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Application of Situational Simulation Teaching Method in Standardized Training of Anesthesiology Residents

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Abstract

Objective: To study and analyze the application value of situational simulation teaching methods in standardized training of anesthesiology residents. **Methods:** A total of 120 physicians who received standardized training for anesthesiology residents from January 2022 to December 2023 were selected as the study objects and grouped according to the standardized training time, among which 60 physicians from January 2022 to December 2022 were included in the control group. Sixty physicians from January 2023 to December 2023 were included in the study group. The control group carried out the conventional teaching method in the standardized training of anesthesiology residents, and the research group adopted the situational simulation teaching method in the standardized training of anesthesiology residents. The results of the standardized training of anesthesiology residents, non-technical skills, and teaching satisfaction of the two groups were evaluated and compared. **Results:** The scores of theoretical assessment and practical assessment after the standardized training course were higher in the study group than in the control group, the difference was statistically significant ($P < 0.05$). After standardized training in anesthesiology, the scores on the ANTS scale increased in both groups, and the difference before training was statistically significant ($P < 0.05$). After training, the scores on the ANTS scale in the study group were higher than those in the control group, and the difference was statistically significant ($P < 0.05$). The evaluation of teaching satisfaction showed that the total satisfaction of anesthesiology after standardized training in the study group was higher than that in the control group, and the difference was statistically significant ($P < 0.05$). **Conclusion:** The application of the situational simulation teaching method in the standardized training of anesthesiology residents can improve the training effect, non-technical skills, and teaching satisfaction.

Keywords

Anesthesia; A resident physician; Standardized training; Situational simulation teaching method; Teaching effect; Teaching satisfaction

As one of the important departments in modern medicine, the Department of Anesthesiology has high application requirements. Medical personnel in the department of anesthesiology should not only possess professional knowledge and skills related to anesthesiology, but also master professional contents such as emergency treatment for critical cases and pain intervention, and have high requirements for independent thinking and problem-solving ability [1, 2]. In recent years, with the continuous development of standardized training for residents, the requirements for related

teaching work have gradually increased [3]. The situational simulation teaching method is a relatively new clinical teaching method. This teaching method emphasizes student-centered, student-led, combined with teaching objectives and cases, and simulates the diagnosis and treatment process through the simulation of clinical situations and students' role-playing [4]. Compared with traditional teaching methods, situational simulation teaching methods can make students master clinical skills faster, learn professional knowledge, and accumulate certain experiences. In recent years, the situational simulation teaching method has been widely applied in modern medical practice. Relevant studies [5] show that the application of situational simulation teaching methods can improve clinical operation ability, improve team communication and cooperation ability, and promote the healthy development of medical teams. Based on the data of some physicians who received standardized training for anesthesiology residents, this study analyzed the application value of the situational simulation teaching method in standardized training for anesthesiology residents and provided some references for related teaching work.

1. Data and the methods

1.1 General information

A total of 120 physicians who received standardized training for anesthesiology residents from January 2022 to December 2023 were selected as the study objects and grouped according to the standardized training time, among which 60 physicians from January 2022 to December 2022 were included in the control group. Sixty physicians from January 2023 to December 2023 were included in the study group. There was no statistical significance in the comparison of general data between the two groups ($P > 0.05$), as shown in Table 1.

Table 1. Comparison of general data between the two groups of physicians

Group	Gender (Male/female, e.g)	Age ($\bar{x} \pm s$, age)	Education background (Bachelor/Master, e.g)
Research group/60	39/21	23.49 ± 2.54	41/19
Control group/60	37/23	24.01 ± 2.77	42/18
χ^2/t	0.144	1.072	0.039
P	0.705	0.286	0.843

1.2 Methods

1.2.1 Control group

In the standardized training of anesthesiology residents, the conventional teaching method was carried out, led by the teacher, and the teaching work was carried out in strict accordance with the teaching syllabus. Every week, the teacher released the next week's teaching content to Dr. Guipei, and carried out teaching work through courseware and video materials. Combined with the actual work of the Department of Anesthesiology, under the leadership of the teacher, the doctor participated in the program, and a unified assessment was carried out after the program was finished.

1.2.2 Research group

The situational simulation teaching method was adopted in the standardized training of anesthesiology residents, specifically as follows:

(1) Simulation scenario script writing: combined with the teaching content and objectives in the training, clear the background of scenario simulation, character communication, and simulation key points. For example, combined with surgical cases, design and simulate the pathological characteristics of patients, surgical methods, anesthesia requirements, etc. By designing the characteristics and requirements of different diseases and different operations, and interspersing anesthesiology-related knowledge and skills, physicians are trained to formulate anesthesia programs from a professional perspective and carry out relevant invasive or non-invasive operations in the face of different patients and operations.

(2) Grouping and preparation: A scenario simulation training group of 3-5 people was formed based on the actual situation of each group of doctors. The teacher provides the corresponding script. Different roles were divided through group discussion, and independent exercises were carried out after class. In the after-class exercises, the teacher gives targeted guidance on the existing problems according to the students' practice and guides

the doctors to think independently and solve problems in group cooperation in the process of guidance, so as to effectively grasp the essence of simulation teaching.

(3) Classroom exercises and Q&A: In class, scenarios are simulated through the training room and PPT, and role play and exercises are conducted by the trained physicians according to groups. Classroom exercises are carried out in different aspects, such as preoperative visits, patient assessment, communication with the surgeon, anesthesia plan formulation, intraoperative anesthesia operation (tracheal intubation, internal jugular vein puncture, intraspinal anesthesia, etc.), and intraoperative monitoring. There will be no discussion or interruption during the exercise. After the exercise, the exercise team will conduct a self-evaluation, analyze the problems and shortcomings in the exercise process, and tell their own ideas and feelings. Teachers combine relevant professional knowledge to analyze and degrade specific problems.

1.3 Observation target

1.3.1 Evaluation of training effect

Assessment of anesthesiology residents shall be carried out after the completion of standardized training courses, and the assessment contents shall be formulated strictly according to the teaching syllabus, training content, examination question bank, etc., including theoretical assessment and practical training assessment. The total score of each item is 100 points, and the higher the total score, the better the training effect.

1.3.2 Non-technical skills assessment

anesthetists' non-technical skills (ANTS) scale was used to evaluate the non-technical skills of anesthetists' non-technical skills (ANTS) before and after standardized training of anesthetists' anesthetists' non-technical skills (ANTS), which included 15 items including task management, teamwork, situational awareness, and decision-making. Each item is scored from 0 to 4 points, 0 is not observed, 4 is good, and the total score is 0 to 60 points. The higher the score, the higher the non-technical skill level.

1.3.3 Teaching satisfaction evaluation

After the standardized training of anesthesiology residents, a questionnaire survey was conducted to evaluate the teaching satisfaction of each physician, and the Likert scale was used to score the total score ranging from 1 to 5 points, among which 1 was very dissatisfied, 2 was dissatisfied, 3 was indifferent, 4 was satisfied, and 5 was very satisfied. Total satisfaction = (very satisfied + satisfied) × 100%.

1.4 Statistical method

SPSS23.0 statistical software was used for processing, measurement data were represented by ($\bar{x} \pm s$), comparison by *t-test*, counting data by percentage, comparison by χ^2 test, and $P < 0.05$ was considered statistically significant.

2. Results

2.1 Comparison of the training effect of residents in the two groups

The scores of theoretical assessment and practical assessment of anesthesiology residents in the study group after the standardized training course were higher than those in the control group, with statistical significance ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of training effect of residents in the two groups ($\bar{x} \pm s$)

Group	Theoretical examination (point)	Training assessment (point)
Research group/60	89.23 ± 3.41	92.11 ± 5.67
Control group/60	83.40 ± 4.58	84.39 ± 6.02
t	7.909	7.231
P	< 0.001	< 0.001

2.2 Comparison of non-technical skills before and after training of residents in the two groups

After standardized training of the anesthesiology department of residents in the two groups, the ANTS scale score increased, and the difference before training was statistically significant ($P < 0.05$); after training, the ANTS scale

score of physicians in the research group was higher than that of the control group, and the difference was statistically significant ($P < 0.05$), as shown in Table 3.

Table 3. Comparison of non-technical skills of residents before and after training between the two groups ($\bar{x} \pm s$)

Group	Pre-training (point)	Post-training (point)	t	P
Research group/60	22.39 ± 4.56	48.72 ± 4.51	31.800	< 0.001
Control group/60	23.10 ± 4.78	42.10 ± 5.72	19.743	< 0.001
t	0.832	7.040		
P	0.407	< 0.001		

2.3 Comparison of teaching satisfaction of residents in the two groups

Evaluation of teaching satisfaction showed that the total teaching satisfaction of residents in the study group after standardized training in anesthesiology was higher than that of the control group, with statistical significance ($P < 0.05$), as shown in Table 4.

Table 4. Comparison of teaching satisfaction between the two groups of residents (case %)

Group	Great satisfaction	Satisfaction	Not to matter	Dissatisfaction	Very dissatisfied	Overall satisfaction
Research group/60	33(55.00)	26(43.33)	1(1.67)	0(0.0)	0(0.00)	59(98.33)
Control group/60	20(33.33)	33(55.00)	3(5.00)	3(5.00)	1(1.67)	53(88.33)
χ^2						4.821
P						0.028

3. Discussion

Anesthesiology is an important and special discipline, which not only requires medical personnel to have independent clinical thinking and working ability but also to master various medical knowledge and skills, including clinical anesthesia, emergency and critical emergency treatment, pain treatment, etc., in order to ensure the life safety of patients. Compared with other departments, the standardized training of anesthesiology residents has great special features. First, anesthesiology includes a number of invasive operations such as tracheal intubation, deep vein puncture, intramural puncture, and nerve block [6, 7]. Meanwhile, during anesthesia, anesthesiologists are required to closely monitor patients and adjust the dose of anesthesia drugs according to the actual situation of patients. At the same time, abnormal conditions are identified for the first time to maintain the stability of the patient's internal environment, and to ensure the safety of the patient and the smooth development of related treatment such as surgery [8]. This study mainly analyzed the application effect of the situational simulation teaching method in the standardized training of anesthesiology residents. It showed that the scores of the theoretical assessment and practical training assessment after the standardized training course of anesthesiology residents in the research group were higher than those in the control group, and the scores of the ANTS scale after the training of physicians in the research group were higher than those in the control group, indicating that compared with the conventional teaching mode, The situational simulation teaching method is more conducive to training doctors' skills and improving the teaching effect.

In the scenario simulation teaching method, it is necessary to set up scenarios and prepare scripts in combination with specific teaching contents. In the process of training doctors, they can perform group role-play and simulate actual combat exercises according to the scripts. In the relevant learning process, the whole process is led by the doctor, which can fully mobilize the enthusiasm of learning, and also strengthen the communication and cooperation between the doctors. In the relevant teaching activities, through the action orientation, the doctor can take the initiative to participate in the role. Experience different roles, and cultivate professional knowledge and skills at the same time, so that each trained physician in the professional field of work is more emotional and thoughtful, improve the ability of communication, coordination, and interpersonal skills. The evaluation of teaching satisfaction showed that the total satisfaction of anesthesiology residents in the study group was higher than that in the control group after standardized training, indicating that the situational simulation teaching method could better meet the needs of training physicians

and improve their satisfaction with teaching work. Relevant studies [9] show that the situational simulation teaching method is significantly better than the conventional teaching method in enhancing professional skills and improving the teaching effect, which is consistent with the results of this study.

4. Conclusion

To sum up, the application of the situational simulation teaching method in standardized training of anesthesiology residents has outstanding value in improving the training effect, improving the non-technical skills of the training physicians, and improving teaching satisfaction. In the standardized training of resident doctors, the traditional teaching method has been difficult to adapt to the clinical needs, and the situational simulation teaching method has good practicality and operability, which can enable the training doctors to experience diagnosis and treatment from different angles in the learning process, improve the communication ability and teamwork ability, and is worth promoting. The application of this teaching model is expected to help build mutual trust and an open medical environment.

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