teaching method combined with PDCA teaching method in the teaching of surgical nursing students can improve the teaching quality and practice effect.

Keywords

Problem-based teaching method, PDCA cycle, Nursing teaching, Core competence

1. Introduction

Clinical nursing teaching is an important transition period to guide nursing students from school to work smoothly, which not only provides students with the opportunity to combine theory with practice, but also can cultivate students' professional way of thinking and the ability to analyze and solve problems (Zhen, TAN, 2006). Wu Ying and Zhao Rongrong et al. (2008) from School of Nursing, Capital Medical University prepare tools of defining core competency of nursing students through literature analysis and communication with semi-structured experts, and acquire six dimensions of core competency needed for the nurses in Beijing area by adopting the questionnaire investigation, including the professional construction and development ability, clinical nursing ability, support and interpersonal communication ability, medical and nursing knowledge application ability, good personal characteristics critical thinking and innovation ability. Liu Ming from Macao (Liu M, 2007; Liu, 2009) adopts qualitative research methods to explore China reg-

istered nurse core strength, including seven dimensions such as critical thinking and research system, clinical nursing, leadership, interpersonal relationships, ethical or legal practice, professional development and teaching practice. The nurse core competence evaluation questionnaire developed by Huber et al. (Hu Bo, 2011) includes five dimensions such as good personal qualities, clinical nursing competence support and interpersonal communication ability, critical clinical thinking competence, professional construction and development competence. The research results of domestic nursing researchers show that the overall situation of nursing students' core competence is not satisfactory, which is manifested as critical thinking ability, scientific research ability, innovation ability, interpersonal communication and cooperation ability, education consulting and leadership ability, etc., which need to be further improved (Tu, 2014; Wang, 2013; Zhao, 2014; Wang, 2013; Tu, 2013).

Problem-based teaching method is a kind of problem-centered teaching methods, using nursing process as the main line, which makes students to analyze problems and organize knowledge according to nursing process to achieve goals of comprehensive grasp of knowledge. The traditional teacher-lecturing teaching will be replaced by teaching with discussion between teachers and students, and the traditional teacher-centered teaching method will be instead by the teacher-guided and student-subjected method (Tian, 1997). This method can fully mobilize the enthusiasm of students to actively participate in learning and improve their ability to analyze and solve problems.

PDCA (plan-do-check-act) is a basic operation mode of total quality management system (TQMS), which was first developed by Hugh Hart in Economic Control of Quility of Manufacturing and improved and developed by The American quality management expert Dr. Deming. Subsequently the PDCA cycle concept was formally proposed, which mainly includes four stages of planned, implementation, inspection and treatment, and it was one of the quality management methods recognized by the management circle at present (Yang An-Yu, 2010). A comparison was made by Wimuttipanya, J (Jittawisut, 2019) between 62 students in a university who used PDCA quality cycle to monitor and evaluate the teaching process of practice, and statistical differences were found between before and after use. Dam, M. (2020) found that teachers can better promote teaching and learning and improve the quality of education by using PDCA circular teaching method to design the teaching framework. This topic intends to explore the application effect of PDCA circular teaching method in the teaching of surgical nursing students in our hospital.

2. Methods

2.1 Materials and Methods

According to the general requirements of statistics, combined with the data of the cross-sectional survey results of this study, it is stipulated that the test level α=0.05, the test efficiency is 0.90, and the look-up $Z\alpha$=1.645. $Z\beta$=1.28, so the sample size n1= N2 55. In order to ensure sufficient sample size after termination and withdrawal of a certain amount of cases, the sample size was increased by 10%. Finally, 124 intern nursing students who came to our department from October 2020 to April 2021 were selected as the research objects and randomly divided into observation group and control group, with 62 students in each group. Control group: 52 girls, 10 boys; There was no statistically significant difference in theoretical scores between the two groups of nursing students, and the professional titles of the teachers were all chief nurses or above. The baseline data were balanced and comparable.

2.2 Teaching method

The two groups are taught by the same teacher. The control group is taught by the head nurse of the department and the general teacher according to the teaching syllabus and the traditional teaching mode. The teachers of each class complete the teaching tasks according to the teaching plan of the department. The teachers carry out small lectures every week, organize teaching rounds once a month, and complete the theory and operation assessment of students before leaving the course.

The experimental group was taught by question teaching method combined with PDCA circular teaching method, one-to-one teaching with the class, the specific measures are as follows:

Teaching Plan: Setting up a teaching management team composed of the head nurse and the teacher to achieve hierarchical management. All teachers were trained uniformly. According to the teaching syllabus and teaching plan, closely combined with the content and chapters of the textbook, teachers find out the key problems students should master, and carefully design a set of problems or cases. The setting of the problem is generally divided into 3 levels, the first level is to ask the student to grasp the outline of the teaching material, to solve the key and difficult points in the problem. The problem of this level should be arranged and solved before class through self-study by students. The second level is around the key difficulty setting two or three typical problems. The third level is the knowledge inner link. The title should include the main nursing process, which runs through the old and new knowledge, making the

student to acquire new knowledge by reviewing the old. The teaching goal is to cultivate interns who have critical thinking ability, interpersonal communication ability, clinical nursing ability, core competence of self-development capacity. The teaching plan should be formulated in detail, and the theoretical knowledge and clinical operation techniques that need to be mastered and understood every week should be outlined, so that the students can ask clinical questions by themselves, and collect, analyze and classify data with the questions as planned.

Teaching: (1) The students preview the teaching materials, look up relevant materials and complete the first level of questions by themselves. (2) Inspiring and guiding students to discuss the problems at the second and third levels in class. In the discussion, teachers should encourage students to think actively and have the courage to put forward their own opinions. Teachers should give appropriate inspiration and guidance in the whole process. (3) Resolving doubts and summarization. The teacher summarizes the key and difficult points in the textbook according to the students' speeches and discussions as well as their own preparation for answers to questions. (4) The internship rotation cycle is one month, and the simple explanation will be given in the form of small classes once a week. To understand the theory of knowledge, under the principle of hospital rules and regulations, protecting the patient's privacy protection and psychological needs of nursing basic literacy was the teaching point. (5) Adopting the bedside teaching ward-round, demonstrate clinical nursing operation and interpretation of the relevant theoretical knowledge, including the matters needing attention, etc. In view of the students' questions, conclusions would be made by teachers' and students' discussion. At the same time, under the guidance of teachers, nursing students choose cases by themselves, and carry out clinical practice ability training, practice basic operations and a nursing ward round before the department.

Teaching inspection: After 2 weeks of practice, the unified assessment of theoretical knowledge and practical operation ability is carried out to check the nursing students' mastery of theoretical knowledge and proficiency of operation skills. The forum is held for the exchange and discussion between nursing students and teaching teachers. Both nursing students and teaching teachers can put forward problems and solutions to each other, so as to achieve the purpose of teaching and learning.

2.3 Teaching treatment

Comparing the gap between teaching plan objectives and assessment results, solving problems, analyzing causes and summarizing experience to provide basis for the development of the second PDCA cycle teaching plan. Each group of nursing students completed the PDCA cycle twice during the internship in our department.

Statistical methods SPSS17.0 statistical software was used for statistical analysis and percentage of mean standard deviation was used for statistical description. Two groups of interns in the overall competence and all dimensions of the score of independent sample were analyzed by T test. By repeated measurement variance analysis, the students' scores in the entry and exit courses, the teachers' evaluation and the students' self-evaluation of the overall endurance and the scores of each dimension were all bilateral probability, and $P<0.05$ was considered as statistically significant difference.

3. Results

Table 1. Comparison of total practice results of nursing students between the two groups (x±s)

Tranches	Tests Grade	Operating practice	t	p
Observation group	46.32±5.65	32.51±4.20	-11.223	＜0.05
Controlgroup	39.21±7.89	29.10±3.31		

Table 2. Comparison of core competence between the two groups of nursing students (x±s)

Dimension	Entry score	Tranches	Goal	t	p
Total	220	Observation group	105.50±0.50	-3.767	＜0.05
		Control group	122.61±36.98		
Critical thinking	30	Observation group	14.63±3.30	-3.180	＜0.05
		and research Control group	17.05±4.19		
Clinical care	40	Observation group	17.25±5.23	-3.867	＜0.05
		Control group	20.97±5.81		

Leadership	36	Observation group	16.05±4.71	-4.974	＜0.05
		Control group	21.22±4.58		
Interpersonal	32	Observation group	17.40±3.23	-1.274	＜0.05
		Relation Control group	18.02±4.49		
Ethical and	32	Observation group	17.34±4.45	-2.23	＜0.05
		legal practice Control group	19.53±5.53		
Professional	24	Observation group	12.31±4.12	-1.34	＜0.05
		Development Control group	13.19±4.45		
Educational	24	Observation group	11.72±3.22	-2.48	＜0.05
		Counseling Control group	13.21±4.31		

Table 3. Comparison of teaching satisfaction between the two groups of nursing students (x±s)

Tranches	Means	T-value	P-value
Observation group	89.83±5.39	-4.855	＜0.05
Controlgroup	94.67±3.28		

4. Discussion

The disadvantages of the traditional clinical practice teaching management mode are mainly shown in the following aspects. First, the traditional teaching is the teacher-centered. With the development of medical education, the teaching center has been transferred to the student (Li, 2008; Yan, 2017), but the existing management mode is still the teacher as the center, the students in a subordinate position, it is difficult for them to actively participate in the whole management process, which will inevitably affect the learning enthusiasm, initiative and creativity of students, thus affecting the teaching effect. Second, the teaching closed loop has been formed in the existing teaching mode which was a top-down management system, so it is difficult to receive the teaching evaluation feedback from nursing students. Only when the closed-loop of the teaching process was formed, the teaching reserves phase could be guided by the teaching evaluation feedback, forming a virtuous cycle of sustainable development, and constantly improving the quality of teaching (Zhang, 2018; Wu, 2020). Thirdly, the key points of management implementation are not clear. Interns have clear requirements for teaching effects in practice. The traditional management mode often emphasizes the control of key points of influence quantity, but neglects the control of key points of influence quality (Dong, 2019; Yan, 2020), which is not conducive to interns' mastery of relevant theoretical knowledge and practical skills.

Application of problem-based teaching combined with PDCA circulation law in nursing teaching, is proposed to improve nursing students' ability of mastering the theoretical knowledge skills and the teaching method of satisfaction, standardize the nursing teaching practice process, prompt nursing students to actively explorative study, improve the clinical teaching effect of each department (Sui, 2020). The results of this study showed that the theoretical knowledge scores and practical operation scores of nursing students in the observation group were higher than those in the control group ($P<0.05$), which confirmed that the combination of the problem-guided teaching method and PDCA round-guided teaching method played a positive role in improving students' learning initiative. In addition, the core competence of nursing students in the observation group was also higher than that in the control group ($P<0.05$), which also indicated that the combination of the problem-solving teaching method with PDCA circular teaching method could improve the communication learning interest, active thinking and problem-solving ability of nursing students. Finally, from the perspective of satisfaction, the satisfaction of the observation group was higher than that of the control group ($P<0.05$), indicating that this innovative teaching mode was more popular among nursing students.

In conclusion, compared with the traditional teaching methods, combining the problem-solving teaching method with PDCA circular teaching method in the teaching of surgical nursing students can stimulate the learning initiative of nursing students and improve their ability to analyze and solve problems. In addition, the problem teaching method combined with PDCA circular teaching method is helpful to promote mutual communication between teachers and students, and ultimately achieve a satisfactory teaching effect.

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