

# Application Effect of Blended Education Strategy Based on the Learning Pass Platform in Phase III Cardiac Rehabilitation of Patients with Coronary Artery Disease

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**Abstract:** *Objective:* To explore the application effect of the blended education strategy based on the Learning Pass platform in the phase III cardiac rehabilitation of patients with coronary artery disease. *Methods:* 90 patients diagnosed with coronary artery disease in the Department of Cardiology of our hospital from January 2019 to January 2021 were selected and divided into the control group and the experimental group according to the method of randomized numerical table, with 45 cases in each group. Both the experimental group and the control group received pre-discharge cardiac rehabilitation education by conventional means. The control group received education and supervision information via WeChat after discharge, while the experimental group joined the Learning Pass platform to receive online and offline hybrid education and supervision, with online as the mainstay and offline as a supplement. The disease cognitive level, self-management skills, quality of life, medication adherence, and emotional status of the two groups were compared. *Results:* The disease cognitive levels in the experimental group were significantly higher than those of the control group ( $P < 0.05$ ); the scores of the experimental group in terms of quality of life, self-management skills, and medication adherence were significantly higher than those of the control group ( $P < 0.05$ ); and the scores of anxiety and depression in the experimental group were significantly lower than those of the control group ( $P < 0.05$ ). *Conclusion:* The blended education strategy based on the Learning Pass platform has a significant application effect in phase III cardiac rehabilitation of patients with coronary artery disease. It can improve patients' disease cognitive level, self-management skills, and quality of life, and provide a basis for improving patients' prognosis.

**Keywords:** Learning Pass platform; Blended education; Coronary artery disease; Cardiac rehabilitation

**Online publication:** February 25, 2024

## 1. Introduction

Coronary artery disease (CAD) is a common chronic disease with increasing incidence. It is a complex condition that has a serious impact on the quality of life and health status of patients. In the diagnosis and treatment of coronary artery disease, cardiac rehabilitation, as an important therapeutic means, can help

patients improve cardiac function, alleviate symptoms, and enhance the quality of life [1-6]. However, due to the large individual differences between patients, it is often difficult for the traditional cardiac rehabilitation education model to meet the individualized needs of patients. Therefore, it is particularly important to explore a new educational model to improve the effectiveness and compliance of cardiac rehabilitation for patients. In recent years, with the rapid development of information technology, online education has gradually attracted attention. As an online education tool with the advantages of rich resources, high interactivity, and personalized customization, the Learning Pass platform provides a new approach to cardiac rehabilitation education for patients with coronary artery disease. However, relying solely on online education cannot meet the patients' practical needs and emotional communication, thus it is necessary to incorporate offline educational tools to form a hybrid educational strategy. A hybrid education strategy is an education method that combines online and offline education, through the comprehensive use of a variety of educational resources and means, in order to achieve the best educational effect. In the cardiac rehabilitation education of patients with coronary artery disease, the blended education strategy can maximize the advantages of the Learning Pass platform and offline activities to provide patients with more comprehensive and personalized educational services [7-12]. Specifically, the online courses can meet the patients' learning needs for disease knowledge and rehabilitation skills, while the offline activities can strengthen the communication and interaction between patients, and improve their practical skills and teamwork spirit. Meanwhile, through the establishment of a patient communication group, patients can be encouraged to ask questions and share their experiences to improve their participation and compliance. This study aims to explore the application effect of the blended education strategy based on the Learning Pass platform in phase III cardiac rehabilitation for patients with coronary artery disease.

## 2. General information and methods

### 2.1. General information

Ninety patients diagnosed with coronary artery disease in the Department of Cardiology of our hospital from January 2019 to January 2021 were selected and divided into the control group and the experimental group by the method of randomized numerical table, with 45 cases in each group. In the control group, there were 25 males and 20 females; their ages ranged from 45 to 75 years, with an average of  $60.31 \pm 8.23$  years; the duration of the disease ranged from 1 to 10 years, with an average of  $5.21 \pm 2.34$  years. In the experimental group, there were 22 males and 23 females; age ranged from 46–77 years, with a mean of  $61.16 \pm 7.92$  years; disease duration ranged from 1–9 years, with a mean of  $5.70 \pm 2.12$  years. There was no statistically significant difference between the two groups in terms of gender, age, and disease duration ( $P > 0.05$ ), and they were comparable.

Inclusion criteria included patients meeting the diagnostic criteria for coronary artery disease set by the International Society and Association of Cardiology/World Health Organization in 1979; patients about to be discharged from the hospital and residing in the urban area; patients with normal cognitive, reading, writing, and comprehension abilities; patients who own and use a smartphone; patients with good mental status, able to communicate verbally and in writing; patients who are able to move freely; patients with informed consent.

Exclusion criteria were contraindications to exercise rehabilitation, such as unstable angina pectoris, acute myocardial infarction, uncontrolled arrhythmia, decompensated heart failure, complex ventricular arrhythmia, severe pulmonary hypertension, intraluminal thrombus, recent thrombophlebitis with or without pulmonary embolism, severe obstructive cardiomyopathy, severe or symptomatic aortic stenosis, high blood pressure  $> 220$  mmHg, uncontrolled aortic stenosis, uncontrolled inflammatory or infectious diseases, any musculoskeletal muscle disease that hinders exercise training, combination of severe hepatic and renal impairment, severe

gastrointestinal diseases, malignant tumors, etc.

## 2.2. Educational methods

Both the experimental group and the control group received pre-discharge cardiac rehabilitation education by conventional means. The patients in the control group received educational and supervisory information distributed in the form of micro-letters after discharge, while the experimental group joined the Learning Pass platform to receive online and offline hybrid education and supervision, online as the mainstay and offline as a supplement. Patients in the experimental group received the blended education strategy based on the Learning Pass platform as follows:

- (1) Online course: Using the Learning Pass platform, a targeted coronary artery disease rehabilitation education course was produced according to the actual situation of patients, including basic knowledge of the disease, drug treatment, dietary guidance, rehabilitation training, and other aspects. The courses were presented in the form of video, PowerPoint presentation, etc., and explained by professional medical personnel, with each course lasting for 10–20 minutes.
- (2) Offline activities: Patients participated in regular offline rehabilitation knowledge lectures, rehabilitation training camps, and other activities to strengthen communication and interaction among patients, and to improve their practical skills and teamwork spirit.
- (3) Interactive communication: A patient communication group was established through the Learning Pass platform, where medical staff regularly provided disease-related knowledge and rehabilitation skills, encouraged patients to ask questions and share their experiences, and improved patients' participation and compliance.
- (4) Regular assessment: Regular assessment of patients was conducted to understand the changes in patient's condition, rehabilitation progress, etc. The education strategy was adjusted according to the assessment results to ensure that the education effect was maximized.

## 2.3. Observation indicators

- (1) Disease cognitive level: A self-made coronary artery disease knowledge questionnaire was used to assess the patients' disease cognitive level, including the basic knowledge of the disease, drug treatment, dietary guidance, rehabilitation training, and other aspects. The full score was 100 points, where higher score indicated better cognitive level.
- (2) Self-management skills: The scale was compiled by Ren Hongyan of Chongqing Medical University in 2009, with good reliability and validity. It includes 7 dimensions and 27 entries, i.e., bad habit management, symptom management, emotional cognition management, first aid management, disease knowledge management, daily life management, and treatment adherence. A 5-point Likert scale was used, the higher the score, the better the patient's self-management skills.
- (3) Quality of life: The Minnesota Living with Heart Failure Questionnaire was used to evaluate the patients' quality of life, including physical limitations, social limitations, and emotional problems, with a full score of 100, and lower scores indicated better quality of life.
- (4) Medication adherence scale: The "Questionnaire on Medication Adherence in Coronary Heart Disease Patients for Secondary Prevention" compiled by Zhou Yi of Hebei University in 2018 was used. The questionnaire included elements related to medication adherence such as "time," "dose," "frequency," "type," "regular review," and "medication adjustment." A 4-point Likert scale was used, the higher the score, the better the adherence.

- (5) Generalized Anxiety Disorder Scale (GAD-7): This scale was used by Spitzer's team in 2007 for anxiety screening, it was sinicized to form a Chinese version by He *et al.* It consisted of 7 entries and was scored on a 4-point Likert scale, with higher scores indicating greater anxiety.
- (6) Patient Health Questionnaire (PHQ-9): Based on the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), which has been used in other disease areas, the Chinese version of the scale was sinicized by Bian *et al.* The scale contained 9 entries and was scored on a 4-point Likert scale, with higher scores representing more severe depression.

## 2.4. Statistical methods

SPSS19.0 software was used for statistical analysis. Measurement information was expressed as mean  $\pm$  standard deviation (SD) and *t*-test was used; counting information was expressed as rate and  $\chi^2$  test was used. The difference was considered statistically significant at  $P < 0.05$ .

## 3. Results

### 3.1. Analysis of disease cognitive level

Patients in the experimental group had significantly higher disease cognitive level than the control group ( $P < 0.05$ ), as shown in **Table 1**.

**Table 1.** Analysis of disease cognitive level

Group	Case	Disease cognitive level score
Control group	45	63.21 $\pm$ 10.36
Observation group	45	78.12 $\pm$ 11.44
<i>t</i>		6.48
<i>P</i>		0.00

### 3.2. Analysis of quality of life, self-management skills, and medication adherence

The scores of the experimental group in terms of quality of life, self-management skills, and medication adherence were significantly higher than those of the control group ( $P < 0.05$ ), as presented in **Table 2**.

**Table 2.** Analysis of quality of life, self-management skills, and medication adherence

Group	Case	Quality of life	Self-management skills	Medication adherence
Control group	45	64.21 $\pm$ 11.36	2.69 $\pm$ 0.69	1.89 $\pm$ 0.21
Observation group	45	79.12 $\pm$ 10.44	3.87 $\pm$ 0.47	2.98 $\pm$ 0.36
<i>t</i>		6.48	9.48	17.84
<i>P</i>		0.00	0.00	0.00

### 3.3. Anxiety and depression analysis

Based on **Table 3**, the anxiety score and depression score of the experimental group were significantly lower than that of the control group ( $P < 0.05$ ).

**Table 3.** Anxiety and depression analysis

Group	Case	Anxiety score	Depression score
Control group	45	3.21 ± 0.36	3.01 ± 0.11
Observation group	45	2.12 ± 0.44	2.03 ± 0.31
<i>t</i>		12.86	19.98
<i>P</i>		0.00	0.00

#### 4. Discussion

When exploring the application effect of the blended education strategy based on the Learning Pass platform in the phase III cardiac rehabilitation of patients with coronary artery disease, it was found that the education strategy could significantly improve the patients' disease cognitive level, self-management skills, and quality of life. This result indicated that the blended education strategy had a positive facilitating effect in the process of cardiac rehabilitation of patients with coronary artery disease<sup>[13-16]</sup>.

Firstly, patients in the experimental group ( $78.12 \pm 11.44$ ) scored significantly higher ( $P < 0.05$ ) than those in the control group ( $63.21 \pm 10.36$ ) in terms of disease cognitive level. The blended education strategy provided patients with rich and comprehensive disease knowledge and rehabilitation skills through online courses, which enabled patients to better understand their condition and practice healthy diet and lifestyle and taking the correct medication, which are crucial for their cardiac rehabilitation<sup>[17]</sup>.

Secondly, the quality of life score of the experimental group ( $79.12 \pm 10.44$ ) was significantly higher than that of the control group ( $64.21 \pm 11.36$ ), and the self-management skills of the experimental group ( $3.87 \pm 0.47$ ) was also significantly higher than that of the control group ( $2.69 \pm 0.69$ ). The results showed that the blended education strategy also strengthened the communication and interaction between patients through offline activities. During the activities, patients can share their experiences and feelings, and learn from and support each other, and the resulting teamwork spirit helps patients to better cope with the disease and improve their recovery<sup>[18]</sup>.

In addition, the blended education strategy encourages patients to ask questions and share experiences by establishing a patient communication group. The medication adherence of the experimental group ( $2.98 \pm 0.36$ ) was significantly higher than that of the control group ( $1.89 \pm 0.21$ ). This interactive approach can increase patient participation and adherence and help patients better understand and master disease knowledge and rehabilitation skills.

Compared with the traditional cardiac rehabilitation education model, the blended education strategy based on the Learning Pass platform offer more advantages. It can meet the individualized needs of patients and provide more comprehensive and diverse educational services. At the same time, the blended education strategy can also improve patients' self-management skills, which in turn improves their prognosis and quality of life.

However, this study also has certain limitations. Firstly, the sample size was relatively small, which may affect the generalizability and reliability of the results; secondly, the long-term follow-up outcomes of patients were not assessed in this study, so the long-term effects of the blended education strategy on patients could not be determined. Future studies could further expand the sample size and enhance the long-term follow-up of patients in order to more comprehensively assess the effects of blended education strategies in cardiac rehabilitation for patients with coronary artery disease.

## 5. Conclusion

In conclusion, the blended education strategy based on the Learning Pass platform has significant application effects in phase III cardiac rehabilitation of patients with coronary artery disease. It can improve patients' disease cognitive level, self-management skills, and quality of life, which provides a basis for improving patients' prognosis. In the future, the blended education strategy can be further optimized and improved, and applied to more patients with coronary artery disease in the process of cardiac rehabilitation to provide more comprehensive and personalized educational services for patients.

## Disclosure statement

The authors declare no conflict of interest.

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