

Effect Analysis of WeChat Platform Combined with PBL Teaching Method for Standardized Training of Residents in Anesthesiology Department

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Abstract: *Objective:* To explore and analyze the effect of the WeChat platform combined with the PBL teaching method in the standardized training of anesthesia residents. *Methods:* 120 anesthesiology residents from January 2018 to the end of December 2019 were selected, and divided into a control group and an observation group of 60 each according to the time sequence of admission. The control group adopted the conventional teaching mode, and the observation group adopted the WeChat platform combined PBL teaching method. The scores of theoretical knowledge and anesthesia skills operation after training, the scores of the teaching interest survey, and the satisfaction with the teaching mode between the two groups were compared. *Results:* The scores of theoretical knowledge and anesthesia skills operation in the observation group were significantly higher than those in the control group, and the indicators of teaching interest in the observation group were also higher than those in the control group. The differences were statistically significant ($P < 0.05$). The satisfaction degree of the observation group was significantly higher than that of the control group, and the difference was also statistically significant ($P < 0.05$). *Conclusion:* The WeChat platform combined with the PBL teaching method is beneficial to improve the training effect of anesthesiology residents, stimulating autonomous learning ability, ensuring the effective practice of theoretical knowledge, and promoting them to move towards a higher standard of anesthesia skills.

Keywords: WeChat platform; PBL teaching method; Anesthesiology department; Resident physician; Traditional teaching

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1. Introduction

Anesthesiology is a modern medical discipline. Its value is to apply anesthesia in the operation and first aid process, the purpose is to reduce the pain of patients, ensure the safety of patients' lives, and facilitate the operation. With the progress and development of medicine, anesthesiology is not limited to anesthesia and analgesia but also includes various aspects such as patient resuscitation first aid, shock rescue, pain treatment, etc. ^[1]. Anesthesiology is a complex subject combining basic medicine and clinical medicine. In addition to anesthesia pharmacology, basic anesthesia skills, and human anatomy, it also requires familiarity with internal medicine, surgery, and many other disciplines, with high coverage. Anesthesia residents are anesthesia workers who are based on basic theories of anesthesia, have the clinical knowledge and skilled operations, and their work footprint involves the entire hospital. In addition to involving many aspects of theoretical knowledge, anesthesiology also requires residents to have strong professional ethics

and the ability to deal with emergencies. Therefore, it is necessary to carry out standardized training for anesthesiology residents, which can strengthen the anesthesiologists for the hospital and professional recognition, improve its practical operation level, and train anesthesiologists to a higher standard. However, at present, due to the lack of effective training methods, residents of the clinical anesthesiology department are not motivated to work, patients' comfort requirements are not satisfied, practical operations are not emphasized, and further training is neglected, which all affected the quality of anesthesia and clinical nursing effects in the anesthesiology department [2-4]. Hence, our hospital proposes the effect analysis of the WeChat platform combined with the PBL teaching method for the standardized training of residents in the anesthesiology department, aiming to provide a reference direction for the standardized training of the anesthesiology department.

2. Materials and methods

2.1. General information

A hundred and twenty anesthesiology residents from January 2018 to the end of December 2019 were selected and divided into a control group and an observation group of 60 each according to the order of admission time, including 41 males and 19 females in the control group, with an age range of 31–36 years old, the average age is 32.35 ± 2.31 years old, and the ratio of undergraduate and graduate students is 23:37, whereas the observation group consists of 50 males and 10 females, the age range is 32.5–35 years old, the average age is 31.26 ± 1.45 years old, the ratio of undergraduates and graduate students is 24:36. The general information of the two groups was not statistically significant ($P > 0.05$), which was comparable, and all physicians were informed and voluntarily joined the study.

2.2. Methods

The control group was trained in the conventional mode, that is, the instructor formulated the outline, taught according to the book knowledge, and then guided and corrected the daily anesthesia work, and at the same time carefully answered the questions raised by them. At the same time, they were trained to fill in the anesthesia record sheet and communicate with patients to reduce their fear of anesthesia.

The observation group adopted the WeChat platform combined with the PBL teaching method, and the specific operations were as follows:

- (1) Set up a WeChat group: All trainers were assigned to the learning group responsible for training, and clarifying the identities of their trainers and trainees. The training outline is formulated, which consisted of theoretical knowledge level, actual anesthesia operation, observation of anesthesia records, handling of anesthesia emergencies, and psychological construction of patients under anesthesia.
- (2) Ask a question: The trainer takes the anesthesia problem encountered in the hospital or the news as an entry point, throws the question in the WeChat group, arouses the interest of the trainees, and arranges either a trainee to search for information on the Internet and read medical teaching materials, or an experienced clinical anesthesiologist to answer the questions and display all the treatment plans in a textual way. Powerpoints, handwritten outlines, or detailed opinions can be prepared to facilitate the later discussion. Note that the main purpose of this process is to stimulate the interest of the trainees, and the secondary purpose is to sort out doubts and difficulties.
- (3) Set up a group: The trainees who will be trained at the same time are divided into a study group of 3–6 people, with the purpose of brainstorming and eagerly discussing the problems raised before. There are many anesthesia training contents, mainly including pre-anesthesia assessment of patient status and preparation of anesthesia drugs, specific operation skills of anesthesia, perioperative blood transfusion indications, and treatment of anesthesia complications. Instructors should pay attention to the discussion content during each group discussion, guide them not to deviate from the topic, and rely

on related operations of the anesthesia discipline. At the same time, they should pay attention to incorrect anesthesia concepts and techniques.

- (4) Comprehensive explanation: Incorrect conceptions and techniques recorded during the group discussion as well as questions raised before are explained by the trainers, the main points of the discussion and trainers' explanations are then sorted out and posted on the WeChat platform. It is convenient for trainees to stabilize their impressions.
- (5) Summary and induction: Trainees are encouraged to bring up questions, search for information, discuss with their peers for more inspiration, summarize and analyze the topics raised before, and present a 1–3 minutes presentation, which not only promotes trainees to effectively summarize the problem, but also to exercise their expressive ability. Taking percutaneous coronary intervention in patients with acute myocardial infarction as an example, the application of the PBL teaching mode was discussed. “The patient is 65 years old and often suffers from chest pain. Recently, the attack has been repeated, each time lasting 3 hours. The latest attack has no remission period. The electrocardiogram is diagnosed as myocardial infarction with arrhythmia. How to make an anesthesia plan?” Focusing on this question, trainees are guided to review the literature on how to carry out the anesthesia process, how to implement anesthesia management, and what are the principles of anesthesia. During the discussion, the trainers need to listen to the discussion content and give appropriate reminders, such as whether myocardial ischemia in patients with acute myocardial infarction will lead to ischemic necrosis, whether it is necessary to increase the protection of the patient's heart based on anesthesia to ensure the development of interventional surgery, whether it is necessary to consider the heart rate control of the patient during anesthesia, etc. After all the trainees have discussed it, they will brainstorm and conclude their findings: interventional surgery for patients with acute myocardial infarction needs to evaluate their cardiac function, strengthen the protection of the heart during the perioperative period, and reduce the oxygen consumption of myocardial cells. Meanwhile, individual differences in anesthesia induction should be considered, such as reducing stress response, avoiding excessive inhibition, and maintaining the patient's blood circulation function and normal myocardial function during the entire anesthesia period. The discussed and concluded data are collected and written in the text before sending it to the WeChat platform, where the trainees can comprehend the knowledge deeply and easily find the information when encountering the same issue next time.

2.3. Observation indicators

The observation indicators of the study included:

- (1) Comparing the scores of theoretical knowledge and anesthesia operation after the two groups of training, the higher the score, the better the training effect;
- (2) Comparing the teaching interest rating of the two groups after training, the tutor's percentage rating system that the higher the score, the better the training effect;
- (3) Comparing the satisfaction of the two groups with the teaching mode, the self-assessment satisfaction questionnaire includes very satisfied, basically satisfied, and dissatisfied.

2.4. Statistical analysis

The SPSS22.0 software was used for analysis. The *t*-test and the mean \pm standard deviation (SD) values were used to represent measurement data. The chi-square and % values were used to represent count data, and a *P* value of < 0.05 was considered statistically significant.

3. Results

3.1. Comparing the scores of theoretical knowledge and anesthesia skills after training between the two groups

Table 1 showed that the trainees' theoretical knowledge and anesthesia skill scores in the observation group were significantly higher than those in the control group ($P < 0.05$).

Table 1. Comparison of theoretical knowledge and anesthesia skill operation scores between the two groups after training (mean \pm SD)

Group	Number of cases	Theoretical knowledge	Anesthesia skill performance score
Observation group	60	94.05 \pm 2.19	91.69 \pm 3.08
Control group	60	92.37 \pm 3.21	89.85 \pm 3.07
<i>t</i>	-	3.348	2.926
<i>P</i>	-	0.001	0.004

3.2. Comparing the interest survey scores after the two groups of training

The trainees in the observation group were better than those in the control group in all training indicators, and the differences were statistically significant ($P < 0.05$), see **Table 2** for details.

Table 2. Comparison of interest survey scores after two groups of training (mean \pm SD)

Group	Control group (N = 60)	Observation group (N = 60)	<i>t</i> value	<i>P</i> value
Learning interest	79.16 \pm 4.31	80.35 \pm 1.07	2.075	0.040
Curiosity and exploration	83.65 \pm 1.29	84.62 \pm 2.37	2.784	0.006
Self-study ability	81.04 \pm 1.28	82.21 \pm 2.86	2.892	0.004
Enthusiasm for anesthesia	81.67 \pm 2.68	83.05 \pm 2.17	3.099	0.002
Anesthesia Case Writing Ability	84.65 \pm 2.37	85.63 \pm 1.06	2.923	0.004
Anesthesia psychological care ability for patients	78.35 \pm 4.38	80.01 \pm 3.37	2.326	0.021
Anesthesia responsibility	82.35 \pm 2.34	85.21 \pm 1.34	2.470	0.014

3.3. Comparing the effect satisfaction of the two groups after training

Fifty-eight trainers in the observation group were satisfied, and the total satisfaction rate was 96.67%, which was significantly higher than that in the control group, where 51 trainers were satisfied, and the satisfaction rate was 85%. The differences in the comparison of various data between groups were statistically significant ($P < 0.05$), as shown in **Table 3**.

Table 3. Comparing the satisfaction of the teaching effect of the two groups of nursing students [n, (%)]

Group	Number of cases	The effect is very good and very satisfied	Generally satisfied with the effect	The effect is very poor and dissatisfied	Satisfaction
Observation group	60	42 (71.42%)	16 (25.00%)	1 (3.58%)	96.67%
Control group	60	24 (43.75%)	27 (40.62%)	9 (15.63%)	85.00%
χ^2	-	10.909	4.385	6.981	8.719
<i>P</i>	-	0.001	0.036	0.008	0.004

4. Discussion

With the advancement of medicine and the improvement of people's awareness of anesthesia, clinical medicine has put forward higher requirements for anesthesia workers. At present, the main content of anesthesia workers is to evaluate the patient's preoperative data, the type of surgery they accept, carry out anesthesia analgesia with different drugs and corresponding anesthesia skills, relieve patients' anesthesia tension, and cope with anesthesia problems that may occur during the operation^[5]. Through innovative, comprehensive, and in-depth training methods, anesthesia workers can lay good basic skills, assist them in the independent and correct implementation of anesthesia skills, improve their professional ability and deepen theoretical knowledge, and promote anesthesia workers to form a correct clinical awareness. A higher level of progress will ultimately improve the quality of anesthesia and standardized anesthesia management for patients in the perioperative period^[6-8].

The concept of the PBL teaching mode is an innovative teaching method that is problem-oriented and group discussion learning is the main mode. The way of questioning urges and prompts the trainees to learn independently, and explore the core and difficulties of the question by themselves^[9]. The aim is to focus on the trainees and allow teachers to promote trainees' self-learning. This method can effectively exert the positive subjective initiative of people themselves, promote the transformation of learning thinking from passive learning to active learning, and clarify the direction of their learning. Combining clinical event experience with group topic discussions, and in-depth and comprehensive learning can effectively create comprehensive anesthesia talents with self-judgment awareness and independent development thinking^[10,11]. The traditional teaching mode only focuses on output, regardless of acceptance, and the training mode is rigid, which is prone to disconnection of training purpose and results, which has obvious disadvantages for training anesthesiology talents. Unlike the traditional teaching mode, PBL is an effective reversal teaching model starting from the result followed by exploring the means and measures to achieve the result^[12,13]. Conceptually speaking, the question is followed by the answer, which can guide the trainees to conduct exploratory research in multiple dimensions. Anesthesiology covers a large area and has many operational skills. Without effective learning and training methods, it is difficult to cultivate comprehensive anesthesiology talents. Therefore, the implementation of PBL is of great significance for the cultivation of excellent talents. Zheng Shaohua pointed out in his research that the PBL teaching mode has been applied to the teaching of medical content in Chinese clinical teaching since 2015^[14]. By guiding teachers to raise questions, trainees are guided to self-study and organize their own opinions based on their understanding, mentally forming a temporary knowledge framework as the foundation. Then, the group discussion will further stimulate the interest in learning. During the discussion, the temporary knowledge framework will be rebuilt or improved and fixed into a permanent knowledge framework. Finally, the answer to the question will be completed through an on-site summary^[15]. In this study, after PBL teaching, the trainees in the observation group improved their theoretical knowledge and basic operation of anesthesia. At the same time, their interest in all aspects of learning was significantly higher than that of the traditional teaching control group, which shows that PBL teaching has obvious advantages. It is of great positive significance to cultivate comprehensive anesthesia talents.

To sum up, the combination of the WeChat platform and the PBL teaching method is beneficial to improve the training effect of anesthesiology residents, stimulate the ability of independent learning, ensure the effective practice of theoretical knowledge, and promote them to move towards a higher level of anesthesia.

Disclosure statement

The authors declare no conflict of interest.

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