

EFFECT OF WHOLE-COURSE MEDICATION EDUCATION METHOD ON DRUG LITERACY AND COMPLICATIONS OF ELDERLY PATIENTS WITH CORONARY HEART DISEASE AFTER PERCUTANEOUS CORONARY INTERVENTION

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ABSTRACT

Objective: To observe the effect of the whole-course medication education method on the drug literacy and complications of elderly patients with coronary heart disease after percutaneous coronary intervention.

Methods: A total of 116 elderly patients with coronary heart disease who underwent PCI from March 2019 to April 2021 were randomly divided into routine group and education group, with 58 cases in each group. The routine group was guided by routine medication, while the education group used the whole-course medication education method. The drug literacy and complications of the two groups were compared.

Results: Before the intervention, there was no significant difference in drug literacy scores between the two groups ($P > 0.05$). The drug literacy scores of patients in the education group were higher than those in the routine group at 1 month and 3 months after operation, and the difference was statistically significant ($P < 0.05$). The error rate of medication in education group was 5.17% (3/58), which was lower than that in the routine group ($P < 0.05$). The incidence rates of complications and readmission in the education group were 3.45% (2/58) and 13.79% (8/58) respectively, which were lower than those in the routine group ($P < 0.05$). There was no significant difference in the incidence and mortality of recurrent cardiovascular diseases between the two groups ($P > 0.05$).

Conclusion: The whole-course medication education method could improve the drug literacy and the health behavior and reduce the risk of postoperative complications and readmission for elderly patients with coronary heart disease after percutaneous coronary intervention, but its intervention effect on cardiovascular disease recurrence and mortality is equivalent to that of routine medication guidance. It is worth popularizing.

Keywords: The whole process, medication education law, the elderly, coronary heart disease, percutaneous coronary intervention.

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Introduction

In recent years, China's social and economic development has made great progress, and people's living standards have been improved. With the improvement of living standard, the diet structure has also changed. The high salt, high sugar and high fat diet increases the risk of coronary atherosclerotic heart disease in Chinese people⁽¹⁾. Acute coronary syndrome is a critical type of coronary atherosclerotic heart disease, which usually should be treated by

percutaneous coronary intervention (PCI). The coronary heart disease is a common disease of the elderly population. The number of patients with coronary heart disease is increasing year by year with the increase of the elderly population in China⁽²⁾. Elderly patients with coronary heart disease need secondary preventive medicine after PCI, but they are characterized by poor memory and low cognitive ability of diseases^(3,4). According to the research⁽⁵⁾, about 86.1% of patients with coronary heart disease have the problem of decreasing compliance with

anticoagulation, lipid-lowering and antihypertensive drugs in the first and second years after discharge. Only 68.0% of them still take drugs in the first year, and only 59.7% still take drugs in the second year. Lack of drug knowledge and drug compliance will increase the risk of cardiovascular adverse events and readmission in patients with coronary heart disease⁽⁶⁾. Drug literacy, as an important part of health literacy, is a patient's cognitive level of drug knowledge, beliefs and behaviors, which is closely related to patients' social support and self-efficacy⁽⁷⁻⁸⁾.

The drug literacy of patients with coronary heart disease directly determines their ability to effectively control the condition and improve medication compliance. For this reason, our hospital designed and formulated a whole-course medication education method based on the expectation of 3 months after PCI to going home from the hospital, so as to improve patients' drug literacy and risk of disease complications.

Information and methods

Research objects

A total of 124 elderly patients with coronary heart disease treated by PCI from March 2019 to April 2021 were selected by convenient sampling.

Inclusion criteria:

- Age ≥ 65 years old;
- First PCI treatment;
- Carrying two or more secondary preventive drugs for coronary heart disease after discharge;
- Normal cognitive function.

Exclusion criteria:

- Patients with hepatorenal insufficiency and tumor;
- Patients with mental illness, hearing impairment and visual impairment;
- Patients who are critically ill and delirious;
- Patients who participated in other medical research or dropped out of the group halfway.

To ensure the rationality of the sample size, this experiment calculated the sample size according to the pre-experimental results:

$$n = (u_{\alpha/2} + u_{\beta})^2 (\sigma_1^2 + \sigma_2^2) / \delta^2.$$

Taking $\alpha=0.05$ and $\beta=0.05$, $n=48$ was obtained. Considering 20% lost-to-visit rate, 58 cases were taken as a single group of samples, and finally the total sample size was set to 116 cases. The random number table was generated by SPSS24.0 software, and the patients were divided into routine group and

education group according to the sequence of the random number table. The designer of this study hid the identity of nursing operation staff and medical staff, and the patients did not know which group they were in. This study was reviewed and approved by the Medical Ethics Committee of our hospital. The content of the study conforms to the relevant medical ethics standards of the Helsinki Declaration.

There was no significant difference in sex, age, education level, past medical history, medication history, type of medicine taken out of hospital, operation time and hospitalization time between two groups ($P>0.05$), so they were comparable.

Nursing methods

Routine group

Routine medication education was carried out, providing medication education brochures for each patient and routine education after distributing oral medication. Guidance on taking drugs out of the hospital was given, and patients were informed that drugs for lowering blood pressure, lowering blood fat and anticoagulation could not be stopped at will. The in-patient nurses regularly carried out medication education according to the patient's knowledge of drugs, and made follow-up visits at 7 days, 1 month, and 3 months after discharge to understand the medication situation of patients and correct their misconduct.

Education group

The education group conducted the whole-course medication education method on the basis of routine medication education. According to Ebbinghaus's forgetting curve theory, the enlightenment time of intervention was set as 1d(5min) before operation, the next day after operation (30min), 3d(60min) after operation, and 7d, 8d, 1 month and 3 months after operation.

- On the day before the operation, the medication education manuals were distributed for patients with coronary heart disease to provide the knowledge of lipid-lowering drugs, anticoagulants, and antihypertensive drugs according to the patient's condition. Positive and negative patients were taken as examples to inform patients that they should take the prescribed drugs on time and in quantity after the operation, and they were also informed of the necessity of taking the drugs according to the doctor's advice. A WeChat group was established for communicating with patients at any time;

- On the next day after the operation, the total intervention time is 30 minutes. By asking questions, the patients are required to describe the knowledge of medication told in the previous time, and the literature that the patients failed to accurately describe was explained again, so as to strengthen the patients' cognition of drug types, drug administration methods and drug action knowledge;

- Three days after operation, the total intervention time was 60min. The contents of drug-related education on patients was strengthened again. 3 patients who could continue to take drugs according to the doctor's advice were selected as model patients, and peer support videos were recorded. The video mainly describes the patients' drug taking and recovery after discharge, and the education time is 20min. After the broadcast, the drug name, trade name, appearance, dosage, administration method, precautions for drug storage, drug effects, possible adverse reactions, and other precautions of patients' drug use were strengthened.

- 7 days after the operation, the responsible nurse in the hospital evaluated the knowledge of drug use of the patients, helped them sort out the knowledge of drug use again, answered their questions about drug use, and corrected their bad drug taking behavior after operation. For discharged patients, telephone communication or outpatient reexamination were adopted for training the family members of patients to help the patients and their families sort out their knowledge of medication. Self-made medication forms were used for patients to check their medication status at home, so as to reduce the risk of missed medication and multiple medications.

- 8 days after operation, an intervention was carried out through family-led WeChat group. During this period, most patients have been discharged from the hospital, and some patients have been able to fill out the medication forms independently. Through the feedback of family members on the medication situation of patients, we can understand the compliance of patients, and intervene in some patients who still miss or take more medication. Feedback health education was mainly used to guide patients to repeat medication precautions again.

- 1 month after the operation, the patients were reexamined by telephone and WeChat group or outpatient service. After the reexamination, the medication prescriptions of some patients may be changed. At this time, it is necessary to explain the precautions of the changed medication again to avoid the medication errors of patients.

- 3 months after operation, outpatient reexamination was carried out to check the patient's medication at home and their postoperative recovery.

Observation indicators

General data differences

General data were collected after the patients were enrolled in the group, mainly covering gender, age, education level, past medical history, medication history, type of medicine taken out of the hospital, operation time and hospitalization time.

Drug literacy level

It was evaluated before the intervention, 7 days after the operation, 1 month after the operation and 3 months after the operation. The drug literacy questionnaire compiled by Maniaci et al.⁽⁹⁾ was adopted, and the contents of the questionnaire were translated and adjusted in Chinese by Zheng Feng et al.⁽¹⁰⁾. The total score of the questionnaire is 7 points.

The higher the score of patients, the higher their drug literacy. The retest reliability of the questionnaire is 0.943. The internal validity index is 0.812 and Cronbach's α coefficient is 0.800.

Complications

The medication errors of patients within 3 months after discharge were collected, including vascular complications such as stent unloading, acute stent thrombosis, coronary artery dissection, and recurrence of cardiovascular disease, readmission rate and mortality.

Follow-up visits and data collection

After discharge, outpatient reexamination and telephone follow-up were combined. The general data and drug literacy scores of patients were collected before intervention. The complications of patients were collected during the follow-up 3 months after the intervention.

Statistical methods

SPSS 24.0 software was used for data processing. Normal measurement data were expressed by $\bar{x} \pm s$. Independent sample t test was used for comparison between groups. Repeated measurement variance analysis was used for comparison at different time points within groups. Frequency was used for description of counting data. χ^2 test was used for comparison between groups. $P < 0.05$ was regarded as statistically significant.

Results

Comparison of general data of two groups of patients

There was no significant difference in sex, age, education level, past medical history, medication history, type of medicine taken out of hospital, operation time and hospitalization time between two groups ($P>0.05$), indicating strong comparability (see Table 1).

Group	Gender		Age(year)	Education level			Past medical history			
	Male	Female		Primary school	Junior school	High school and above	Diabetes	Hypertension	Hyperlipoidemia	None
Routine group (58)	34	24	68.24±1.81	24	20	14	17	20	16	5
Education section (58)	33	25	68.26±2.32	25	14	19	18	18	20	3
χ^2/t	0.035		-0.045	1.837			1.216			
P	0.851		0.964	0.399			0.749			

Group	Medication history			Types of medicine taken out of hospital			Operation time (min)	Hospitalization time (d)
	Hypotensive drugs	Hypoglycemic drug	Hypolipidemic drug	1 type	2 types	2 types		
Routine group (58)	16	16	13	18	18	22	131.16±25.34	7.45±1.34
Education group (58)	18	12	15	11	18	29	128.07±22.80	7.31±1.35
χ^2/t	0.832			2.650			0.690	0.552
P	0.842			0.266			0.492	0.582

Table 1: Comparison of drug literacy scores between two groups.

Comparison of drug literacy between two groups before and after the intervention

Before the intervention, there was no significant difference in drug literacy scores between two groups ($P>0.05$); the drug literacy scores in the education group were higher than those in the routine group at 1 month and 3 months after operation, and the difference was statistically significant ($P<0.05$). (see Table 2).

Group	Before intervention	7dSeven days after operation	1 month after operation	3 months after operation.
Routine group (58)	2.95±1.57	6.19±0.98	5.09±0.54	4.10±0.62
Education group (58)	3.26±1.98	6.26±0.76	5.98±0.87	5.02±0.48
t	-0.935	0.423	-6.680	-8.963
P	0.352	0.673	0.000	0.000

Table 2: Comparison of drug literacy scores between two groups (score).

Note: f group = 29.569, p group = 0.000; $F = 51.701$, $p = 0.000$; F interaction = 6.295, P interaction = 0.014.

Comparison of medication errors between two groups

The medication error rate of the education group was 5.17%(3/58), which was lower than that

of the routine group. The difference was statistically significant ($P<0.05$) (see Table 3).

Comparison of postoperative complications and prognosis between two groups

The incidence of complications and readmission rate in the education group were 3.45% (2/58) and 13.79%(8/58) respectively, which were lower than those in the routine group ($P<0.05$); the recurrence rate and mortality of cardiovascular diseases

between two groups were not statistically significant ($P>0.05$) (see Table 4).

Group	Excessive	Missing	Mistaking	Medication error rate (%)
Routine group (58)	10 (17.24)	8 (13.79)	7 (12.07)	25 (43.10)
Education group (58)	1 (1.72)	2 (3.45)	0	3 (5.17)
χ^2				22.786
P				0.000

Table 3: Comparison of medication error rate between two groups (%).

Group	Complication				Prognostic related indexes			
	Stent unloading	Acute stent thrombosis	Coronary artery dissection	Total incidence	Recurrence of cardiovascular disease	Readmission rate	Mortality	
Routine group (58)	3	4	3	10 (17.24)	14 (24.13)	17 (29.31)	5 (8.62)	
Education group (58)	1	0	1	2 (3.45)	7 (12.07)	8 (13.79)	4 (6.90)	
χ^2					5.949	2.849	4.130	0.120
P					0.015	0.091	0.042	0.729
χ^2					5.949	2.849	4.130	0.120
P					0.015	0.091	0.042	0.729

Table 4: Comparison of postoperative complications and prognosis between two groups (%).

Discussion

It is self-evident that whether the patients need to take medicine correctly after PCI is of great significance to their prognosis and rehabilitation. In the past, patients mainly used medical advice and pharmaceutical care to intervene. However, the shortage of doctors and pharmacists in most hospitals leads to the lack of supervision on the medication process of patients after PCI in China. Qi Liuying et al.⁽¹¹⁾ found that the cognition rate of coronary heart disease (CHD) patients and drug cognition rate were vague, and the demand for drug guidance was at a high level. Hu et al.⁽¹²⁾ believe that the cooperation between pharmacists and nurses for secondary prevention of coronary heart disease patients can effectively promote the awareness of secondary prevention drugs for coronary heart disease patients. The elderly patients with coronary heart disease are affected by their age growth, basic diseases and other problems. After discharge, they usually need to take a variety of oral drugs. Whether these drugs can be taken on time and in quantity often becomes the key factor that restricts the success of secondary prevention. Therefore, it is necessary to improve the medication guidance of elderly patients with coronary heart disease after PCI, so as to improve the medication safety and effectiveness of elderly patients after PCI.

The whole-course medication education method is based on Ebbinghaus's forgetting curve theory⁽¹³⁾. It is to establish a whole-course nursing method that can more effectively improve patients' knowledge about medication. The whole-course medication education method not only intervenes patients in the hospital, but also carries out medication education for many times at different time points after discharge. Besides, nursing measures such as WeChat group, peer support⁽¹⁴⁻¹⁵⁾ and feedback health education⁽¹⁶⁾ are used as intervention tools.

During the perioperative period of PCI, the most beneficial medication mode for patients is strengthened in a timely manner, so as to improve patient's compliance with the doctor's advice. Studies have proved⁽¹⁷⁻¹⁹⁾ that it can improve patients' medication compliance by repeatedly and continuously introducing to patients with cardiovascular diseases the necessity of taking medication and the risk of changing their condition if they don't follow the doctor's advice. Improvement of medication compliance can provide a good practical basis for secondary prevention after PCI.

The results of this study confirmed that the drug literacy scores of patients in the education group were higher than those in the routine group at 1 month and 3 months after operation, and the difference was statistically significant ($P < 0.05$). It can be seen that the whole-course medication education method can effectively improve the drug literacy of patients 1 month and 3 months after operation. In the past, health education mostly considered patients' own conditions or patients' needs at that time to formulate nursing measures. However, the adjustment of drug use in elderly patients with coronary heart disease after PCI will be frequent, which inevitably leads to the mismatch between drug use and its corresponding drug instruction. This further affects the drug literacy of drug users. For the education group, the convenient and quick follow-up function of WeChat group was given full play, and peer support and feedback health education was used to provide patients with a variety of drug introductions and medication precautions.

These contents were carried out in many time periods after hospitalization and discharge, which promoted the improvement of drug literacy of patients in the education group. However, due to the short discharge time at 7 days after operation, there was no obvious difference between the two groups. At the same time, the error rate of medication in the education group was lower than that in the routine group, and the difference was statistically significant ($P < 0.05$). It can be seen that the whole-course medication education method can reduce the medication error rate after PCI. A standardized knowledge intervention study of Gallagher R⁽²⁰⁾ confirmed that individualized health guidance for people with knowledge deficiency of medication can help to reduce patients' erroneous cognitive state, and the change of cognitive errors is the prerequisite for reducing medication errors. The research results of Calvo E et al.⁽²¹⁾ show that elderly patients with myocardial infarction have no compliance at 12 months. It can be seen that with the extension of discharge time, the medication compliance of elderly patients with coronary heart disease will decrease. Zhang S et al.⁽²²⁾ believe that the compliance of dual antiplatelet drugs can provide protection for the reduction of one-year mortality after PCI. Studies of Florescu R, et al⁽²³⁻²⁴⁾ show that statins play a protective role in blood vessels in patients undergoing PCI. However, the application errors of anticoagulants and lipid-lowering drugs, such as taking them by mistake, missing them, and

taking more than one dose, will inevitably lead to the patient's failure to obtain the secondary preventive effect. In this study, the complications and prognosis indexes of the two groups were further compared. It was found that the incidence of complications and readmission rate in the education group were lower than those in the conventional group, and the difference was statistically significant ($P < 0.05$).

The recurrence rate and mortality of cardiovascular diseases between the two groups were not statistically significant ($P > 0.05$). It can be seen that the whole-course medication education method can reduce the risk of complications after PCI and the rate of readmission, but its intervention effect on cardiovascular disease recurrence and mortality is equivalent to that of routine medication guidance. Cui KY et al.⁽²⁵⁾ think that health education on medication for patients with stable coronary heart disease and diabetes can significantly reduce ischemic cardiovascular events. Wang's study⁽²⁶⁾ found that the intervention program based on accidental readmission risk model can effectively promote the rehabilitation of patients with myocardial infarction after PCI. The above results are similar to those of this study. Stent unloading, acute stent thrombosis and coronary artery dissection are common complications after PCI, and they are closely related to patients' medication compliance after PCI. The reduction of medication errors after PCI can reduce the risk of postoperative complications to some extent. However, in this study, the medication guidance content of patients' families was added, which was more suitable for elderly patients. For elderly patients with coronary heart disease undergoing PCI in the future, graded medication management should be further increased to further avoid medication errors and the risk of postoperative complications.

The whole-course medication education method could improve the drug literacy and the health behavior and reduce the risk of postoperative complications and readmission for elderly patients with coronary heart disease after percutaneous coronary intervention, but its intervention effect on cardiovascular disease recurrence and mortality is equivalent to that of routine medication guidance. It is worth popularizing.

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