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A Preliminary Study on the Application of Step-By-Step Case Teaching in Gastroenterology Ward Rounds

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Abstract: *Purpose:* To analyze the practical effect of applying step-by-step case teaching in gastroenterology ward rounds. *Methods:* 72 clinical medical students interned in the Gastroenterology Department of our hospital from February to October 2023 were divided into the control group and the observation group according to the mean score method, with each group having 36 students. The control group adopted the traditional clinical teaching mode and the observation group implemented the step-by-step case teaching mode. The teaching effect and teaching method were evaluated through the theoretical knowledge test, the clinical skills examination, and the teaching method recognition survey after the end of the teaching. *Results:* Students in the observation group scored higher than those in the control group in the examination of theoretical knowledge and clinical skills in gastroenterology ($P < 0.05$); students in the observation group recognized the step-by-step case teaching method more than those in the control group in terms of improving motivation and initiative in learning, consolidating theoretical knowledge, improving clinical skills, and fostering team spirit and clinical thinking ($P < 0.05$). *Conclusion:* The application of step-by-step case teaching in gastroenterology ward rounds can significantly enhance students' learning motivation, enable students to have a deeper understanding of the basic theories of gastroenterology, and better master the practical skills of history taking, physical examination, diagnosis, and the development and implementation of treatment plans in gastroenterology, which is worth to be widely used in clinical education.

Keywords: Gastroenterology; Step-by-step case teaching; Ward rounds; Recognition

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1. Introduction

Globally, the incidence of gastrointestinal diseases is showing a continuous upward trend, especially in the context of population aging and lifestyle changes, and the spectrum of gastrointestinal diseases is characterized by diversification. Common gastrointestinal diseases, including gastrointestinal diseases, liver diseases, pancreatic diseases, etc., constitute a significant burden on individual health and the social healthcare

system. Therefore, optimizing clinical education in gastroenterology is of great significance in enhancing the professionalism of future physicians and improving the quality and outcome of patient care. In the clinical education of gastroenterology, traditional teaching methods often focus on the teaching of theoretical medical knowledge and neglect the cultivation of students' practical skills, so when facing the increasingly complex clinical diagnosis and treatment of digestive diseases, it is difficult to make an accurate judgment and effective treatment due to the lack of sufficient practical skills and experience [1]. For this reason, it is particularly urgent to actively explore a new teaching mode that combines theoretical teaching and practical skills training. Step-by-step case teaching is an innovative clinical teaching mode, which aims to cultivate the clinical thinking and practical skills of medical students through hierarchical and gradual in-depth case analysis. The teaching method is from simple to complex, from single disease to multi-system disease, step-by-step to guide students to deeply understand the clinical problems and improve their ability to solve complex cases. In the implementation of the step-by-step case teaching ward rounds, we first start with the explanation of basic knowledge, and then introduce simple clinical cases related to them, so that students can apply what they have learned in specific, practical situations and carry out preliminary clinical thinking and diagnostic and treatment plan design [2]. As the teaching progresses, the cases gradually involve more complexity, such as the management of disease complications and treatment strategies for multi-disease coexistence, etc., which require students to synthesize and apply interdisciplinary knowledge to deal with more complex clinical scenarios. In addition, through interactive forms such as simulated ward rounds and role-playing, the teacher guides students to think actively, ask questions, and share their views in group discussions, which promotes the exchange of knowledge and collision of ideas among students and effectively develops their clinical thinking and problem-solving skills.

In order to evaluate the actual effect and effectiveness of the step-by-step case teaching applied in the clinical teaching of gastroenterology, this study was conducted to carry out a clinical education trial, aiming to further improve the development of the clinical medical education system in our hospital, promote the effective improvement of the quality of the clinical education and teaching of the interns in our hospital, and contribute to the cultivation of more modernized clinical medical talents.

2. Study subjects and methods

2.1. Study subjects

72 clinical medical students interning in our gastroenterology department from February to October 2023 were divided into the control group and the observation group of 36 students each according to the mean score method. In the control group, there were 20 males and 16 females, with an age range of 21–24 years, a mean of 22.35 ± 1.26 years, and a score of 70.29 ± 5.12 in theoretical knowledge of admission, implementing the traditional clinical teaching method. In the observation group, there were 19 males and 17 females, with an age range of 21–25 years, a mean of 22.45 ± 1.17 years, and a score of 69.87 ± 5.48 in theoretical knowledge of admission, and a step-by-step case teaching and ward rounds were used. Both groups of students voluntarily participated in this study, and the difference in general information was not statistically significant ($P > 0.05$).

2.2. Teaching methods

Both groups of trainees were taught by the chief and deputy chief physicians of the Department of Gastroenterology after admission to the department, with the Clinical Diagnostic and Treatment Guidelines of Gastroenterology as the training materials for theoretical and practical teaching, and the duration of the course was 90 sessions.

The traditional clinical teaching method was implemented in the control group, i.e., theoretical knowledge

teaching and observation of clinical practice activities. The instructor designed the teaching program according to the clinical syllabus of gastroenterology and explained the theoretical knowledge of gastroenterology in accordance with the established process and the safety of the class time, the students took notes carefully, and completed the exercises according to the requirements of the class, so as to achieve the effect of literacy; when the students mastered a certain amount of basic theoretical knowledge, they were led to conduct ward rounds by observing the actual clinical operations of the teachers in order to further deepen the understanding of theoretical knowledge and to master practical operation skills.

The observation group adopted the step-by-step case teaching method, which was mainly divided into four steps to gradually deepen the depth and difficulty of teaching, as follows:

(1) Basic knowledge and case introduction: In the early stage of teaching, the teacher explained the basic knowledge of gastroenterology to students through PowerPoint lectures, including the anatomy and physiology of the digestive system, the pathophysiology of common diseases, and the principles of diagnosis and treatment. Subsequently, clinical cases related to the content of the lecture were introduced, so that students could familiarize themselves with the routine clinical operation points such as history taking, examination of signs and symptoms, preliminary diagnosis, and treatment planning in the clinical diagnosis and treatment activities of gastroenterology through analyzing the cases, helping students to establish a correct clinical thinking mode and guiding them to learn to apply the theoretical knowledge to the actual clinical scenarios.

(2) In-depth case analysis and discussion: Based on the efficient completion of the first step of the learning program by all students, more complex clinical cases were introduced, such as multi-system involvement, cross-disease, and other broader digestive system diseases. Under the guidance of the instructor, students analyzed the cases in depth through group discussions, exploring the pathological mechanisms, diagnostic process, and the selection of treatment options, in order to effectively enhance their practical skills and teamwork spirit.

(3) Comprehensive case practice and simulation: In the middle and late stages of teaching, the instructor designed more comprehensive and challenging cases, requiring students to synthesize and apply the knowledge and skills learned in the first two steps to solve problems that are more complex and closer to real clinical situations. At this stage, students completed history taking, physical examination, and other operations through simulated ward rounds, role-playing, clinical simulation, and other activities, and then proposed a diagnosis and treatment plan based on the information obtained, in order to fully improve students' clinical reasoning, decision-making, and communication skills.

(4) Feedback and self-reflection: After completing the teaching of each case, the teacher conducted a professional evaluation of the students' enthusiasm for participating in group discussion activities, the effectiveness of the content and effect of the discussion, and the scientificity of handling the case, correcting the deficiencies, and affirming the good performance. At the same time, students were encouraged to conduct self-reflection and think about the gains and losses and room for improvement in the process of case handling, aiming to help students identify their knowledge and skill blind spots, promote the cultivation of their comprehensive clinical literacy, and lay a solid foundation for their future clinical work.

2.3. Evaluation indicators

(1) Learning achievement test: At the end of teaching, the theoretical knowledge and clinical skills of the two groups of students were assessed. The theoretical knowledge assessment mainly contains basic

theories of digestive internal medicine, principles of diagnosis and treatment of common diseases, and the latest research results. The assessment was conducted in the form of a written examination, online test, or oral examination, with a total score of 100 points. Clinical skills assessment focuses on students' practical operation skills and clinical decision-making skills assessment, including history taking, physical examination, diagnostic thinking process, development and implementation of treatment plan, and other practical operations. The total score is 100 points.

(2) Teaching recognition survey: The hospital's own questionnaire was used to investigate the students' recognition of the teaching method, which mainly includes the teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating teamwork and clinical thinking. Students filled in the form according to their real feelings. Recognition = Number of students / Total number of students × 100%.

3. Results

3.1. Comparison of learning achievement of the two groups of participants

Students in the observation group had higher scores in the examination of theoretical knowledge and clinical skills in gastroenterology than those in the control group, and the difference was statistically significant ($P < 0.05$), as shown in **Table 1**.

Table 1. Comparison of the academic performance of the two groups of participants (mean ± standard deviation [SD], points)

Assessment program	Control group (n = 36)	Observation group (n = 36)	*t*	*P*
Theoretical knowledge	82.24 ± 3.75	89.76 ± 4.63	7.5728	0.0000
Clinical skill	80.17 ± 3.53	87.61 ± 4.25	8.0799	0.0000

3.2. Comparison of recognition of teaching methods in the two groups of participants

As for the recognition of teaching, the observation group trainees' recognition of the teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating teamwork and clinical thinking was significantly higher than that of the control group ($P < 0.05$), as presented in **Table 2**.

Table 2. Comparison of recognition of teaching methods between the two groups of participants [n (%)]

Assessment program	Control group (n = 36)	Observation group (n = 36)	χ^2	*P*
Increasing motivation and initiative in learning	27 (75.00)	35 (97.22)	7.4323	0.0064
Consolidation of theoretical knowledge	25 (69.44)	34 (94.44)	7.6037	0.0058
Improvement of clinical practice skills	24 (66.67)	36 (100.00)	14.4000	0.0001
Fostering teamwork	26 (72.22)	35 (97.22)	8.6915	0.0032
Developing clinical thinking	21 (58.33)	33 (91.67)	10.6667	0.0011

4. Discussion

4.1. Overview of gastroenterology

Gastroenterology is an important discipline in the field of modern medicine, which mainly focuses on the

diagnosis, treatment, and prevention of digestive system-related diseases, involving multiple organs such as the esophagus, stomach, small intestine, large intestine, liver, pancreas, and gallbladder. Common diseases in gastroenterology mainly include gastritis, gastric ulcer, enteritis, hepatitis, cirrhosis, pancreatitis cholelithiasis, etc., which not only affect the quality of life of the patients but also may threaten their lives. With the development of society, especially the aging of the population and changes in lifestyle, such as unhealthy dietary habits and lack of exercise, the incidence of digestive diseases has shown a significant upward trend, which not only increases the pressure on the demand for medical resources, but also puts higher requirements on the professional skills of doctors, especially in the early diagnosis of diseases, the choice of therapeutic strategies, and the management of chronic diseases [3]. Therefore, strengthening clinical research, education and training, and public health education in gastroenterology can improve the prevention, control, and treatment of these diseases.

4.2. The need for teaching innovation in clinical gastroenterology education in the context of educational reforms

With the rapid development of medical science and technology, new therapeutic techniques and drugs are constantly emerging, and the knowledge systems and skills required of doctors are continuously improving. The diagnosis and treatment of gastroenterology diseases are becoming more complex and involve more interdisciplinary knowledge, such as molecular biology, genetics, the recently emerging precision medicine, etc., which require medical education to keep up with the times and constantly adapt to the new changes in the medical field [4].

In the face of these challenges, the traditional lecture-based teaching mode is no longer able to meet students' needs for in-depth, practical knowledge. Educational reform requires the adoption of more flexible and diversified teaching methods, such as case teaching, simulation training, group discussion, etc. in order to improve students' clinical thinking and practical problem-solving skills. At the same time, it is also necessary to strengthen the cultivation of students' independent and lifelong learning abilities and to encourage students to take the initiative to explore and learn the latest medical knowledge and technology in order to adapt to the rapidly changing healthcare environment. In addition, education reform should also emphasize the cultivation of students' ethical and moral outlook and the spirit of humanistic care, which is of great significance to the improvement of the quality of medical services and the establishment of a harmonious relationship between doctors and patients. Through these teaching innovations and reform measures, the professional skills and overall quality of gastroenterologists can be effectively improved, and more high-quality medical talents can be cultivated for future medical development.

4.3. Advantageous features of step-by-step case teaching

Step-by-step case teaching is an advanced medical education model. It aims to combine actual checkup practice with gradual escalation of clinical case teaching so that students can be guided by teachers, and the teaching content is divided into different stages according to the degree of difficulty and complexity, and each stage is designed with a clinical case that meets the level. Students need to gradually improve their clinical competence through analyzing cases, discussing treatment plans, and participating in activities such as ward rounds under the guidance of the instructor [5]. Compared with the traditional clinical teaching method, the step-by-step case teaching has obvious advantages:

(1) Practice-oriented: The practice-oriented feature of the step-by-step case teaching provides students with a close-to-realistic learning environment by simulating real clinical scenarios, which not only enables students to apply what they have learned and deal with complex clinical situations under safe and risk-

free conditions, but also enhances their clinical operation and decision-making skills and provides them with a better opportunity to improve their clinical skills, laying a solid foundation for their future clinical work.

(2) Step-by-step: The teaching mode organizes the teaching content according to the principle of simple to difficult, from shallow to deep, to ensure that students can be exposed to the knowledge and skills of corresponding difficulty at the appropriate learning stage. This step-by-step learning approach helps students gradually build a complete knowledge system and avoids the frustration that may be brought about by facing difficult problems directly. Through hierarchical and escalating case studies and practical exercises, students are able to consolidate their knowledge and improve their skills at each stage, thereby effectively enhancing their learning efficiency and self-confidence.

(3) Reinforcement of thinking training: Through continuous case analysis and discussion, the step-by-step case teaching encourages students to take the initiative to think, ask questions, and solve problems, so as to encourage them to be able to independently carry out clinical reasoning in the face of disease diagnosis and treatment. Meanwhile, through repeated thinking training, students are encouraged to learn how to quickly and accurately analyze problems and formulate reasonable diagnostic and treatment plans in complex and changing clinical situations, so as to improve their independent problem-solving skills.

(4) Promoting teacher-student interaction: Immediate feedback and discussion during the step-by-step case teaching not only increases the interactivity of teaching but also provides students with immediate learning feedback, helping them to find and correct their mistakes in time [6]. In addition, this teaching mode encourages students to express their views and doubts, promotes communication and understanding between teachers and students, and better meets students' individualized and diversified learning needs, thus improving the teaching effect.

4.4. Practical effects of applying step-by-step case teaching in gastroenterology ward rounds

The results of this study showed that the application of step-by-step case teaching in the clinical education of gastroenterology achieved significant teaching effects. The scores of the students in the observation group on the assessment of theoretical knowledge of gastroenterology (89.76 ± 4.63) and the scores of the clinical skills assessment (87.61 ± 4.25) were higher than those of the control group, which were 82.24 ± 3.75 and 80.17 ± 3.53, respectively. The difference was statistically significant ($P < 0.05$). The observation group students' degree of recognition of the step-by-step case teaching method in improving learning enthusiasm and initiative, consolidating theoretical knowledge, improving clinical practice skills, and cultivating team spirit and clinical thinking was 97.22%, 94.44%, 100%, 97.22%, and 91.67% in order, which was correspondingly higher than that of the control group (75.00%, 69.44%, 66.67%, 72.22%, and 58.33%, respectively), and the difference was statistically significant ($P < 0.05$). Further analysis revealed that under this teaching mode, students were able to apply theoretical knowledge to actual clinical situations, thus gaining a deeper understanding and mastery of the diagnosis and treatment of digestive system diseases. Meanwhile, through different levels of case analysis, students' clinical thinking skills were significantly improved, which stimulated students' interest in learning, improved learning initiative, and promoted students' self-learning and exploration. In addition, through the application of this teaching mode, the interaction between teachers and students is enhanced, and teachers can adjust the teaching content and methods in time according to students' feedback, so that the teaching is closer to the actual needs of students.

5. Conclusion

In conclusion, the application of step-by-step case teaching in gastroenterology education not only enhances the clinical ability of students but also promotes the innovation of education and teaching methods, which helps to cultivate high-quality medical talents adapted to the needs of modern medical treatment. The successful practice of this model provides useful reference and inspiration for educational reform in other medical fields.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Li H, Chen JH, Su QY, et al., 2020, Using Case Teaching Method to Integrate Medical Morphology and Cultivate Students' Clinical Thinking Ability. Journal of Right River College of National Medicine, 42(4): 523–525.

[2] Gao Y, Gao J, Zhang LL, et al., 2020, Diagnostic Guidelines Combined with Case-Based Teaching in Rheumatologic Application in Standardized Training of Departmental Residents. Chinese Journal of Medical Education Exploration, 19(10): 1190–1192.

[3] Pancreatic Surgery Group of the Chinese Medical Association Surgical Branch, 2021, Chinese Guidelines for the Diagnosis and Treatment of Acute Pancreatitis (2021). Chinese Journal of Digestive Surgery, 20(7): 730–739.

[4] Liu Y, Xiang L, Tan W, et al., 2023, A Multidimensional Survey Study on the Status of Clinical Internship in Gastroenterology. Continuing Medical Education, 37(02): 72–75.

[5] Wang S, Shen C, Zhang S, et al., 2023, The Role of Catechism in the Teaching Reform of Standardized Training of Chinese Medicine Residents in Gastroenterology. Beijing Traditional Chinese Medicine, 42(02): 232–234.

[6] Wu D, Yang X, Pang X, 2020, Effectiveness of Cascade Teaching in Teaching Nursing Interns in Gastroenterology. China Continuing Medical Education, 12(17): 56–59.