

Application of PDCA Circulation Combined with PBL Method in Internal Medicine Nursing Teaching under Mixed Teaching Mode

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Keywords: Mixed teaching mode; PDCA cycle; PBL method; Internal medicine nursing teaching; innovate

Abstract: This paper discusses the application of PDCA circulation combined with PBL (Problem-Based Learning) method in internal medicine nursing teaching under mixed teaching mode. By integrating the continuous improvement concept of PDCA cycle with the problem-oriented and student-centered thinking of PBL method, this teaching mode effectively promotes the cultivation of students' independent learning, teamwork and critical thinking. The core features of mixed teaching mode include flexibility, individuality, interactivity and high efficiency, which can meet the needs of different students and improve teaching effect and learning efficiency. However, there are also some challenges in practice, such as technical problems, students' participation, interaction and communication, and the limitations of teachers' ability, students' autonomy, time and resources. In view of these problems, this paper puts forward corresponding solutions and suggestions, such as strengthening technical support, improving students' participation, optimizing interaction and communication, and enriching teaching resources. In order to promote the continuous innovation and development of PDCA cycle combined with PBL method under mixed teaching mode.

1. Introduction

With the rapid development of medical science and technology and the transformation of medical model, internal medicine nursing, as an important part of the medical system, its teaching methods and methods are also facing great challenges and reform needs[1]. Traditional teaching of internal medicine nursing often focuses on imparting theoretical knowledge, but the cultivation of practical ability is relatively insufficient, which is far from the current medical system's demand for high-quality and practical nursing talents[2]. Therefore, how to improve and innovate the teaching mode of internal medicine nursing to meet the needs of the development of the times has become an urgent problem in the current education field.

In recent years, the mixed teaching mode, as a new teaching method, has gradually been widely applied and popularized in the field of education[3]. The mixed teaching mode emphasizes the organic combination of online learning and face-to-face teaching, and gives full play to their advantages to improve the teaching effect and learning experience[4]. The introduction of mixed teaching mode in internal medicine nursing teaching can not only enrich teaching means and resources, improve students' interest and enthusiasm in learning, but also effectively cultivate students' practical ability and comprehensive quality, and better meet the demand of medical industry for talents[5].

On the basis of mixed teaching mode, introducing PDCA cycle and PBL method as teaching AIDS can further improve the effect and quality of internal medicine nursing teaching[6]. PDCA cycle is a continuous improvement management method, which includes four links: planning, execution, inspection and handling. It can help teachers and students plan and implement teaching activities systematically, find problems in time and make improvements[7]. The PBL principle is a problem-oriented teaching method, which cultivates students' critical thinking and innovative ability

by guiding students to explore and solve real problems independently[8]. Combining PDCA cycle and PBL method into mixed teaching mode can form a more perfect and systematic teaching method system, which is helpful to improve the overall effect of internal medicine nursing teaching.

2. Overview of mixed teaching mode

Mixed teaching mode refers to a teaching method that organically combines the traditional face-to-face classroom teaching and online learning. This teaching mode makes full use of the advantages of modern information technology, breaks the time and space limitation of traditional teaching, and makes learning more flexible and efficient[9]. The core features of the mixed teaching model are shown in Table 1.

Table 1 Core characteristics of mixed teaching mode

Serial number	Characteristic	Describe	Superiority
1	Flexibility	Students can arrange their studies according to their own time and place, and are not limited by the time and space of traditional classrooms.	It is convenient for students to arrange their own learning schedule and place, and improve their learning freedom.
2	Personalized	Online learning resources are rich and varied, which can meet the individual learning needs of different students.	Allow students to choose learning content according to their own interests and needs, and improve their learning motivation.
3	Interactivity	Through online discussion and group cooperation, students can communicate and cooperate more conveniently.	Strengthen cooperation and communication among students, and promote knowledge sharing and teamwork.

It is of great significance to introduce the mixed teaching mode in the teaching of internal medicine nursing: through the online learning platform, students can be provided with a large number of internal medicine nursing learning resources, including courseware, videos, cases, etc., which will help students better understand and master the knowledge of internal medicine nursing[10]. Online learning elements in mixed teaching mode can stimulate students' interest and enthusiasm in learning and improve their autonomous learning ability. Through online simulation experiments, virtual simulation and other means, it can provide students with a more realistic practice environment and effectively cultivate their practical ability and operational skills. The interactive link in the mixed teaching mode can promote the communication and cooperation between teachers and students, and help teachers to know the students' learning situation in time and give targeted guidance to realize teaching and learning.

3. PDCA cycle theory

3.1. The origin and basic concepts of PDCA cycle

PDCA cycle originated from the field of quality management. Its core idea is to realize continuous improvement and promotion of quality through four steps-Plan, Do, Check and Act.

Plan: At this stage, teachers need to define teaching objectives, make teaching plans and strategies, including the selection of teaching content, the design of teaching methods, the preparation of teaching resources, etc.

Do: Carry out the actual teaching activities as planned. Teachers can flexibly adjust teaching methods and strategies according to students' feedback and actual situation to ensure the smooth

progress of teaching activities.

Check: After the teaching activities, teachers need to evaluate and feedback the students' learning achievements. This can be done through exams, homework, group discussions, etc. At the same time, teachers also need to reflect and summarize their teaching effects.

Act: According to the inspection results, teachers need to put forward targeted improvement measures and incorporate these measures into the plan of the next cycle. This can realize the continuous improvement and promotion of teaching quality.

3.2. Application of PDCA circulation in internal medicine nursing teaching

In the teaching of internal medicine nursing, through the continuous improvement mechanism of PDCA cycle, teachers can constantly improve teaching plans and methods and improve teaching effect and quality. PDCA cycle emphasizes students' active participation and feedback, which is helpful to cultivate students' autonomous learning ability and lifelong learning habits. At the same time, the inspection and treatment in PDCA cycle can promote the communication and cooperation between teachers and students, and help to build a good teacher-student relationship and teaching atmosphere. At present, the reform of medical education emphasizes student-centered and ability training. The introduction of PDCA cycle can better meet the needs of this reform and provide strong support for cultivating high-quality and practical medical nursing talents.

4. Discussion on PBL teaching method

4.1. Definition and core concept of PBL method

PBL emphasizes student-centered, and stimulates students' learning interest and motivation by solving real or simulated problems, thus cultivating students' critical thinking, innovative ability and problem-solving ability. The core idea of PBL method is that "learning is realized by solving problems", which encourages students to actively explore and cooperate in learning and apply what they have learned to solving practical problems.

In the teaching of internal medicine nursing, PBL method can help students transform theoretical knowledge into practical skills by solving real or simulated nursing problems, and improve their practical ability and operational skills. At the same time, PBL is student-centered and encourages students to explore and learn actively, which can stimulate students' interest and motivation in learning and improve the learning effect. It is usually carried out in the form of group discussion and teamwork, which is helpful to cultivate students' teamwork spirit and communication and coordination ability. In addition, the current medical education reform emphasizes the cultivation of ability, and PBL method is a teaching method with the cultivation of ability as the core, which is helpful to realize the goal of medical education reform.

4.2. Comparative analysis of teaching methods

Compared with traditional teaching methods, the advantages of PBL method are as follows: (1) Traditional teaching methods are often teacher-centered, and students are in a passive position; The PBL method is student-centered and encourages students to explore and learn actively. (2) Traditional teaching methods usually focus on imparting knowledge, while PBL is problem-oriented and learns knowledge by solving problems. (3) Traditional teaching methods focus on inculcating and memorizing knowledge, while PBL emphasizes the cultivation and promotion of abilities, including critical thinking, innovative ability and problem-solving ability. (4) Traditional teaching methods often ignore the cooperation and communication between students; PBL encourages cooperative learning and teamwork among students, which is helpful to cultivate students' teamwork spirit and communication and coordination ability.

However, PBL method also has some challenges and limitations, such as higher requirements for teachers and students' autonomous learning ability. Therefore, in practical application, it is necessary to choose and use teaching methods flexibly according to specific situations.

5. Application of PDCA circulation combined with PBL method in internal medicine nursing teaching

5.1. Teaching mode design: how to integrate PDCA cycle and PBL method

The design of teaching mode integrating PDCA cycle and PBL method is a systematic process, involving many considerations. First of all, we must make clear the specific objectives of internal medicine nursing teaching, covering all levels of knowledge, skills and attitudes, so as to provide direction for the follow-up teaching plan. Secondly, based on these goals, combined with the four stages of PDCA cycle, a detailed teaching plan is formulated. At this stage, the concept of PBL method can be integrated into it, and it will become the core of teaching by designing challenging and authentic nursing problems. Next, it is necessary to flexibly combine PBL method and PDCA cycle in the teaching plan. For example, the inspection and treatment of PDCA cycle should be introduced in the implementation of PBL method, so as to feedback and adjust students' learning results in time. Finally, according to the requirements of teaching plan and method, the teaching resources are optimized and integrated, including teaching materials, cases, simulation equipment, etc., to ensure the smooth progress of the teaching process. This integrated design aims to maximize the advantages of PDCA cycle and PBL method and improve the effect and quality of internal medicine nursing teaching.

5.2. Teaching implementation process: specific steps and key links

The teaching implementation process can be carried out according to the following steps:

Start-up stage: introduce teaching objectives, plans and evaluation methods to stimulate students' interest and motivation in learning.

Problem presentation: present challenging and authentic nursing problems and guide students to analyze and discuss them.

Students' autonomous learning and teamwork: students use learning resources to carry out autonomous learning and teamwork to solve problems together.

Teacher's guidance and feedback: teachers give timely guidance and feedback during students' learning process to help students solve problems and improve learning effect.

Achievement display and evaluation: students display their learning achievements, including solutions and case studies, and conduct self-evaluation and mutual evaluation. Teachers evaluate and feedback students' learning achievements according to the evaluation criteria.

The key links include problem design, students' autonomous learning and teamwork, teachers' guidance and feedback, and achievement evaluation. These links need to be carefully designed and effectively implemented to ensure the teaching quality and students' learning results.

5.3. Evaluation of teaching effect: expected results and actual impact

Teaching effect evaluation is a comprehensive process, which can be carried out through multiple dimensions. Students' performance is an important index to evaluate the teaching effect, which can be measured by exams, homework and group discussions. At the same time, students' feedback is also an indispensable part of the evaluation. Students' direct feelings and suggestions on the teaching effect can be collected through questionnaires and individual interviews. In addition, teachers' evaluation is also the key factor to comprehensively evaluate the teaching effect. Teachers can give professional evaluation from the aspects of students' learning achievements, learning attitude and teamwork ability. According to the above evaluation results, targeted teaching improvement measures can be put forward to provide practical reference for the next round of PDCA cycle. Through this evaluation, it is expected to see the improvement of students' knowledge level, the enhancement of practical ability, and the cultivation of critical thinking and innovation ability. The actual influence may be manifested in the improvement of students' interest in learning, the improvement of learning effect and the improvement of teachers' teaching level. These expected results and practical effects will jointly provide strong support and promotion for the continuous improvement of internal medicine nursing teaching.

6. Challenges and countermeasures

In the mixed teaching mode, the following problems may be encountered: technical problems, student participation, interaction and communication, and resource problems. In addition, although PDCA cycle and PBL method have many advantages, they may encounter some limitations in practice. These problems and limitations are shown in Table 2 and Table 3.

Table 2 Difficult problems faced by mixed teaching mode

Serial number	Problem types	Incorporate	Potential impact
1	Technical difficulty	Unstable network connection, technical failure and students' unfamiliarity with online learning platform.	Affect the smooth progress of online learning and reduce the learning effect.
2	Student participation	Some students lack self-discipline, their participation is reduced, and there is a phenomenon of "diving".	Reduce students' effective study time and affect their study results.
3	Interaction and communication	Face-to-face interaction and communication are limited in the online environment.	Obstruct team cooperation and discussion, and reduce learning effect and social experience.
4	Resource problem	Making high-quality online teaching resources requires a lot of time and resources, and needs to be constantly updated and maintained.	It may lead to insufficient teaching resources or low quality, which will affect the teaching effect.

Table 3 PDCA cycle and limitations of PBL method

Serial number	Limited type	Incorporate	Potential impact
1	Teacher's ability	Teachers are required to have high teaching ability and experience, including problem design, guiding discussion and providing feedback.	If teachers' ability is insufficient, PDCA cycle and PBL method may not be effectively implemented, which will reduce the teaching effect.
2	Student autonomy	PBL requires students to have strong autonomous learning ability and teamwork spirit.	Some students may have difficulties in adaptation, which leads to different learning progress and affects the team learning effect.
3	Time and resource constraints	Both PDCA cycle and PBL method need to invest a lot of time and resources, including teaching preparation, student discussion, achievement display and so on.	Lack of time and resources may lead to the failure to implement the teaching plan smoothly and affect the teaching effect and learning results.

In view of the aforementioned potential problems and challenges, this paper proposes the following suggestions and solutions:

Firstly, technical support should be strengthened. Stable technical assistance and training should be provided to ensure that students can proficiently utilize online learning platforms and their associated tools.

Secondly, efforts should be made to improve student participation. Clear learning objectives, along with timely feedback and reward mechanisms, can enhance student engagement and self-discipline.

Thirdly, interaction and communication ought to be optimized. Online forums, chat rooms, and

other collaborative tools should be leveraged to foster communication and teamwork among students. Additionally, students should be encouraged to actively contribute to discussions during face-to-face classes.

Fourthly, teaching resources need to be enriched. Online educational materials should be continuously developed and refined, offering students a variety of learning experiences that complement face-to-face classroom instruction.

Fifthly, the focus should be on improving teachers' abilities. Professional development and mentorship programs should be implemented to enhance teachers' skills and effectiveness in utilizing the PDCA cycle and PBL methodologies.

Lastly, attention must be paid to students' needs. When implementing the PDCA cycle and PBL approach, it is essential to consider students' individual needs and differences, providing personalized guidance and support accordingly.

Reasonable arrangement of time and resources: according to the teaching objectives and students' needs, reasonable arrangement of teaching time and resources investment ensures the teaching effect and students' learning achievements.

7. Conclusions

The application of PDCA circulation combined with PBL method in the teaching of internal medicine nursing under the mixed teaching mode provides strong support for the improvement of teaching quality and students' learning achievements. By integrating the continuous improvement concept of PDCA cycle with the problem-oriented and student-centered thinking of PBL method, this model effectively promotes the cultivation of students' autonomous learning, teamwork and critical thinking. However, the implementation of PDCA cycle combined with PBL method under mixed teaching mode also faces some challenges. In view of these problems and challenges, this paper puts forward corresponding solutions and suggestions.

Based on the above research, this paper thinks that the application of PDCA cycle combined with PBL method in the teaching of internal medicine nursing under the mixed teaching mode is of great significance and practical value, which is worth further promotion and improvement. In the future, a more comprehensive and scientific evaluation system can be established to evaluate the teaching effect of PDCA cycle combined with PBL method in mixed teaching mode more objectively and accurately.

Acknowledgements

The authors acknowledge the 2020 college-level teaching reform of Shandong Union College: "Application of PDCA cycle combined with PBL method in medical nursing teaching under mixed teaching mode" (Project No: 2020GZ12).

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