The implementation of evidence-based medicine and the Problem-Based Learning (PBL) teaching approach in the clinical practice education of the gastroenterology department

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Abstract: Objective: The application effect of the combination of evidence-based medicine and PBL teaching mode in the internship teaching of gastroenterology was investigated, analyzed, and discussed. Method: A study was conducted on 20 medical students who underwent their internship teaching in the Department of Gastroenterology. They were divided into a control group and an experimental group, with 10 students in each group. The control group followed the conventional teaching mode, while the experimental group adopted a combined approach integrating evidence-based medicine and PBL teaching modes. The performance during the internship, comprehensive quality rating, and satisfaction level among both groups of medical student interns were analyzed and compared. Results: The experimental group demonstrated significantly higher levels of internship performance, comprehensive quality scores, and internship satisfaction compared to the control group (P<0.05), indicating a statistically significant difference. Conclusions: The integration of evidence-based medicine and the problem-based learning (PBL) teaching mode exerts a positive impact on the internship teaching of gastroenterology, as it effectively stimulates students' enthusiasm and enhances their mastery of medical knowledge. This pedagogical approach can be readily implemented in instructional practices.

Key words: evidence-based medicine; randomized controlled trials; PBL teaching mode; internship teaching in gastroenterology; teaching satisfaction

1 Introduction

Clinical internships play a pivotal role in integrating theoretical knowledge and practical skills in the field of medicine. Currently, the most pressing challenge lies in effectively amalgamating theory and practice within medical internships [1]. In China, the prevailing approach involves mentorship from senior physicians during these internships, which facilitates interns' acquisition of clinical understanding but hinders their capacity for exploration and innovation [2]. Despite the emergence of evidence-based medicine teaching and problem-based learning (PBL) as novel concepts in recent years, their implementation within clinical practice remains limited and fails to provide substantial assistance for educating medical interns [3]. Consequently, this study selected 20 medical interns from our hospital to evaluate the efficacy of combining

evidence-based medicine with PBL teaching modes specifically within gastroenterology internships.

2 Materials and methods

2.1 Clinical data

Twenty medical interns were selected from the Department of Gastroenterology in our hospital and divided into a control group and an experimental group, with 10 cases in each group. Inclusion criteria included: ① Medical interns must have a planned internship in the Department of Gastroenterology in our hospital. ② The duration of the internship should be at least two months. The medical interns were informed about this study and actively participated in it. Exclusion criteria consisted of: ① Interns unable to adhere to their original internship plan. ② Interns with poor cooperation hindering research requirements. Additionally, interns with compromised physical health or serious illnesses were excluded from participation. In the control group, participants' ages ranged from 18 to 24 years, with an average age of (21.37 ± 3.55) years; There were two male interns and eight female interns; The duration of their internships ranged from 8 to 16 weeks, averaging (12.35 ± 4.38) weeks. In the experimental group, participants' ages ranged from 18 to 24 years old, with an average age of (21.33 ± 3.61) years; There was one male intern and nine female interns; The duration of their internships was ranged from 8 to 16 weeks, averaging (12.32 ± 4.35) weeks. There were no significant differences in baseline data between the two groups $(P>0.05)$.

2.2 Method

The control group implemented the conventional teaching mode, conducting instructional activities based on the interns' internship plan, such as executing medical orders, composing internship medical records, and refining skills related to gastroenterology.

The experimental group utilized a hybrid approach that integrates evidence-based medicine and problem-based learning (PBL) teaching mode. ① Regarding evidence-based medicine, we will conduct comprehensive analysis and education on prevalent gastroenterological diseases, such as gastric ulcers and gastrointestinal bleeding. Medical interns will generate inquiries while supervising physicians will provide answers based on specific cases, relevant guidelines, and facilitate the collection of evidence-based medical content. Personalized medical plans for hospitalized patients with diverse digestive disorders will be developed based on the outcomes of evidence-based medicine. We will continuously monitor treatment effectiveness and patient satisfaction indicators, promptly analyze and discuss issues with medical interns, and devise appropriate solutions accordingly. ② In terms of PBL teaching: PBL sessions will be prepared every Tuesday and Friday, focusing on common digestive ailments like gastrointestinal bleeding, peptic ulcers, hepatic encephalopathy etc. PBL lesson plans will be developed centered around specific clinical scenarios; Interns will be informed about the first scenario's content one day prior to the session to allow ample preparation time. On the designated day of PBL teaching, each intern is expected to perform tasks such as collecting medical history data, conducting physical examinations or interpreting auxiliary test results under the guidance of supervising doctors. Interns are encouraged to initiate discussions by proposing precise diagnostic queries or treatment strategies for deliberation purposes. Following these instructional sessions, interns' performance will be comprehensively evaluated and constructive feedback will be provided on their progress. The distinct challenges encountered by medical interns during this process will be summarized, and the implementation of improvement plans will be supervised.

2.3 Observation indicators

This study aims to analyze and compare the internship performance, comprehensive quality rating, and internship satisfaction of two groups of medical interns. The evaluation of internship performance includes assessing and comparing

theoretical knowledge, practical skills, and overall assessment scores. The comprehensive quality rating primarily focuses on indicators such as clinical analysis ability, understanding capacity, and emergency response capability of medical interns. Internship satisfaction refers to the subjective evaluation of medical interns' contentment with their medical education.

2.4 Statistical methods

The data from this group should be entered into SPSS 21.0 software for processing and analysis. Quantitative data should be presented as (x±s) and subjected to t-test analysis, while count data should be expressed as percentages and analyzed using χ^2 inspection. A statistically significant difference is indicated when $P<0.05$.

3 Results

3.1 A comparative analysis of the academic performance between two groups of interns

The interns in the experimental group exhibited significantly higher scores in theoretical knowledge, practical operation, and comprehensive assessment compared to the control group ($P<0.05$). Detailed results can be found in Table 1.

Table 1. Performance comparison between two cohorts of interns (x±s)

Group	Occurrence rate of cases (example)	Theoretical knowledge (score)		Actual operation (score)		Comprehensive evaluation (score)	
		Before teaching	After teaching	Before teaching	After teaching	Before teaching	After teaching
Control group	10	78.53±10.20	81.28±18.35	57.43±11.24	62.34±15.67	70.38±11.28	75.34±14.92
Experimental group	10	78.56±10.17	95.96±10.00	57.35±11.26	85.73±10.12	70.33±11.21	89.58±10.56
T value	-	0.007	2.221	0.016	3.965	0.010	2.464
P value	-	0.995	0.039	0.988	0.001	0.992	0.024

3.2 The comparative evaluation of overall quality ratings between two cohorts of interns

The interns in the experimental group demonstrated a statistically significant improvement in their overall quality score compared to the control group ($P<0.05$). Detailed findings are presented in Table 2.

Table 2. Comparative analysis of comprehensive quality scores between two groups of Interns (x ± s)

Group	Occurrence rate of cases (example)	Clinical analysis (score)	Understanding ability (score)	Emergency response capability (score)	Team collaboration (score)	Communication between doctors and patients (score)	Mean score (score)
Control group	10	65.38±5.55	66.17±5.42	67.14±5.35	66.10±5.38	64.79±5.86	65.50±5.32
Experimental group	10	88.78±4.32	87.10±4.54	88.59±4.28	87.46±4.21	88.52±4.37	88.66±4.59
T value	-	10.521	9.317	9.900	9.860	10.304	10.423
P value	-	0.000	0.000	0.000	0.000	0.000	0.000

3.3 The comparative analysis of satisfaction levels between two cohorts of interns

The interns in the experimental group demonstrated a statistically significant increase in satisfaction compared to the control group ($P<0. 05$). The detailed findings can be found in Table 3.

Table 3. The comparative analysis of satisfaction levels among two groups of interns (n, %)

Group	Occurrence rate of cases (example)	Optimal state of satisfaction (%)	Relatively satisfied	Basically satisfied (%)	Dissatisfied (%)	Total satisfaction rate (%)
Control group	10 (100.00%)	3 (30.00%)	3 (30.00%)	2 (20.00%)	4 (40.00%)	6 (60.00%)
Experimental group	10 (100.00%)	8 (80.00%)	2 (20.00%)	0 (0.00%)	0 (0.00%)	10 (100.00%)
χ^2 value	-	5.051	0.267	2.222	5.000	5.000
P value	-	0.025	0.606	0.136	0.025	0.025

4 Discussion

Medical interns play a vital role as an essential reserve force for clinical physicians, necessitating the reinforcement of practical teaching and training in the field of gastroenterology alongside fundamental theoretical knowledge [4]. Currently, evidence-based medicine and problem-based learning (PBL) have emerged as pivotal concepts and tasks both domestically and internationally. The teaching of evidence-based medicine primarily involves instructors enhancing instructional quality and knowledge accuracy by sourcing the latest literature and guidelines from domestic and international sources [5]. Implementing instruction on evidence-based medicine can enhance medical interns' correct comprehension of medical concepts and theoretical knowledge, thereby promoting standardized clinical practice behaviors. Conversely, PBL instruction effectively integrates theoretical knowledge with practical skills through scenario simulation, bridging the gap between textbooks and clinical practice while providing valuable support for future clinical work [6-7]. This study suggests that combining evidence-based medicine with PBL as a teaching method can strengthen the theoretical foundation and practical abilities of gastroenterology interns, enabling them to deliver targeted treatment for various digestive diseases, improve treatment outcomes, and even enhance patient prognosis [8].

The integration of evidence-based medicine and problem-based learning (PBL) pedagogy demonstrates a favorable application efficacy in gastroenterology internship education. Essentially, it effectively stimulates students' enthusiasm and enhances their proficiency in acquiring medical knowledge, thereby facilitating its implementation within educational settings.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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