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Application of Individual Case Management Nursing Model in Blood Lipid Management of Patients with Coronary Heart Disease

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ABSTRACT

Objective: To explore the effect of the case management nursing model on lipid management in patients with coronary heart disease. Methods: Coronary heart disease patients admitted to the cardiology department of a tertiary hospital in Henan Province from April 2023 to March 2024 were randomly divided into a conventional care group and a case management group. The case management model was implemented, and a 3-month follow-up was conducted. Data were collected and analyzed. Results: There were no statistically significant differences in baseline data between the two groups. After 3 months of case management, the case management group showed better medication adherence, greater reductions in lipid levels, and higher lipid control rates. Conclusion: The case management nursing model can improve medication adherence and lipid control rates in patients with coronary heart disease.

KEYWORDS

Case management model; Coronary heart disease; Hyperlipidemia; Medication adherence

1. INTRODUCTION

In the past 30 years, the prevalence of dyslipidemia among the Chinese population has gradually increased. The rise in lipid levels is projected to lead to approximately 9.2 million additional cardiovascular events, such as coronary heart disease, between 2010 and 2030, thereby further exacerbating the burden of cardiovascular diseases [1-2]. Lowering lipid levels can reduce the recurrence and mortality rates of adverse events in patients with coronary heart disease, making lipid management crucial in the treatment of these patients [3-4]. The case management nursing model, a systematic care management approach, has been widely applied in dementia patients, empty-nest families, and other groups, with international reports indicating its effectiveness in managing chronic diseases [5-8]. This study applies the case management model to lipid management in patients with coronary heart disease and observes its effects.

2. MATERIALS AND METHODS

2.1. General Information

A total of 162 coronary heart disease patients from a tertiary hospital in Henan Province, who met the inclusion, exclusion, and withdrawal criteria between April 2023 and March 2024, were selected as study subjects. Patients were randomly divided into a conventional care group (80 patients) and a case management group (82 patients) using a random number table. The conventional care group had an average age of 61.3 ± 9.7 years, while the case management group had an average age of 59.7 ± 10.1 years. Inclusion criteria: (1) Meeting the diagnostic criteria for coronary heart disease; (2) Age 18 or older; (3) Willingness to participate and ability to use communication tools such as phone, SMS, or WeChat. Exclusion criteria: (1) Patients with contraindications or allergies to medication; (2) Patients with mental, cognitive, or communication disorders. There were no statistically significant differences in the general characteristics between the two groups ($P > 0.05$). The study adhered to the ethical principles of fairness, confidentiality, informed consent, beneficence, and non-maleficence, and received approval from the hospital's ethics committee (Ethics approval number: (2021) Ethics Review No. (207).

2.2. Research Methods

2.2.1. Conventional Care Group

All enrolled patients were randomly assigned to the conventional care group or the case management group using a random number table. The conventional care group received standard care, including one outpatient follow-up, one post-discharge follow-up, and health education during hospitalization, medication education, psychological counseling, and instructions on lifestyle, diet, medication precautions, and the importance of regular follow-ups before discharge.

2.2.2. Case Management Group

In addition to conventional care, the case management group received a 3-month case management intervention. Specific details are as follows:

(1) Establishing a Case Management Nursing Team: The case management team consisted of 9 members, including 1 head nurse from the cardiovascular ward, 3 long-term case managers in charge of the ward, 1 deputy chief physician with over 10 years of clinical experience in cardiology, 3 cardiovascular specialist nurses from the Chinese Nursing Association, and 1 experienced psychological counselor. The head nurse was primarily responsible for coordinating and overseeing the overall case management plan, ensuring its accuracy and effectiveness. The case managers were in charge of establishing and tracking individual patient files, systematically assessing and providing timely feedback on the case management content, and collaborating with doctors, patients, and families to set lipid management goals and implementation plans. The doctors prescribed appropriate treatment plans based on patient conditions and coordinated lipid management and follow-up plans for coronary heart disease patients. The specialist nurses were responsible for providing health education on lipid management, guiding medication use, and assessing patients' medication adherence and lipid levels. The psychological counselor focused on patients' mental health, offering psychological support to those with severe negative emotions by observing their expressions and language. The management team established a strong partnership with the patients, and at the end of the case management period, data on lipid levels and medication adherence scores were collected.

(2) Implementation Phase of the Case Management Model: The intervention spanned the entire process from admission to discharge and included personalized, comprehensive case management, followed by 3 months of post-discharge follow-up and tracking.

Case Enrollment: Upon admission, the case managers introduced the objectives, significance, and post-discharge follow-up requirements of the case management plan to the patients and their primary caregivers, obtaining their consent to participate in the study and cooperate with long-term follow-up.

Developing the Plan: The case management team, working collaboratively according to their specialties, provided health education on lipid management and medication precautions. The team held scenario discussions 1-2 times per week based on patient conditions to develop individualized lipid management plans. The case managers, head nurse, cardiologists, cardiovascular specialist nurses, and psychological counselor jointly formulated and implemented the steps and schedule for the coronary heart disease lipid management plan.

Plan Implementation: The head nurse supervised the overall process, while the case managers followed up throughout to ensure accurate execution of the case management nursing plan.

Post-Discharge Follow-up: On the day of discharge, the case manager invited the patient and primary caregiver to join a WeChat group named "Lipid Management Case Follow-up Family." Case managers and specialist nurses conducted follow-ups every two weeks during the first 3 months and once a month thereafter through WeChat and other online platforms. They monitored medication adherence, reminded patients of scheduled lipid level check-ups, and adjusted and evaluated the case management plan based on lipid levels and adherence. Feedback was provided to the patients and caregivers, and necessary adjustments were made to meet their needs.

2.2.3. Evaluation Methods

The study used the Morisky Medication Adherence Scale (MMAS-8) to evaluate medication adherence, while the lipid target achievement rate was used to assess lipid management outcomes. The MMAS-8 is an expanded version of the MMAS-4 and is widely used for assessing medication adherence. The scale consists of 8 items, with items 1-7 answered with "Yes" or "No" (scoring 0 for "Yes" and 1 for "No," with item 5 reverse-scored). Item 8 assesses the difficulty of following the medication plan, with responses ranging from "Always" to "Never," scored as 1, 0.75, 0.5, 0.25, and 0, respectively. The total score ranges from 0 to 8, with higher scores indicating better adherence. A score of 8 indicates good adherence, 6-8 indicates moderate adherence, and 0-6 indicates poor adherence. The Cronbach's alpha coefficient for this scale is 0.725[9].

2.3. Statistical Methods

The researchers collected and organized the data promptly. The statistical analysis was conducted using SPSS 26.0, with a significance level of $\alpha = 0.05$. Baseline information for the two groups was analyzed using the Pearson chi-square test and independent samples t-test. Measurement data were expressed as mean ± standard deviation ($\bar{x} \pm s$), while non-normally distributed data were presented as medians and interquartile ranges. Categorical data were expressed as rates and percentages. Independent samples t-tests were used to compare the differences in total cholesterol, low-density lipoprotein, and high-density lipoprotein between the two groups at different time points.

3. RESEARCH RESULTS

Among the 162 patients, 80 were randomly assigned to the conventional care group, while 82 were assigned to the case management group. A total of 155 patients completed the 12-month follow-up (77 in the conventional care group and 78 in the case management group). Reasons for loss to follow-up included death (3 patients), inability to be contacted (2 patients), and refusal to continue participation (2 patients). The baseline characteristics of participants in both groups are shown in Table 1.

Table 1. Baseline data of patients in the two groups (n=155)

		Conventional care group	Individual Case group	t	P
Gender, n(%)			0.166		0.684
	Male	54(70.13%)	57(73.08%)		
	Female	23(29.87%)	21(26.92%)		
years		60.7±8.4	59.9±9.5	0.613	0.540
BMI(kg/m^2)		26.5±3.8	26.3±3.8	0.272	0.786
diploma, n(%)			0.346		0.841
	Elementary and below	21(27.27%)	24(30.77%)		
	Middle school	37(48.05%)	34(43.59%)		
	Bachelor and above	19(24.68%)	20(25.64%)		
Blood lipids mmol/L					
	TC	5.69±0.80	5.63±0.97	0.475	0.635
	LDL-C	3.49±0.58	3.45±0.64	0.449	0.654
	HDL-C	1.07±0.20	1.06±0.29	0.178	0.859
Medication Adherence Scale			0.233		0.890
	Good	36(46.75%)	37(47.44%)		
	Medium	29(37.66%)	27(34.61%)		
	Bad	12(15.58%)	14(17.94%)		

Table 1 Baseline data of the two groups of patients. (BMI, Body Mass Index, TC, total cholesterol, HDL-C, high-density lipoprotein cholesterol, LDL-C, low-density lipoprotein cholesterol, low-density lipoprotein cholesterol)

After 12 months of follow-up, the blood lipid levels and medication compliance of the two groups of patients are shown in Table 2. After 12 months, the average TC and LDL-C levels in the routine care group were significantly lower than those in the case management group (Table 2). The average HDL-C levels in both groups increased moderately.

Table 2. Comparison of blood lipids and medication compliance between the two groups before and after nursing (n=155, s)

		Conventional care group	Individual Case Group	t	P
Blood lipids mmol/L					
	TC	4.47±0.59	4.21±0.67	2.521	0.013
	LDL-C	2.69±0.49	2.27±0.47	5.451	< 0.001
	HDL-C	1.08±0.23	1.21±0.31	-3.093	0.002
LDL-C Compliance rate n(%)		43(55.84%)	61(78.20%)	8.776	0.003
Medication Adherence Scale			6.634		0.036
	Good	41(53.24%)	57(73.08%)		
	Medium	22(28.57%)	12(15.38%)		
	Bad	14(18.18%)	9(11.53%)		

Table 2. Blood lipid levels and medication compliance of the two groups of patients (TC, total cholesterol, HDL-C, high-density lipoprotein cholesterol, LDL-C, low-density lipoprotein cholesterol, low-density lipoprotein cholesterol)

4. DISCUSSION

This study applied the case management nursing model to the lipid management of patients with coronary heart disease, and followed up for 3 months. The conventional care group was given routine education, medication guidance and regular follow-up visits, while the case management group was implemented by the case management team. The case management model includes outpatient consultation, monitoring and feedback, and a personalized management model is formulated according to the patient's condition. The results show that the case management nursing model can improve the management level of secondary prevention by strengthening the lipid management of patients with coronary heart disease. After 12 months of case management, the LDL-C level of patients in the case management group decreased much more than that in the conventional care group ($P<0.05$). The reason may be that after the patient is discharged from the hospital, the case management team closely tracks and supervises the nursing plan of the patient after discharge, formulates personalized and precise nursing plans and nursing measures according to the patient's condition, enables the patient to complete the nursing plan formulated by the case management team on time, and effectively participates in the formulated personalized management plan, which is conducive to the patient's control of his own blood lipids. Through case management, the patient's compliance with medication has been significantly improved ($P<0.05$). Studies have shown that a multidisciplinary approach guided by nurses can provide safe and effective management methods for patients with dyslipidemia [10-12]. The reason may be that for patients with hyperlipidemia hospitalized for coronary heart disease, after discharge, a case management model is implemented for the patients, and a personalized nursing plan is developed for the patients. A personalized nursing management model is implemented for the patients from the aspects of physiology, psychology, family and social support. Based on multidisciplinary diagnosis and treatment (MDT), a detailed medication plan is developed for the patients, and the patients are urged to take the medication, so that the patients adhere to lipid-lowering treatment and medication. Providers may be more willing to follow up on lipid management recommendations, thereby improving the patients' compliance with medication. It is worth noting that patients in the routine care group showed some positive changes in lipid management, and 71.43% of the patients had a medication compliance of above medium at 1 year. Although this percentage is higher than that in other larger surveys [13], the proportion of LDL-C reaching the target in the routine care group (55.84%) is still significantly lower than that in the case management group, suggesting that the feedback from medical staff on lipid levels and recommendations seems to increase the initiation of drug treatment, but is not enough to significantly improve long-term control [14-15]. Since most patients in both groups were taking similar lipid-lowering drugs, the improvement in LDL-C levels in the case management group may be due to more frequent titration of lipid-lowering drugs to effective doses and better self-reported drug compliance.

5. CONCLUSION

In summary, the application of the case management model in the lipid management of patients with coronary heart disease can significantly improve the medication compliance of patients with coronary heart disease and improve the rate of lipid compliance. Control of blood lipids can improve patients' medication compliance, thereby further improving their quality of life. However, the small sample size of this study may affect the accuracy of the conclusions. A larger-scale study is still needed to more objectively explore the application of the case management model in patients with coronary heart disease and further explore its clinical significance.

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