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Application of Objective Teaching Method Combined with Flipped Classroom in the Standardized Training of Anesthesiology Residents

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Abstract

Objective: To explore and analyze the application value of objective teaching method combined with flipped classroom in the standardized training of anesthesiology residents. **Methods:** A total of 60 residents who participated in the standardized training of anesthesiology residents in our hospital from January 2021 to October 2022 were selected as the research objective, and 30 residents who received standardized training of anesthesiology residents from January 2021 to November 2021 were included in the control group to carry out traditional training. A total of 30 residents who received standardized training of anesthesiology residents from December 2021 to October 2022 were included in the study group, and the targeted teaching method combined with flipped classroom training was carried out. The examination results and satisfaction of residents in the two groups were statistically compared. **Results:** After the standardized training of anesthesiology department, the scores of theoretical knowledge assessment, clinical skills assessment and subjective assessment of anesthesiology in the study group were higher than those in the control group, and the differences were statistically significant ($P < 0.05$).The total satisfaction of residents' theoretical knowledge training, clinical skills training, teachers' teaching level, teaching methods, medical ethics training and other aspects of the study group were higher than those of the control group, and the differences were statistically significant ($P < 0.05$). **Conclusion:** Target-oriented teaching method combined with flipped classroom has outstanding value in the standardized training of anesthesiology residents in terms of overall improvement of residency training results and teaching satisfaction.

Keywords

Target teaching method, Flipped classroom, Anesthesia, Standardized residency training

Under the guidance of national policies, the standardized training system for residents has been implemented nationwide, which plays a positive role in training medical talents and promoting the rational allocation of medical resources (Chen CS., 2020; Hicks PJ et al., 2018). As a secondary clinical discipline, anesthesiology is a practical, professional and risky important discipline. After graduating from medical colleges and entering clinical practice, medical students all need to receive standardized training for anesthesiology residents, which lays a solid foundation for future clinical work of residents (LATENSTEIN CSS et al., 2019). In the process of standardized training for anesthesiology residents in our hospital, we actively explore the improvement and adjustment of training mode. Objective teaching method com-

bined with flipped classroom is a new type of combined teaching mode which has been carried out and achieved certain results in our hospital recently. The objective teaching method and flipped classroom were combined to find a feasible standardized training method for anesthesiology residents through the implementation of the teaching model and clinical exploration. Based on the standardized training of anesthesiology residents in our hospital in recent years, this study analyzed the application and value of the teaching model of target teaching method combined with flipped classroom.

1. Data and Methods

1.1 General Information

A total of 60 residents who participated in the standardized training of anesthesiology residents in our hospital from January 2021 to October 2022 were selected as the research target, including 27 male residents and 33 female residents, aged 24-32 (28.42±2.12) years old, 48 with bachelor's degree and 12 with master's degree. Between January 2021 and 2021 on November 30 cases accepted during anaesthesia resident in the control group, the resident standardization training for traditional training, between December 2021 and in October 2022, during the 30 patients who underwent anesthesia resident in resident standardization training team, to carry out the target teaching method combined with flip classroom training. There was no significant difference in the general situation of residents receiving standardized training in anesthesiology department between the two groups ($P > 0.05$).

1.2 Methods

Both groups of residents received standardized training for anesthesiology residents in our hospital, and the teaching syllabus and teacher qualifications were consistent. The specific teaching methods were as follows:

1.2.1 Control group

Standardized training for anesthesiology residents was carried out. After entering the anesthesiology department, all residents were organized into the department of anesthesiology. The teachers introduced the daily work content of anesthesiology department with slides, and led the residents to get familiar with the working environment and workflow of anesthesiology department. Teachers on the basis of curriculum arrangement, carry out once a week centralism teaching, the rest of the time the teacher work arrangement based on anesthesiology group resident involved in anesthesia, anesthesia physician daily work independently arrange professional learning, encounter problems can be through the communication between resident and timely feedback to teachers. After the standardized training of anesthesiology residents, the residents were evaluated.

1.2.2 Research group

Carry out target-based teaching method combined with flipped classroom training, as follows:

Based on the principle of starting from shallow to deep, and according to the requirements of the standardized training syllabus of anesthesiology department, the training of target teaching method was mainly divided into the basic theoretical knowledge of anesthesiology department, professional skills of anesthesiology department, clinical thinking of anesthesiology department and other stages. After teachers determine the phased teaching objectives, they formulate target teaching methods at different stages combined with the development and teaching of flipped classroom training content. In order to facilitate the development of target-oriented teaching method combined with flipped classroom training, teachers and residents established an online communication group to facilitate communication.

(1) Basic theoretical knowledge training of anesthesiology department: In the initial stage after residents entered the department, teachers carried out teaching activities once a week through unified teaching. Teaching courseware mainly included slides, video materials, etc. After the teachers made the teaching courseware, they uploaded the courseware to the online teaching platform one week in advance, and the residents logged on the teaching platform through their personal accounts and downloaded the teaching courseware for self-study. After uploading the teaching courseware, the teachers published the teaching notice and teaching task in the online communication group, so that the residents could have targeted learning. In the training of theoretical knowledge, theoretical teaching mainly focuses on basic theory and operation knowledge, professional anesthesia content, special cases or emergency management, etc. In addition to weekly centralized teaching activities, residents can improve the mastery of theoretical knowledge by self-study through their own arrangement, combined with teaching courseware and professional books. In order to clarify the implementation effect of phased target teaching, the teachers provided test questions after the course, so that residents could clarify the omissions and deficiencies in learning through answering questions.

(2) Professional skills training of anesthesiology department: This stage is the middle stage after the admission of residents. Through the study and work of anesthesiology department in the last stage, residents have a basic under-

standing of the work of the department. Teachers organized professional skills training in the training room, including mask ventilation, intraspinal puncture, emergency tracheotomy, central venipuncturing, pulmonary isolation and other professional skills training, teachers demonstrated, residents watched and practiced in groups. After class, residents can learn by themselves through relevant teaching videos and enter the training room to carry out exercises at their own time.

(3) Clinical thinking training in anesthesiology department: This stage is the later stage after residents are admitted to the department. On the basis of theoretical knowledge and professional skills training, teachers can lead anesthesiologists into the clinic to carry out clinical thinking training. Combined with specific cases, preoperative visit, intraoperative anesthesia, difficult airway management, special cases or critical management training. Before the clinical thinking training, the teachers uploaded the typical cases of anesthesiology treatment to the online teaching platform, and the residents watched them by themselves. They had a certain understanding of the teaching content and teaching objectives at this stage, and then carried out offline teaching activities. During the preoperative visit, the anesthesiologist needs to collect the patient's personal information and inform the patient well before the operation. The preoperative visit is completed by the teacher and assisted by the resident. During the implementation of intraoperative anesthesia, the teachers explained the selection and reasons of anesthesia methods, anesthesia management methods, etc., combined with typical cases to carry out teaching activities. The management of difficult airway mainly includes the evaluation and treatment of difficult airway, including the implementation of fiberoptic bronchoscopy and emergency tracheotomy. Special cases or critical conditions such as allergic constitution anaphylactic shock, cardiac arrest, etc. Through the clinical teaching activities of typical cases, the residents' awareness of the work of anesthesiology department was deepened and the practice level was improved.

1.3 Evaluation Index

1.3.1 The results of out-of-department examination

The results of out-of-department examination of the two groups of residents after the standardized training of anesthesiology were counted, including the theoretical knowledge assessment of anesthesia, clinical skills assessment and subjective assessment, and the total score was 100.

1.3.2 Satisfaction survey of resident standardized training

Before is given through the way of bearer, two groups of resident standardization training satisfaction survey of anesthesiology, the main theoretical knowledge training, clinical skill training, teachers' teaching level, teaching methods, training of medical ethics and the satisfaction survey, all aspects are very satisfied, satisfied and not satisfied with three dimensions, the total satisfaction = 100% - not satisfaction.

1.4 Statistical methods

SPSS23.0 statistical software was used for processing, measurement data were expressed as ($\overline{x} \pm s$), comparison was performed by t test, count data were expressed as percentage, comparison was performed by χ^2 test, $P < 0.05$ was considered statistically significant.

2. Results

2.1 Comparison of the results of the out-patient examination of the two groups: the results of the out-patient examination of the anesthesiology department standardized training of the residents in the study group were higher than those in the control group in terms of the theoretical knowledge assessment, clinical skills assessment and subjective assessment, and the differences were statistically significant ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of resident examination results between two groups ($\overline{x} \pm s$)

group	Examination results of theoretical knowledge of anesthesia(points)	Clinical skills assessment scores(points)	Subjective assessment results(points)
research team/30	88.23±4.52	89.12±4.92	90.92±3.49
control group/30	80.85±7.61	82.33±6.50	85.37±4.16
t	4.567	4.562	5.598
P	＜0.001	＜0.001	＜0.001

2.2 Comparison of residents' satisfaction with standardized training between the two groups: the total satisfaction of residents' theoretical knowledge training, clinical skills training, teachers' teaching level, teaching methods, medical ethics training and other aspects of the study group were higher than those of the control group, and the differences were statistically significant ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of residents' satisfaction with standardized training between two groups (case ％)

group	Total satisfaction with theoretical knowledge training	Total satisfaction with clinical skills training	Total satisfaction with teachers' teaching level	Total satisfaction with teaching methods	Total satisfaction of medical ethics training
research team/30	29(96.67)	29(96.67)	30(100.00)	29(96.67)	30(100.00)
control group/30	23(76.67)	24(80.00)	26(86.67)	24(80.00)	26(86.67)
χ^2	5.192	4.043	4.286	4.043	4.286
P	0.023	0.044	0.038	0.044	0.038

3. Discussion

Resident standardization training system is a kind of effective comprehensive system of training the medical talent with practical ability, resident standardization work in China started relatively late compared with developed countries, the results of training also has a bigger difference, but with the implementation of a Chinese resident standardization training system and popularization, tens of thousands of resident standardization training has been completed. It has trained a large number of practical talents for medical institutions at all levels (Wu B et al., 2020). Under the background of the continuous development and improvement of the medical industry in China, higher requirements are also put forward for the standardized training of residents. Superior medical institutions pay attention to the continuous innovation and exploration of the standardized training methods of residents, in order to gradually improve the effect of standardized training of residents and provide high-quality medical talents for clinical practice.

Objective teaching method is a kind of teaching method based on teaching objectives. In this teaching mode, students are the main body, teachers are the leading, and both play an active role. Compared with the traditional teaching method, goal-based teaching method can construct multiple phased goals based on the teaching situation, so as to help students explore and solve a series of problems encountered in the learning process (Li MX et al., 2019; Chen P et al., 2018). Some medical institutions in China have applied goal-based teaching method in the standardized training of residents. Xuanwu Hospital of Capital Medical University has applied the objective teaching method to the standardized training of residents in gastroenterology, and the key to the development of the objective teaching method is the setting of "small stage goals". In the relevant research report of the hospital, clinical small goals were formulated based on the principle of simplicity and difficulty. Daily teaching work is carried out through the process of target proposal, self-study, exchange and discussion, interactive intensive lecture, training feedback and so on. In daily teaching, repeated training is carried out through small targets to ensure the real mastery of knowledge. Found in the survey of 132 resident, accept the teaching hospital resident standardization training of resident doctors for the teaching job satisfaction are higher than the traditional teaching of resident, the end of the training work in history, humanities concern, clinical judgment, the overall performance of consider ratings were superior to the traditional teaching.

Flipped classroom is a new teaching method that breaks through traditional teaching. In this teaching mode, students are the main body, turning "teaching" into "learning" and passive teaching into active learning. The main purpose of standardized resident training is to cultivate comprehensive medical personnel and constantly enrich the reserve force of medical personnel in China. With the gradual implementation of the new medical reform, medical institutions at all levels have gradually improved their requirements for medical personnel, and also put forward higher requirements for standardized resident training. The traditional standardized training of residents is carried out around professional skills. With the transformation of the training mode of medical talents in China, in addition to the improvement of clinical professional skills, the requirements for humanistic care ability, good medical ethics, scientific research awareness and other aspects are constantly raised. Target teaching method combined with flip class to carry out the process, will be based on periodic teaching goal to carry out the teaching work, will each stage of the teaching to achieve the target, and increases the teaching content of practical sex and maneuverability, with the aid of network platform to share teaching

courseware, to allow residents to own time combined with the courseware for learning, Avoid the traditional teaching work students passively accept, there is a certain degree of arbitrariness and other shortcomings, to ensure the quality of teaching. The basic characteristic of target-oriented teaching method is that students are in the main position in the teaching work. Therefore, in the implementation process of target-oriented teaching method, students will study by themselves according to the stage goals, find out the answers through data consulting, discussion and communication, and lead the whole process of learning, which is conducive to improving the learning enthusiasm and initiative. They can also build their own knowledge system in the process of independent learning (Mou Y et al., 2020; Zhang WJ & Zhang MY, 2017). This research shows that the team after the standardized training of resident anesthesiology is given the result of the examination of anesthesia knowledge examination, clinical skills examination and subjective assessment of three grades were higher than that in control group, and the theoretical knowledge and clinical skills training, teachers' teaching level, teaching methods, training of medical ethics and total satisfaction were higher than that in control group. The results showed that target-oriented teaching method combined with flipped classroom can improve the effect of standardized training for residents and provide strong support for clinical delivery of comprehensive medical talents.

In conclusion, target-oriented teaching method combined with flipped classroom has outstanding value in improving teaching effect and teaching satisfaction in the standardized training of anesthesiology residents, which is worth carrying out.

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