

Application of PDCA Cycle in Clinical Teaching of Respiratory Medicine During the Outbreak of COVID-19

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Abstract: The study was to analyze the application of PDCA cycle in the clinical teaching of respiratory department during the outbreak of COVID-19. The teaching content focused on the prevention, control, diagnosis and treatment of COVID-19. Methods: Thirty clinical interns who entered the Department of Respiratory Medicine in our hospital from June 2020 to December 2020 were selected as the research objects and were randomly divided into two groups. The control group adopted traditional teaching methods and the experimental group adopted PDCA cycle. The teaching effect of the two group was compared. Results: The experimental group that used the PDCA cycle method had significantly higher theoretical knowledge, treatment skills, and comprehensive quality evaluation of COVID-19 than the traditional teaching method of the control group. Conclusion: The application of the PDCA cycle method in clinical teaching activities can improve the teaching process during the outbreak of COVID-19 and help improve the overall quality of clinical interns.

Keywords: PDCA Cycle; Clinical Teaching of Respiratory Medicine; COVID-19

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1 Introduction

COVID-19 has become a public health emergency of global concern, which has the characteristics of

multiple transmission channels, fast transmission speed, and strong contagion^[1]. Under our country's measures to prevent and control COVID-19, it has been effectively controlled, and the resumption of work and school has been gradually implemented, including the internship of clinical medicine students^[2,3]. Clinical internship is the terminal link in the entire teaching system of clinical medicine students. Clinical teaching is to further guide and urge clinical interns to complete this key link. Its main task is to transform the theoretical knowledge learned by clinical interns into clinical practice, so as to train their clinical thinking and clinical skills. However, the disadvantages of the traditional teaching model are becoming more obvious and its effect is not satisfactory. Therefore, how to guide clinical interns to improve their efficiency of internship has become an important topic for clinical teaching. The PDCA cycle is a set of standardization and scientific quality management system, including four stages of planning, doing, checking and acting^[4]. In this study, the prevention, control, diagnosis and treatment of COVID-19 was used as the teaching content to explore the role of the PDCA cycle in the clinical teaching of respiratory medicine, so as to provide a new model for clinical teaching and a reference example for the implementation of clinical teaching when facing major public health events in the future.

2 Information and methods

2.1 General information

Thirty clinical interns who entered the Department

of Respiratory Medicine in our hospital from June 2020 to December 2020 were selected as the research objects, including 19 males and 11 females. Their ages were between 22-24 years old, with an average age of 23. All interns accepted clinical practice and had not used PDCA cycle teaching before, and were randomly divided into an experimental group and a control group with 15 interns each .

2.2 Study methods

2.2.1 Teaching content

The teaching content included the diagnosis and differential diagnosis, protective measures, disinfection measures and respiratory support of COVID-19.

2.2.2 Study methods

The control group adopted traditional teaching methods. The students were trained by the instructor, and teachers explained not only the transmission route, protective measures and disinfection measures, but also the pathogenesis, pathological evolution, diagnosis, differential diagnosis, and the treatment measures of COVID-19. Then the students followed the teachers to carry out diagnosis and treatment activities, including ward rounds, medical record writing, etc., mainly in the form of teachers teaching and students listening.

The experimental group adopted the PDCA teaching method. (1) Planning stage: The teaching directors of the department selected the teaching backbone who was familiar with the prevention and control, diagnosis and treatment of COVID-19, and divided the clinical interns into groups; the learning plan of COVID-19 was formulated according to the actual situation of the department; (2) Doing stage: Training for clinical interns included learning plans for the overall setting of the department, system introduction, protective measures, etc.; (3) Checking stage: It included two aspects of teachers and clinical interns, such as checking on clinical interns about the theoretical knowledge of COVID-19, medical record

writing and technical operations, etc.; the teaching professionalism, systematicness and completeness of the teachers, and the clinical interns' satisfaction with the teachers were investigated; (4) Acting stage: the two-way evaluation was carried out by the teachers and the clinical interns, such as the teaching mode of the teachers and the feedback of the clinical interns; the clinical interns' scores through theoretical examinations and technical skills were comprehensively summarized to find deficiencies and proceed to the next PDCA cycle.

2.3 Evaluation indicators

The clinical interns were assessed on the day before the end of their studies in the Department of Respiratory Medicine. The two groups of clinical interns were evaluated on the theory and skills of COVID-19. Feedback on the learning process of respiratory medicine and the degree of satisfaction with clinical teaching was carried out through questionnaire surveys (The degree of satisfaction was scored according to: 1 point for dissatisfaction, 2 points for general satisfaction, 3 points for satisfaction, and 4 points for great satisfaction).

2.4 Statistical analysis

GraphPad Prism 6.0 software was used to statistically analyze the count data, and the t test was used for inter-group comparison. All the data were used the mean \pm standard deviation (SD), and $P < 0.05$ was considered as a significant difference.

3 Results

3.1 Comparison of the score of the two groups of clinical interns

The evaluation of theoretical knowledge and clinical operation skills were the key indicators for the evaluation of clinical interns. Compared with the control group, the experimental group has the significantly improved theoretical score and clinical operation score, and the difference was statistically significant (Table 1) ($P < 0.05$).

Table 1. Comparison of the score of the two groups of clinical interns

Groups	Number of people	Theoretical score	Clinical operation score
Control group	15	82.73 \pm 0.86	82.60 \pm 1.27
Experimental group	15	87.46 \pm 1.21	89.53 \pm 1.87
<i>t</i>		3.175	3.067
<i>P</i>		$P < 0.05$	$P < 0.05$

2.2 Comparison of the satisfaction of the two groups of clinical interns on the teaching mode

The results of the questionnaire survey showed that

compared to the control group, the experimental group was more satisfied with the teaching mode (Table 2).

Table 2. Comparison of the satisfaction of the two groups of clinical interns on the teaching mode

Groups	Number of people	Satisfaction
Control group	15	82.73±0.86
Experimental group	15	87.46±1.21
t		3.175
P		P<0.05

3 Discussion

As a sudden public health event, COVID-19 has become the focus of global attention [1-4]. In the process of fighting the epidemic, the shortage of medical staff is still one of the focal issues of the hospitals [5]. Therefore, under the new situation, training high-quality and high-level clinical medical students has become the focus of medical schools and teaching hospitals. Medicine is a process of practical teaching, and clinical practice is the key training link for the transformation of clinical medical students' theory into practice. In order to adapt to the clinical teaching system under the new situation, it is necessary to continuously explore new clinical teaching methods.

The PDCA cycle is a four-stage scientific quality management system, which progresses through the four stages and is a scientific method to solve problems. It has been widely used in all walks of life, including medical management systems [6]. In recent years, the application of PDCA in clinical teaching has been paid more and more attention. Its complete circulation system can detect problems in time and further propose improved methods, which can not only improve the satisfaction of clinical interns, but also play a positive role in improving the teaching mode of teachers, improve the effective diagnosis and treatment mode, improve the clinical diagnosis and treatment level of the teachers themselves, and have established a good mutual feedback mechanism between clinical interns and clinical teachers.

At present, the prevention, control, diagnosis and treatment of COVID-19 is the top priority in the hospital diagnosis and treatment process. In this study, it is used as the main teaching content to explore the application study of PDCA cycle in the clinical teaching of respiratory department. This study found that clinical interns' awareness of the

prevention and treatment of COVID-19 has increased significantly, and the teaching satisfaction of clinical teachers has also increased significantly. In terms of the practical effect of clinical interns, it overcame the shortcomings of the pure knowledge-filling model. In addition, clinical interns were also allowed to participate in the anti-epidemic process as prospective doctors, so that they can change from understanding to having a higher cognition, and from book thinking to clinical diagnosis and treatment thinking; from the perspective of teachers, it can promote the teachers' own medical diagnosis and treatment level and teaching ability, and also provide a reference for the smooth development of clinical teaching work when facing sudden public health events.

In short, during the COVID-19 pandemic, the use of the PDCA cycle helps to improve the quality of clinical teaching in respiratory medicine. This has played a positive role in cultivating a new generation of high-quality physicians to participate in the fight against the epidemic.

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