Original Article
Nursing model based on Snyder's hope theory in emergency care of patients with acute myocardial infarction

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Abstract: Objective: To investigate the effect of Snyder's hope theory in emergency care for patients with acute myocardial infarction (AMI). Methods: This retrospective study included 200 AMI patients admitted to Rugao People's Hospital from January 2019 to December 2021. The patients were divided into a conventional group (routine care, n=100) and an intervention group (care based on Snyder's Hope theory, n=100) according to differences in nursing approach. Baseline data of the two groups were collected. The psychological state was evaluated using the self-rating anxiety scale (SAS) and self-rating depression scale (SDS). Self-care ability was assessed using the exercise of self-care agency (ESCA) scale. The myocardial enzyme indexes including cardiac troponin T (cTnT) and myocardial creatine kinase isoenzyme (CK-MB), as well as electrocardiogram index (Tp-Te/QT) were compared between the two groups. Complications of the two groups were recorded, and the risk factors for complications in the intervention group were examined. Results: After nursing, the SAS and SDS scores in the intervention group were lower than those in the conventional group (P < 0.05). The ESCA scores in all dimensions were higher in the intervention group than those of the conventional group (P < 0.05). The cTnT and CK-MB decreased in both groups, but the decreases in the intervention group were greater than those of the conventional group (P < 0.05). The Tp-Te/QT in the intervention group (0.25±0.04) was lower than that in the conventional group (0.32±0.06, P < 0.05). The incidence of complications in the intervention group was 9.00%, lower than 21.00% in the conventional group (P < 0.05). Multivariate logistic regression analysis showed that cTnT, CK-MB, and Tp-Te/QT were influencing factors for complications in the intervention group (P < 0.05). Conclusion: The effect of nursing based on Snyder's hope theory in emergency care fof AMI patients is promising because it can improve the psychological state of patients and reduce the incidence of complications.

Keywords: Acute myocardial infarction, Snyder's hope theory, nursing effect

Introduction

Acute myocardial infarction (AMI) refers to infarction caused by sudden and persistent ischemia and hypoxia of the coronary arteries. Due to its acute onset, severity and high fatality rate, AMI threatens patient life and brings great challenges for clinical work [1, 2]. Elderly patients often have poor self-management ability after surgery due to their worse bodily function and lower cognitive level. When facing AMI, with a strong sense of near death, dyspnea, and chest pain, they are prone to anxiety, depression, and other psychological issues, resulting in increased risk of psychological stress events and a negative response [3]. A

study found that the readmission rate of patients within 1 year after surgery was as high as 20%, and the incidence and mortality of secondary AMI were closely related to poor compliance, negative perioperative psychological status, and insufficient control of risk factors [4]. Therefore, relevant nursing measures are needed to improve the compliance and self-care ability of AMI patients, so as to reduce the readmission rate and improve the rehabilitation effect. At present, nursing measures for AMI patients are relatively simple and cannot effectively build patients' confidence and ability to actively cope with the disease. A positive mental state can enhance and fully utilize patients' self-care ability, which is conducive to the rehabilitation

and pain reduction [5]. Snyder's hope theory is proposed by American psychologist Snyder. The theory is made up of three key elements: goals, pathways, and agency. "Hope therapy" has been widely used in the medical field to help patients fight against negative emotions and improve their self-management ability [6, 7]. At present, medical management model based on Snyder's hope theory has been constructed for various diseases and achieved favorable application value by improving the quality of life and mental health of patients [8, 9]. However, there are few reports on the effect of hope theory-based nursing in AMI patients. The objectives of this study were to fill this gap and provide a reference for the management of AMI patients.

Materials and methods

Subjects

The subjects of this retrospective study were AMI patients (200 cases) admitted to Rugao People's Hospital from January 2019 to December 2021. The patients were divided into a conventional group (routine care, n=100) and an intervention group (care based on Snyder's Hope theory, n=100) according to differences in nursing approach. Inclusion criteria: 1) patients who met the diagnostic criteria for AMI [10], and were diagnosed for the first time [8]; 2) patients who received emergency surgical treatment; 3) patients with clear consciousness and no communication disorder; 4) patients who provided informed consent. Exclusion criteria: 1) patients with a bleeding tendency; 2) patients with acute heart failure, massive myocardial infarction or other serious complications; 3) patients with malignant tumors, autoimmune diseases or other major organ diseases, such as severe hepatic or renal insufficiency; 4) patients with mental illness or no consciousness; 5) patients with incomplete clinical data. This study was approved by the Ethics Committee of Rugao People's Hospital.

Methods

The conventional group received routine care. After the operation, the medical staff assisted patient to bed. The head of the bed was raised by 15°-30° for preventing postural hypotension. During the hospital stay, patients' vital signs (body temperature, pulse, blood pressure, respiration, etc.) were regularly monitored, and the indwelling tube was closely observed to avoid bleeding or hematoma. In addition, patients were given education about this disease, including postoperative precautions. The nurses actively communicated with the patients to understand their psychological state, gave targeted counseling, and helped them adapt to the hospital environment, so as to improve the treatment confidence. At the same time, the patients were guided to turn over and train respiratory muscles, and suggested to eat foods rich in vitamins and cellulose. They were also encouraged to independently practice tasks such as dressing, washing and other activities of daily living.

The intervention group received the nursing based on Snyder's hope theory. (1) The Snyder hope theory nursing team was established, and the team members were trained and posted. The training content included Snyder hope theory and its application methods, data collection, questionnaire survey methods, and interpersonal communication methods. Seminars were regularly held to put forward challenges in nursing work and optimize the nursing intervention measures. (2) The psychological status, level of hope and self-perceived burden of patients were evaluated, and individualized health records were established according to the evaluation results. (3) Nursing contents: 1) Education: Patients were introduced to Snyder's hope theory to enhance their confidence. 2) Goals: The nurses discussed with patients and their families to develop a personalized health education schedule and determine individual nursing goals according to the specific situations of patients. The goals were specified as feasible steps for each day, each week, and each month, with establishing hope as the basic principle and putting patient needs at the top of the schedule. During the process, the patients' active participation and self-management are highly emphasized. If a goal was not achieved, the reasons were analyzed and an alternative solution was proposed. 3) Pathways: In conjunction with visual materials such as brochures, videos, patients and their families were provided with information about AMI prevention and treatment. The materials included guidance on rest, diet, medication, exercise, emotional regulation and other relevant measures. To be specific, patients in

the acute stage were suggested to rest in bed in comfortable positions. It was advocated to follow a low-salt and low-fat light diet, and to avoid irritating food. Patients were informed about the proper methods of medication use, relevant precautions, review time, and the importance of regular follow-up. Aerobic exercises such as jogging and tai chi were incorporated into the patient's routine if possible. Patients could adjust their mood by listening to music and reading books. A good nurse-patient relationship was established to help develop personalized schedules, plan the target pathways, and explore the gap between the patient's current situation and their desired goals. Patients were encouraged to actively participate in self-management, discover their own potential, recognize their own value, and understand the importance of self-care and self-management, so as to give full play to their subjective initiative. 4) Agency: Psychological techniques were applied to improve patients' mental state and enhance self-efficacy, e.g., to mobilize patients' subjective initiative and improve their self-management enthusiasm through commitment strategy. For those with a low hope level, negative mental status and severe self-perceived burden, intensive psychological interventions were conducted, including organizing patient-friend communication meetings, inviting cured patients to share their experiences, and asking family members to give full support to the patients.

Observation indices

1) Baseline data included sex, age, disease type, BMI, hypertension, and diabetes.

2) Psychological state was evaluated before and after care using self-rating anxiety scale (SAS) [11] and self-rating depression scale (SDS) [12]. SAS scale has a total of 20 items, with each item using a scale of 1-4 points. A total score of less than 50 indicates no anxiety, and a score of 50 or higher indicates anxiety. The score is proportional to the level of anxiety. SDS scale also has a total of 20 items, with each item using a scale of 1-4 points. A score of 53 or higher indicates depression. The score is proportional to the degree of depression.

3) Self-care ability was evaluated using the exercise of self-care agency (ESCA) scale [12]

before and after nursing. ESCA includes 43 items, 11 of which are inverted scores, with a total score of 0-172 points. The score is proportional to self-care ability.

4) Myocardial enzyme indexes including cardiac troponin T (cTnT) and myocardial creatine kinase isoenzyme (CK-MB) were compared between the two groups before and after nursing.

5) Electrocardiogram (ECG) index, Tp-Te/QT, was compared between the two groups before and after nursing.

6) Complications and analysis of influencing factors: The incidence of cardiovascular adverse events such as angina pectoris recurrence, severe arrhythmia, congestive heart failure, cardiogenic death, and recurrent myocardial infarction were recorded in the two groups.

Data processing methods

All data were input using Excel 2007 form software and imported into SPSS 24.0 for data analysis. Quantitative data conforming to a normal distribution were described by ($\overline{x}$±s) and subjected to a t-test. Counted data were described in n (%) form and subjected to χ^2 test. The level of statistical significance was set at α=0.05, and a a difference was considered significant when P < 0.05.

Results

Comparison of baseline data between the intervention group and the conventional group

In the conventional group, there were 67 males and 33 females, with an age range of 40-79 years and an average age of (63.74±7.22) years. The mean body mass index (BMI) was (24.17±3.07) kg/m². In this group, there were 79 cases of ST-segment elevation and 21 cases of non-ST-segment elevation, 44 cases with hypertension and 39 cases with diabetes. In the intervention group, there were 71 males and 29 females, with an age range of 41-81 years and an average age of (63.74±7.22) years. The mean BMI was (24.29±3.07) kg/m². In this group, there were 81 cases of ST-segment elevation and 19 cases of non-ST-segment elevation, 48 cases with hypertension

Table 1. Comparison of baseline data between the two groups

Index	Intervention group (n=100)	Conventional group (n=100)	t/χ²	P
Sex (male/female)	71/29	67/33	0.374	0.541
Age (years)	63.55±7.41	63.74±7.22	0.184	0.854
disease type			0.125	0.724
ST segment elevation type	81 (81.00)	79 (78.00)		
Non-ST-segment elevation type	19 (19.00)	21 (21.00)		
Body mass index (kg/m²)	24.29±3.07	24.17±3.07	-0.278	0.781
hypertension	44 (44.00)	48 (48.00)	0.322	0.570
diabetes	39 (39.00)	37 (37.00)	0.085	0.771

mean body mass index (BMI).

Table 2. Comparison of mental state before and after nursing between them ($\overline{x}$±s, points)

Group	SAS		SDS	
	before nursing	after nursing	before nursing	after nursing
Intervention group (n=100)	53.56±4.31	41.81±2.86	52.90±4.61	42.26±3.22
conventional group (n=100)	53.47±4.18	46.77±3.56	53.48±4.71	46.82±3.91
t	0.150	-10.865	-0.880	-8.999
P	0.881	< 0.001	0.380	< 0.001

self-rating anxiety scale (SAS), self-rating depression scale (SDS).

and 37 cases with diabetes. The two groups were comparable in terms of age, sex, disease type and BMI, all $P > 0.05$. See **Table 1**.

Comparison of the psychological state of the two groups before and after nursing

There was no significant difference in the SAS and SDS scores between the two groups before nursing (P > 0.05). After nursing, the SAS and SDS scores in the intervention group were lower than those in the conventional group ($P < 0.05$), as shown in **Table 2**.

Comparison of ESCA scores between the two groups before and after nursing

There was no significant difference in the ESCA scores in all dimensions between the two groups before nursing ($P > 0.05$). After nursing, the ESCA scores were higher in the intervention group than in the conventional group in all dimensions (P < 0.05), as shown in **Table 3**.

Comparison of myocardial enzyme indexes between the two groups before and after nursing

There was no significant difference in the cTnT and CK-MB between the two groups before nursing (P > 0.05). After nursing, the cTnT and CK-MB decreased in both groups, and the

decreases were more significant in the intervention group than in the conventional group ($P < 0.05$). See **Table 4**.

Comparison of ECG index before and after nursing in two groups

Before nursing, there was no significant difference in the Tp-Te/QT between the intervention group (0.39±0.09) and the conventional group (0.37±0.10) ($P > 0.05$). After nursing, the Tp-Te/QT in the intervention group (0.25±0.04) was considerably lower than that of the conventional group (0.32±0.06) ($P < 0.05$), as shown in **Figure 1**.

Comparison of complications between the two groups

The total incidence of complications in the intervention group was 9.00%, which was lower than that of the conventional group (21%), with a significant difference ($P < 0.05$), as shown in **Table 5**.

Univarite analysis of risk factors for complications in intervention group

Significant differences in cTnT, CK-MB, and Tp-Te/QT were found between the complication group and the non-complication group ($P <$

Table 3. Comparison of ESCA scores before and after care between them ($\bar{x}\pm s$, points)

Group	Self-care responsibility		Self-care concept		Self-care skills		Health knowledge cognition		Total score	
	before nursing	after nursing	before nursing	after nursing	before nursing	after nursing	before nursing	after nursing	before nursing	after nursing
Intervention group (n=100)	13.37±4.24	26.23±5.11	14.56±3.05	25.75±4.89	13.40±3.54	27.41±4.25	13.56±3.22	25.89±4.52	54.89±6.78	105.28±9.52
conventional group (n=100)	13.42±3.99	21.23±4.75	14.60±3.14	20.13±3.42	13.38±3.63	21.75±3.76	13.53±3.26	20.05±3.99	54.93±6.78	83.16±8.40
t	-0.086	7.169	-0.091	9.422	0.039	9.976	0.056	9.689	-0.042	17.425
P	0.932	< 0.001	0.927	< 0.001	0.969	< 0.001	0.948	< 0.001	0.976	< 0.001

exercise of self-care agency (ESCA).

Table 4. Comparison of myocardial enzyme indexes between the two groups before and after nursing

Group	cTnT (µg/L)		CK-MB (U/L)	
	before nursing	after nursing	before nursing	after nursing
Intervention group (n=100)	0.36±0.11	0.12±0.03	24.58±3.25	15.24±1.19
conventional group (n=100)	0.34±0.10	0.20±0.57	24.53±3.19	20.10±1.97
t	1.272	-12.156	0.131	-21.222
P	0.205	< 0.001	0.896	< 0.001

cardiac troponin T (cTnT), myocardial creatine kinase isoenzyme (CK-MB).
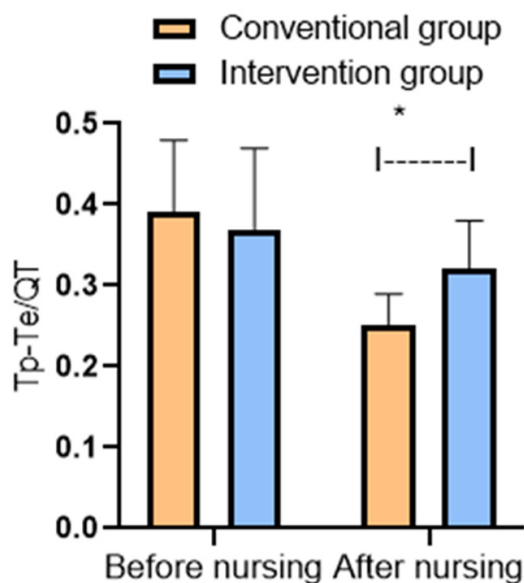
Figure 1. Comparison of ECG index before and after nursing between the two groups. Electrocardiogram (ECG), electrocardiogram indexes (Tp-Te/QT).

0.05). There was no significant difference in other indexes between the two groups (P > 0.05). See **Table 6**.

Multivariate logistic regression analysis of complications in the intervention group

The occurrence of complications was taken as the 'dependent variable', and the indexes with P < 0.05 in the univariate analysis as the independent variable. See **Table 7** for the assignment. Multivariate analysis demonstrated that cTnT, CK-MB, and Tp-Te/QT were influencing factors affecting the occurrence of complications in the intervention group (*P* < 0. 05). See **Table 8**.

Discussion

Middle-aged and elderly individuals are most susceptible to AMI, and the conditions tend to pose greater risks and dangers in these age groups. The main clinical manifestation of AMI is persistent and severe posterior thoracic pain. With a complex etiology, AMI is currently believed to be related to smoking, dyslipidemia, and other factors, and has characteristics of rapid onset and high fatality [14]. It is reported that the incidence of AMI is on the rise in recent years. Without timely and effective treatment and nursing, arrhythmia may occur and endanger the patients' lives [15]. Related studies have shown that 75% of AMI patients suffer from arrhythmia, and the fatality rate is as high as 50%, seriously affecting patients' quality of life and prognosis [16, 17]. At present, surgery is the main clinical treatment method for AMI, and nursing intervention is the main auxiliary treatment [18]. Routine nursing is based on clinical experience, and the nursing effect is usually not ideal. Therefore, it is of great significance to use an effective nursing treatment.

Snyder's hope theory is a goal-oriented way of thinking. This theory believes that hope is the positive dynamic state of thinking, and can promote the achievement of goals. Clinical nursing measures based on this theory try to improve the nursing by setting personalized nursing goals for patients, and help patients establish inner strength. Pathways thinking was initially developed from children's awareness of the correlation and causality between events, and agency is generated from children's awareness of their subjective status as the initiator of actions. With a higher level of hope, individuals can have more positive emotions. Moreover, they are more inclined to select goals with important value [19, 20]. A study in patients with bone tumors showed that the application of Snyder's hope theory significantly improved the mental strength and hope level of patients, and helped patients form a positive coping style [21]. It is speculated that similar effects would be achieved when we applied emergency

Table 5. Comparison of complications between the two groups after intervention [n (%)]

Group	Angina recurrence	Severe arrhythmia	Congestive heart failure	Cardiac death	Another myocardial infarction	Total incidence
Intervention group (n=100)	3 (3.00)	2 (2.00)	2 (2.00)	0 (0.00)	2 (2.00)	9 (9.00)
conventional group (n=100)	6 (6.00)	5 (5.00)	4 (4.00)	3 (3.00)	3 (3.00)	21 (21.00)
χ^2						5.647
P						0.017

Table 6. Univariate analysis of factors affecting the occurrence of complications in the intervention group

Index	Complication group (n=9)	No complication group (n=91)	t/χ^2	P
Sex (male/female)	7/2	64/27	0.221	0.639
Age (years)	63.55±7.41	63.74±7.22	0.184	0.854
disease type			0.400	0.527
ST segment elevation type	8 (88.89)	73 (80.22)		
Non-ST-segment elevation type	1 (11.11)	18 (19.78)		
BMI (kg/m^2)	24.29±3.07	24.17±3.07	-0.278	0.781
hypertension	5 (55.56)	39 (42.86)	0.536	0.464
diabetes	5 (55.56)	34 (37.36)	1.139	0.286
cTnT (µg/L)	0.51±0.05	0.34±0.10	4.894	< 0.001
CK-MB (U/L)	28.27±3.29	24.22±3.03	3.794	< 0.001
Tp-Te/QT	0.52±0.74	0.37±0.83	5.022	< 0.001

mean body mass index (BMI), cardiac troponin T (cTnT), myocardial creatine kinase isoenzyme (CK-MB), electrocardiogram indexes (Tp-Te/QT).

Table 7. Variable assignment

Index	Assignment criteria
cTnT	Original value entry
CK-MB	Original value entry
Tp-Te/QT	Original value entry

cardiac troponin T (cTnT), myocardial creatine kinase isoenzyme (CK-MB), electrocardiogram indexes (Tp-Te/QT).

care based on Snyder's hope theory to AMI patients.

In this study, the mental state of the nursing intervention group improved significantly more than that of the conventional group, indicating that nursing based on Snyder's hope theory can significantly adjust the psychological state of the patients. The reasons could be that Snyder hope theory emphasizes care and support from family members, which helps patients to alleviate the psychological pressure. In this study, ESCA scores in the intervention group were better than those of the conventional group (P < 0.05). This suggests that the nursing based on Snyder's hope theory can significantly improve patients' self-care level. In this

nursing model, the AMI related knowledge was explained to the patients before treatment, and self-care methods were demonstrated by nurses and then practiced by patients themselves. Also, the nursing team established a good nurse-patient relationship with patients, developed personalized schedules, planed target pathways, explored the gap between current satiations and the desired goal, and encouraged patients to actively participate in self-management, discover their own potential, recognize their own value, and understand the importance of self-care and self-management [22, 23]. By doing so, patients fully utilized their subjective initiative and took an active role in their own care.

This study found that the cTnT, CK-MB, and Tp-Te/QT decreased in both groups after nursing, and the decreases were significantly greater in the intervention group than in the conventional group (P < 0.05), indicating that the nursing model based on Snyder's hope theory was helpful to improve the patients' myocardial enzymes and abnormalities in ECG. In this study, the incidence of complications in the

Table 8. Multivariate logistic regression analysis of factors affecting the occurrence of complications in the intervention group

Index	B	SE	Wald	P	OR	95% CI
cTnT	24.973	11.919	4.390	0.036	7.007	5.016~9.788
CK-MB	0.410	0.203	4.055	0.044	1.506	1.011~2.244
Tp-Te/QT	17.221	8.625	3.986	0.046	3.014	1.371~6.624

cardiac troponin T (cTnT), myocardial creatine kinase isoenzyme (CK-MB), electrocardiogram indexes (Tp-Te/QT).

intervention group was 9.00%, which were better than 21% in the conventional group. This suggests that nursing care based on Snyder's hope theory can reduce the incidence of complications in AMI patients after emergency surgery. Considering the organization of regular discussions during nursing based on Snyder's hope theory for putting forward challenges in nursing work and optimizing nursing interventions, more medical resources can be guaranteed for patients prone to complications. Therefore, these patients can get targeted care, which helps reduce the occurrence of complications.

This study further explored the factors affecting the prognosis of AMI in the intervention group. We found that cTnT, CK-MB and Tp-Te/QT were the influencing factors for complications in the intervention group ($P < 0.05$). The levels of serum cTnT and CK-MB in patients with AMI are related to cardiac function or the degree of heart failure. After the onset of AMI, that is, after myocardial ischemia, myocardial cells are necrotic due to ischemia and hypoxia, which release the myocardial cell contents into peripheral blood, increasing the levels of serum myocardial injury markers [24, 25]. The more serious the myocardial cell injury is, the worse the cardiac function of the patient will be, finally leading to related complications. The Tp-Te/QT ratio is relatively constant. It does not change with body size and has a higher sensitivity in reflecting transmural dispersion of repolarization and the risk of ventricular arrhythmias. A previous study also found that the Tp-Te/QT ratio was independently associated with in-hospital and out-of-hospital overall mortality and major adverse cardiac events [26].

There are some limitations in this study. (1) The subjects in this study were all from a third-class A hospital, so the promotion of the results was limited. (2) The intervention time of this study is relatively short. It is expected that the intervention time can be extended in follow-up studies to observe the long-term effect.

To sum up, a nursing model based on Snyder's hope theory integrates goals, pathway and agency, demonstrating beneficial results in the emergency care for patients with AMI. It by improves the psychological state of patients and reduces the occurrence of complications.

Disclosure of conflict of interest

None.

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