

The Practice and Application of PBL Teaching Method in the Standardized Training of Otolaryngology Head and Neck Surgery Residents

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Keywords: PBL teaching method, otolaryngology, head and neck surgery, resident physicians, standardized training

Abstract: The standardized training of resident doctors is the only way for medical students to become qualified clinicians after receiving medical college education, which is of great significance for improving clinical medical level and training high-level medical talents. This study attempted to introduce the "Problem-based Learning (PBL)" teaching method into the standardized training of residents in Otolaryngology head and neck surgery. By elaborating how to apply PBL in the standardized training of ENT head and neck surgery residents, this paper chose 40 doctors who received standardized training of Otolaryngology head and neck surgery. By comparing the different teaching effects of general teaching method and PBL teaching method, this paper tried to make full use of the advantages of PBL teaching method in order to improve the effectiveness of standardized training for otolaryngology head and neck surgery residents. The result showed that PBL teaching method can effectively improve the professional level of the trained doctors and the level of clinical comprehensive skills. The effect is remarkable and has a high promotion value.

1. Introduction

China has gradually implemented standardized training for resident doctors. Since 2014, aiming to train clinicians with good professional ethics, rich medical theoretical knowledge and qualified clinical diagnosis and treatment skills. The standardized training for residents is a kind of continuing medical teaching after graduation Educational behavior, mainly aimed at undergraduate or graduate students after graduation in entering clinical work [1]. Giving comprehensive training before doing this is an effective way to continuously strengthen the comprehensive ability of residents [2]. Standardized and systematic clinical skills training is a necessary condition to become a qualified resident.

The otolaryngology department of head and neck surgery has been characterized by high degree of specialization, complex anatomical position and numerous physiological functions, which is difficult to learn and has a long period of clinician training and growth [3]. As a key clinical specialty in Jiangsu Province, the Department of Otolaryngology, Head and Neck Surgery belonged to the

Affiliated Hospital of Nantong University, has been conducting standardized training for residents in otolaryngology and Head and neck surgery for many years, paying attention to the effect of standardized training for residents, and constantly innovating and improving.

Many teaching methods have been introduced to improve the clinical skill levels and effectiveness. The 5E instructional model is introduced by the American biology curriculum Research (BSCS) development, including engage, explore, elaborate includes five stages: explain, elaborate and evaluate [4]. Its core is to take students as the center of the teaching process and "people" as the emphasis of teaching content. Seminar teaching method is a kind of teaching practiced in university classrooms in Europe and America. It's a learning style of the communication between students and teachers for the purpose of studying a certain issue, which focuses on interactive teaching and group discussion [5]. And Case-Based Learning (CBL) is a situational teaching method that can cultivate learners acquiring initial vocational skills and capable of communicating theories and practices. It is a teaching method integrated with cognitive learning [6]. Although all these teaching methods are conducive to the development of standardized training for doctors, each teaching method has its own shortcomings and still needs to be improved [7].

This study mainly discusses how to apply Problem-based learning (PBL) in the standardized training of ENT head and neck surgery residents, and tries to make full use of the advantages of this teaching method by comparing the different teaching effects of general teaching method and PBL teaching method.

2. PBL Conforms to the Goal of Standardized Training for Otolaryngology Head and Neck Surgery Residents

The standardized training of otolaryngology head and neck surgery residents (hereinafter referred to as the training) mainly focuses on two aspects: (1) clinical skills training. Standardized and systematic clinical skills training is a necessity to become a qualified resident physician. Clinical skills are the main reference for doctors to diagnose and treat diseases based on syndrome differentiation and clinical thinking. Scientific clinical skill training and assessment system is an effective means to continuously improve the clinical skill level and clinical thinking of residents [8]. (2) Department rotation comprehensive quality training. Different departments have higher requirements for the clinical thinking ability of doctors in rotation. Standardized training activities requires residents to carry out rotation learning in the department according to rotation plan. Its core purpose is to improve the basic operation skills commonly used by residents in clinical practice [9].

PBL teaching method was proposed by Barrow, an American professor of neurology in the middle of the 20th century [10]. This method is mainly designed and raised by teachers or students. The teaching process takes problems as the core, answers questions as the driving force, and aims at improving students' self-learning ability. It is conducive to mobilizing the enthusiasm and initiative of learning [11]. PBL focuses on the understanding and application of knowledge, and at the same time cultivates the ability of clinical workers to summarize and analyze problems independently [12], which is in line with the essence of otorhinolaryngology, head and neck training, and conforms to the basic requirements of training. The three-level ward round system is often adopted in modern hospitals, which aims to train residents' ability to judge and differentiate diseases. In daily work, residents are required to collect the medical history of hospitalized patients systematically, and conduct physical examination according to the actual situation. With the help of comprehensive analysis and independent thinking, they can make a preliminary judgment of the disease. During patient management, attending physicians need to accurately modify medical documents. The implementation of this work has highly required for residents' disease diagnosis and treatment plan design as well as clinical experience. Based on this, PBL teaching method is beneficial to the

cultivation of residents' comprehensive quality and the successful completion of clinical tasks.

3. Exploration and Implementation of PBL Teaching Method in the Standardized Training of Otolaryngology Head and Neck Surgery Residents

3.1. Research Subjects

Doctors in the Department of Otolaryngology, Head and Neck, Affiliated Hospital of Nantong University with a one-year training period from July 2021 to July 2023 were selected as the research subjects. The trained doctors were divided into two groups according to their educational background, professional title, working years and hospital level. A total of 40 trained doctors were included in this study, with 20 in each group. In the observation group, there were 22 males and 18 females, with an average age of 23.5 years old, all of whom had bachelor's degree or above. There was no statistical difference in the general information of the two groups ($P>0.05$), which was comparable.

3.2. Research Methods

In addition to daily work of teaching, PBL teaching method and general teaching method were respectively adopted during the study period. The General teaching group is taught by the teaching staff appointed by the Otolaryngology Head and Neck Surgery Teaching and Research Group in multimedia (PPT form) according to the teaching syllabus, once a week (two periods). The basic methods of PBL teaching are as follows: (1) In the first week of teaching, 2-3 classic or rare cases were used to present their relevant clinical manifestations and further develop the differential diagnosis of the disease. (2) A group of 5 doctors was arranged to consult the information in the library and the Internet and make a PPT report. (3) The teacher understood the questions carefully designed for the content, and the rest of the students were free to ask questions, and the group of students preparing the PPT answered the questions. (4) The problems and doubts in the teacher's comments were explained with emphasis, and finally summarized, and the content of the next report was arranged and the reporting group was determined. The weekly teaching tasks of both groups were performed by the same teaching staff.

3.3. Evaluation Methods

The evaluation was conducted before the end of the research. The evaluation indicators include: (1) Examination scores: The doctors attending the research received closed-book tests before and after the study. Two test papers were randomly selected by using the self-built test bank of Otolaryngology Head and Neck Surgery Department. The question types included single choice, multiple choice, question and answer, and the full mark was 100. (2) Self-evaluation: Issue the "Self-evaluation Form for students", the investigation contents include: improvement of learning interest, improvement of expression ability, improvement of self-confidence and self-learning ability, improvement of clinical thinking ability, and improvement of generalization ability. Each item has five options - strongly agree, agree, unsure, disagree and strongly disagree - with a score of 4, 3, 2, 1 and 0, respectively. Only one answer is allowed for each item, with a maximum score of 20.

3.4. Statistical Analysis

SPSS statistical analysis software was used to establish a database and conduct statistical analysis. Measurement data were expressed as mean \pm standard deviation. Comparison between the two groups was performed by t test, $P < 0.05$, the difference was considered statistically significant.

4. Analysis of the Results of the Implementation of PBL Teaching Method in the Standardized Training of ENT Head and Neck Surgery Residents

4.1 Comparison of Evaluation Scores

The scores of theoretical knowledge and operational skills of the observation group were higher than those of the counterpart group, with statistical significance ($P < 0.05$), as shown in Table 1.

Table 1: Comparison of the evaluation scores of the two groups ($\bar{x} \pm s$, points).

Group	Case number	Theory Knowledge	Operation Skill
Observation group	20	88.59 \pm 7.01	91 \pm 7.93
Control group	20	78.03 \pm 4.89	80.02 \pm 5.62
T value	/	5.173	4.926
P value	/	0.023	0.012

4.2 Observe the Evaluation Results of the Whole Teaching Effect of the Group

The students in the observation group had higher evaluation on the overall teaching effect, as shown in Table 2.

Table 2: Evaluation table of the overall teaching effect of the observation group (unit: %).

The content of the evaluation	Satisfied	Relative satisfied	Normal	Relative unsatisfied	Unsatisfied
Improved learning interest	58.21	24.38	9.12	5.68	2.61
Deepen the understanding of knowledge	61.34	26.76	8.23	2.05	1.62
Guided practical skills	63.07	27.58	8.47	0.88	0
Improved ability to solve practical problems	59.94	25.75	10.86	1.65	1.8

5. Conclusion

Our research found that after two years of further study, all of the tested doctors were significantly improved, but the results of the PBL group were more obvious. Their results were higher than those of the LBL teaching group. These data objectively confirmed the PBL teaching method was better compared with the traditional LBL teaching method, it can stimulate the learning interest of studying doctors and improve their learning desire. The results of this study are consistent with the domestic literature reports.

In the traditional standardized training and teaching of otolaryngology head and neck surgery residents, teachers often adopt the mode of one-way information transfer, and the teaching content is mostly centered on the teaching syllabus, which lacks flexibility and limits the improvement of students' actual diagnosis ability, and students are often in a state of passive learning and infusion learning.

In PBL teaching, the trained doctor is an active participant. PBL teaching mode is problem-oriented teaching, which is helpful for students to review old knowledge, discover problems, think about problems and actively solve problems in the training process. The problem-oriented teaching mode deepens the students' memory and understanding of what they have learned, and also allows students to actively participate in learning, arousing their enthusiasm for learning and transforming them from passive learning to active learning. Through continuous comparison and learning, they

have mastered more practical knowledge and can apply the knowledge they have mastered to specific work.

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