

## Original Article

# Application effect of evidence-based nursing in perioperative period of acute coronary syndrome

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**Abstract:** Objective: To investigate the effect of evidence-based nursing on anxiety and depression, sleep quality and life quality of patients with acute coronary syndrome during perioperative period of percutaneous coronary intervention. Method: 113 patients with acute coronary syndrome treated with percutaneous coronary intervention in our hospital from November 2016 to June 2019 were collected and randomly divided into group A and group B. Among them, 58 cases in group A were given routine nursing care, another 55 cases in group B were given evidence-based nursing on the basis of group A. The left ventricular ejection fraction (EF) and left ventricular end diastolic diameter (LVEDD), VAS pain score index, anxiety and depression after nursing intervention were observed in groups A and B. The improvement of sleep quality (Pittsburgh Sleep Quality Index (PSQI)), the incidence of adverse reactions, nursing satisfaction (with the total score of 10 points for each item, the higher score indicates the higher satisfaction), coronary self-management scale (CSMS) were recorded so as to evaluate self-management ability and quality of life after nursing. Results: After nursing, the indicators of heart function, VAS score, anxiety, depression, sleep quality, incidence of adverse reactions, nursing satisfaction, self-management score and quality of life in Group B showed better results compared with Group A ( $P < 0.05$ ). Conclusion: Evidence-based nursing can alleviate anxiety and depression of patients with acute coronary syndrome during perioperative period of percutaneous coronary intervention and improve the quality of life.

**Keywords:** Evidence-based nursing, acute coronary syndrome, quality of life

## Introduction

Acute coronary syndrome (ACS) is a complicated disease [1], and it often undergoes acute myocardial ischemia induced by severe coronary stenosis or occlusion caused by coronary plaque rupture and subsequent thrombosis [2]. Therefore, ACS may cause unstable angina pectoris (UA), acute myocardial infarction (AMI) or sudden cardiac death. Most of the patients will suffer from chest pain and chest distress, accompanying with arrhythmia and heart failure, which poses a great threat to the life safety of patients [3]. The current preventive measures of cardiovascular diseases have reduced the incidence and delayed the onset of ACS [4]. Treatment progress of ACS also effectively reduced the mortality of ACS [5]. For example, percutaneous coronary intervention (PCI) is currently the main clinical therapy for ACS patients, which has the characteristics of quick

response, less surgical trauma and quick recovery [6]. However, during PCI intervention, it is easy to cause various complications, resulting in poor prognosis such as decreased cardiac function and bleeding during perioperative period, and seriously affecting postoperative recovery [7]. With the rapid aging of our population, the number of elderly patients with ACS is increasing rapidly [8]. With the decline of physical function caused by old age, the patients' self-control ability is poor, and it is difficult for them to correct the bad habits [9]. The incidence of adverse cardiovascular events, readmission rate, and death risk of ACS patients increase sharply [10]. Therefore, perioperative nursing plays a very important role in postoperative rehabilitation of ACS patients [11]. In the past few decades, great changes have taken place in the nursing discipline, gradually developing patient-centered holistic nursing, implementing comprehensive nursing quality,

and providing patients with the best quality of service [12]. In clinic practice, we found that the implementation of humanized and targeted nursing is of great help to the rehabilitation of diseases and for the improvement of patients' emotions. For example, Zhang et al suggested that intensive nursing can improve the anxiety and quality of life of patients with liver cancer [13]. Sinclair et al has showed that evidence-based nursing can significantly reduce the blood sugar level of elderly people with type 2 diabetes [14]. We found that evidence-based nursing is based on clinical practice, and through evidence-based discovery and identification of problems, targeted management is implemented for patients [15]. We speculated that evidence-based nursing may act in ACS. In order to verify this, our research will investigate the influence of evidence-based nursing on anxiety, depression, sleep quality and quality of life of patients with ACS during perioperative period of PCI, so as to provide effective reference opinions and schemes for ensuring the postoperative quality of life of ACS patients and reducing the burden of family and social economy.

### General information

A total of 113 ACS patients treated by PCI in The First Affiliated Hospital of University of South China from November 2016 to June 2019 were collected and grouped into group A and group B. Among them, 58 patients in group A adopted routine nursing care, another 55 patients in group B adopted evidence-based nursing based on group A.

### Collection criteria

Inclusion criteria: Patients firstly got sick and received follow-up treatment in our hospital; patients were firstly examined by our laboratory and imaging discipline, and finally diagnosed as ACS by cardiovascular physicians in our hospital [16], and PCI treatment was conducted after diagnosis. The patient was 45~75 years old, the case data was complete, the patient and his family members agreed to cooperate with this experiment, and this research conformed to the Ethics Committee. Exclusion criteria: patients suffered from other major diseases, organ dysfunction or loss, language communication disorder, or operation contraindication; referred patients.

### Nursing methods

Patients were all treated with PCI. Group A received routine nursing: patients received basic nursing after admission, received disease education, and followed the doctor's advice to carry out relevant treatment procedures. The possible dangerous situations were explained to patients and their families during the operation before operation. Patients have signed the agreement of consent to the operation. Routine vital signs detection and environmental treatment were performed during operation. After the operation, the patient's physical signs were continuously monitored, and the patients' families were instructed to take the medicine on time, the postoperative eating habits and rehabilitation guidance were informed. Group B implemented evidence-based nursing on the basis of group A. Firstly, the patient's physical condition was learned to make personal nursing plan according to PCI treatment and evidence-based medicine (all nurses had received evidence-based nursing training). According to previous data, we summarized the nursing measures relating to evidence-based problems, so as to reduce the adverse reactions in perioperative period more effectively. Combined with the patients' clinical situation and nursing needs, the patients were given preoperative education, instructed in the occurrence, development and harm of diseases according to their age and knowledge, and informed of the method and purpose of this operation, listed with successful cases, enhanced of the self-confidence and compliance, implemented with psychological intervention, and relieved of nervous, anxious and afraid emotions. Patients' respiratory function was exercised before operation. The operating room ambient temperature and humidity were adjusted to create a good operating environment. The staff should also pay close attention to patients' pressure dressing puncture after operation, and inform patients not to move at will, and insist on removing the pressure package. The changes of patients' ECG, blood pressure, respiration, heart rhythm and other signs were closely monitored, and patients were reminded to eat reasonably, correct bad habits and exercise properly.

### Outcome measures

The left ventricular ejection fraction (EF) and left ventricular end diastolic diameter (LVEDD)

## Effect of evidence-based nursing on patients with acute coronary syndrome

**Table 1.** General data [n (%)]

|                                  | A (n = 58) | B (n = 55) | t or $\chi^2$ | P     |
|----------------------------------|------------|------------|---------------|-------|
| Age (years)                      | 55.8±8.6   | 56.2±8.9   | 0.243         | 0.809 |
| BMI (KG/cm <sup>2</sup> )        | 26.52±3.05 | 27.46±4.72 | 1.264         | 0.209 |
| Residence                        |            |            | 0.047         | 0.828 |
| Urban                            | 37 (63.79) | 34 (61.82) |               |       |
| Rural                            | 21 (36.21) | 21 (38.18) |               |       |
| History of smoking               |            |            | 0.086         | 0.770 |
| Yes                              | 44 (75.86) | 43 (78.18) |               |       |
| No                               | 14 (24.14) | 12 (21.82) |               |       |
| Drinking history                 |            |            | 0.008         | 0.928 |
| Yes                              | 46 (79.31) | 44 (80.00) |               |       |
| No                               | 12 (20.69) | 11 (20.00) |               |       |
| Family history                   |            |            | 0.150         | 0.698 |
| Yes                              | 7 (12.07)  | 8 (14.55)  |               |       |
| No                               | 51 (87.93) | 47 (85.45) |               |       |
| Nation                           |            |            | 0.216         | 0.642 |
| Han                              | 50 (86.21) | 49 (89.09) |               |       |
| Minorities                       | 8 (13.79)  | 6 (10.91)  |               |       |
| Total cholesterol (mmol/L)       | 4.40±1.10  | 4.15±0.89  | 1.324         | 0.188 |
| Low density lipoprotein (mmol/L) | 2.85±0.46  | 2.76±0.45  | 1.051         | 0.296 |
| Triglycerides (min)              | 1.04±0.21  | 1.05±0.22  | 0.247         | 0.805 |

[the calculation formula is  $EF = (EDV-ES) \times 100\%/EDV$ , and the EF is  $\geq 50\%$  under normal conditions; the LVEDD is about 35-56 mm in normal, increased indicates serious disease] were observed after nursing intervention in the two groups. VAS pain score index after intervention [the mean value of mild pain was  $2.57 \pm 1.04$ ; the mean value of moderate pain was  $5.18 \pm 1.41$ ; the mean value of severe pain was  $8.41 \pm 1.35$ ] was observed. Anxiety and depression were observed [53-62 points indicate mild depression, 63-72 points indicate moderate depression, and 73 points and above indicate severe depression; 50-59 points indicate mild anxiety; 60-69 points indicate moderate anxiety; 70 points and above indicate severe anxiety]. The improvement of sleep quality (Pittsburgh Sleep Quality Index (PSQI)) was observed, with a total score of 21 points, and the higher score indicates the worse sleep quality. Incidence of adverse reactions, nursing satisfaction (a total score of 10 points for each item, the higher score indicates the higher satisfaction), self-management ability assessed by coronary heart disease self-management scale (CSMS) [mainly divided into disease manage-

ment, emotional management and daily life management, the higher score means the higher self-management level of patients] were investigated. The quality of life after nursing was evaluated by the comprehensive quality of life assessment questionnaire, and the higher score means the better quality of life.

### Statistical method

Some results in this study were represented in the form of (mean  $\pm$  SD). SPSS22.0 was applied for data analysis, t-test of independent samples for pair-wise comparison, single factor analysis of variance and LSD back testing for multiple group compar-

ison, and bonferroni back testing for multiple time points comparison. When  $P < 0.05$ , the comparison was statistically evident.

### Result

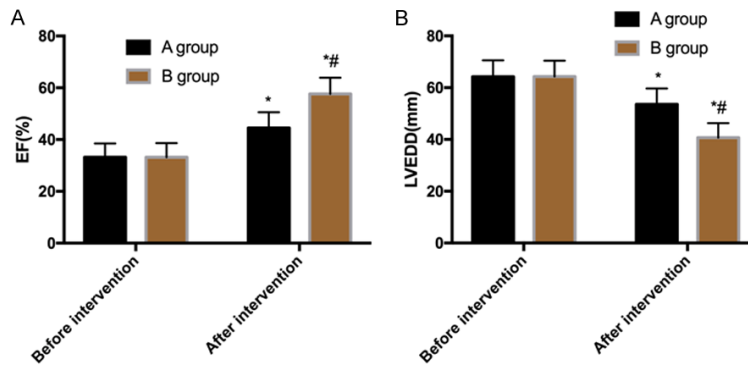
#### General data

There was no difference in age, BMI, residence, smoking history, drinking history, family history, nationality, total cholesterol, low density lipoprotein and triglyceride between group A and group B ( $P > 0.05$ ) (**Table 1**).

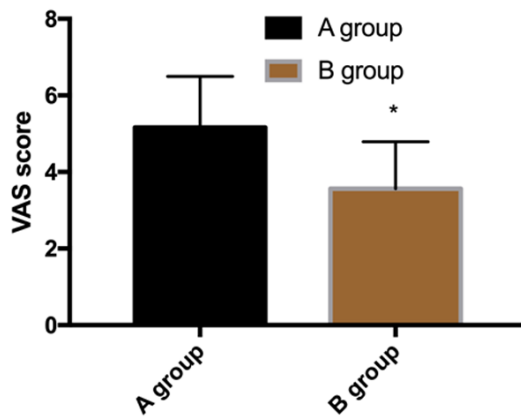
#### Changes of cardiac function indexes after nursing intervention

After nursing intervention, the changes of heart function indexes EF and LVEDD were tested. There was no statistical difference between A and B before intervention ( $P > 0.05$ ), but EF in A and B increased after intervention ( $P < 0.05$ ), and EF in group B was elevated compared with group A ( $P < 0.05$ ), while LVEDD in A and B decreased after intervention ( $P < 0.05$ ), and LVEDD in group B was evidently reduced compared with group A ( $P < 0.05$ ) (**Figure 1**).

## Effect of evidence-based nursing on patients with acute coronary syndrome



**Figure 1.** Changes of cardiac function indexes after nursing intervention in A and B. A. Changes of EF index after nursing intervention in A and B. B. Changes of LVEDD index after nursing intervention in A and B. Note: \* indicates compared with before intervention, # indicates compared with group A.



**Figure 2.** VAS pain score index of two groups after nursing intervention \* indicates  $P < 0.05$ .

### VAS pain score index of two groups after nursing intervention

Evaluation of VAS pain score index after nursing intervention revealed that the score of group B was evidently lower than that of group A after nursing intervention ( $P < 0.05$ ) (Figure 2).

### Anxiety and depression of patients before and after nursing intervention

The anxiety and depression of patients were tested before and after nursing intervention. The scores of anxiety and depression of patients in A and B were similar before intervention ( $P > 0.05$ ). After nursing intervention, the scores were decreased ( $P < 0.05$ ), and the scores in Group B were evidently lower than those in Group A ( $P < 0.05$ ) (Figure 3).

### Improvement of sleep quality before and after intervention

PSQI scores were used to observe the improvement of sleep quality before and after intervention. There was no evident difference in sleep quality scores between A and B before intervention ( $P > 0.05$ ). After intervention, the sleep quality scores of both groups decreased ( $P < 0.05$ ), and the scores of Group B were lower than those of Group A ( $P < 0.05$ ) (Figure 4).

### Incidence of adverse reactions after intervention

The incidence of adverse reactions after nursing intervention was observed. The incidence of group A was 18.97%, while that of group B was 5.45%, which was evidently lower than that in group A ( $P = 0.029$ ) (Table 2).

### Nursing satisfaction of two groups after intervention

After intervention, the nursing satisfaction of the two groups was investigated. The scores of nursing environment, technology and ability, health education, psychological nursing, service initiative and life care of patients in Group A were lower than those in Group B ( $P < 0.001$ ) (Table 3).

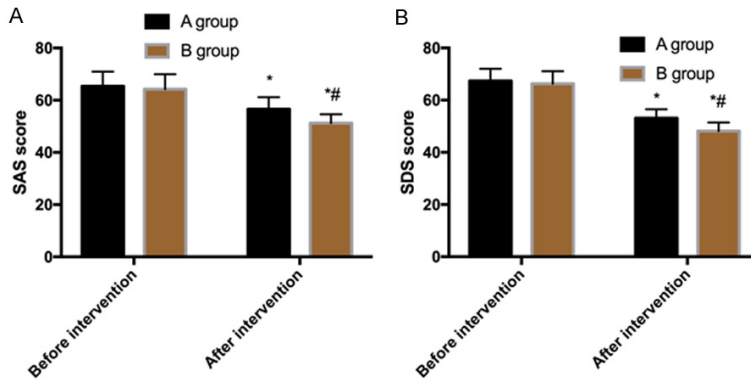
### CSMS evaluation of two groups of self-management ability

The changes of bad habits, emotional cognition, disease knowledge, daily life and compliance were explored. The results revealed that the self-management ability of both groups improved after treatment, and CSMS score was higher than that before nursing ( $P < 0.05$ ), and the score of Group B was higher than that of Group A ( $P < 0.05$ ) (Figure 5).

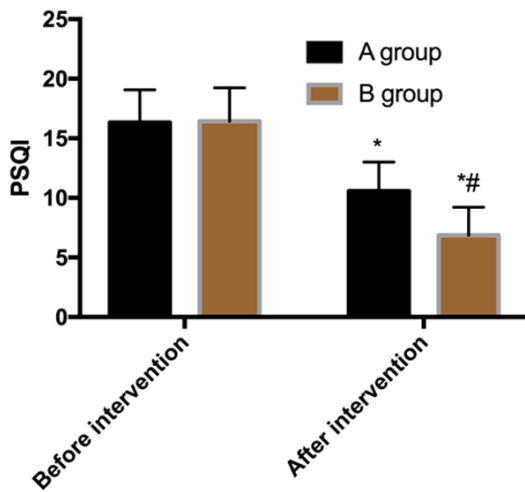
### Quality of life after nursing

The quality of life scores of patients after nursing intervention were observed. The scores of all dimensions in Group B were evidently higher than those in Group A ( $P < 0.001$ ) (Table 4).

## Effect of evidence-based nursing on patients with acute coronary syndrome



**Figure 3.** Anxiety and depression of patients in A and B before and after nursing intervention. A. Anxiety of patients in A and B before and after nursing intervention. B. Depression before and after nursing intervention. Note: \* indicates compared with before intervention, # indicates compared with group A.



**Figure 4.** Improvement of sleep quality of patients in A and B before and after intervention. Note: \* indicates compared with before intervention, # indicates compared with group A.

### Discussion

ACS is a cardiovascular disease with high morbidity and mortality, which is characterized by sudden disability. It is prone to angina pectoris and threatens the safety of patients [17]. In today's society, people's irregular daily routine, diversified diet and aging population have become uncontrollable factors that aggravate the continuous development of ACS [18]. And this disease is the main cause of death of patients with coronary heart disease (CHD) [19]. In recent years, clinical research has been devoted to the prevention and treatment of

ACS, and some achievements have been made, and the mortality rate has obviously decreased [20]. PCI is the main treatment for ACS at present, but all the operations are invasive, and complications and adverse reactions are inevitable. So, how to better consolidate the postoperative recovery of patients and improve the treatment efficiency requires close intervention and guidance of medical staff [21]. In recent years, diversified nursing modes have received good response in clinical application, and a

large number of studies suggest that different nursing methods can evidently help the recovery of various diseases and greatly improve the treatment effect [22, 23]. In this study, we carried out research on the influence of evidence-based nursing on anxiety, depression, sleep quality and life quality of patients with ACS during perioperative period, so as to provide effective reference for improving the treatment effect of ACS and accelerating the recovery of patients' health. The experimental results are as follows:

First of all, we observed the changes of heart function indexes EF and LVEDD after nursing intervention. The results revealed that there was no statistical difference between group A and B before intervention, but EF increased and LVEDD decreased in both groups after intervention, and the heart function indexes in Group B were evidently lower than those in Group A. This suggested that evidence-based nursing can promote the recovery of heart function. PCI treatment can effectively improve myocardial blood perfusion through intervention, but reperfusion can lead to inflammatory reaction of blood vessels, thus leading to postoperative complications [24]. However, the principle of evidence-based nursing is based on consulting a large number of disease-related researches and implementing evidence-based nursing on the premise of past practical experience. We speculate that as evidence-based nursing follows evidence-based medicine, nursing staff have a high degree of awareness of the disease and the incidence of com-

## Effect of evidence-based nursing on patients with acute coronary syndrome

**Table 2.** Incidence of adverse reactions after intervention in A and B [n (%)]

|                                   | Group A<br>(n = 58) | Group B<br>(n = 55) | $\chi^2$ | P     |
|-----------------------------------|---------------------|---------------------|----------|-------|
| Arrhythmia                        | 2 (3.45)            | 1 (1.82)            |          |       |
| Nerve injury                      | 3 (5.17)            | 1 (1.82)            |          |       |
| Bleeding at puncture site         | 3 (5.17)            | 0 (0.00)            |          |       |
| Wound swelling                    | 2 (3.45)            | 1 (1.82)            |          |       |
| Stenosis of puncture artery lumen | 1 (1.72)            | 0 (0.00)            |          |       |
| Total (%)                         | 11 (18.97)          | 3 (5.45)            | 4.748    | 0.029 |

**Table 3.** Nursing satisfaction of two groups after intervention [n (%)]

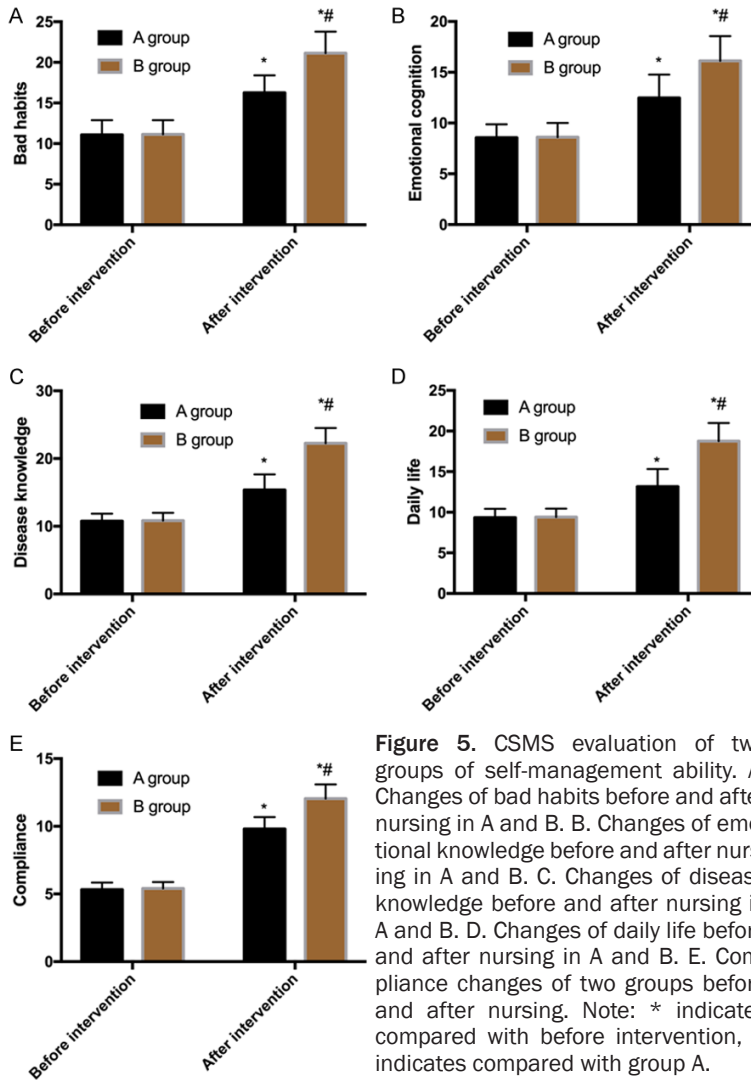
|                        | Group A<br>(n = 58) | Group B<br>(n = 55) | t value | P value |
|------------------------|---------------------|---------------------|---------|---------|
| Environment            | 6.23±1.12           | 7.51±1.08           | 6.179   | < 0.001 |
| Technology and ability | 6.02±0.83           | 8.56±0.79           | 16.640  | < 0.001 |
| Health education       | 6.48±0.78           | 8.15±0.76           | 11.520  | < 0.001 |
| Psychological nursing  | 6.98±0.80           | 8.93±0.72           | 13.590  | < 0.001 |
| Service initiative     | 5.38±0.67           | 7.59±0.75           | 16.540  | < 0.001 |
| Life care              | 4.88±0.64           | 7.63±0.92           | 18.530  | < 0.001 |

plications of patients is reduced by taking appropriate measures in time and reminding patients to take medicine on time. Valiee et al [25] has also proposed that evidence-based nursing can effectively improve the heart function of patients with CHD, which is consistent with the results of this experiment. Then, the VAS pain score index after nursing intervention was evaluated. The results revealed that the score of group B was evidently lower than that of group A after nursing intervention, indicating that the pain of patients was greatly relieved after evidence-based nursing. We speculated that it may be a humanized nursing method of evidence-based nursing, which can intervene in time when patients have pain, guide patients to shift their attention, and give appropriate treatment to effectively relieve patients' pain [26]. Observation of the anxiety and depression of patients revealed that the scores of anxiety and depression of patients in group A and B were similar before intervention, but the scores in group B were evidently lower than those in group A after nursing intervention, indicating that evidence-based nursing improved patients' bad mood. We speculated that as the medical staff have given psychological intervention and targeted psychological counseling to the

patients before and after operation, patients get confidence and their nervousness and anxiety are reduced [27]. The PSQI score was used to observe the improvement of sleep quality of patients in A and B before and after intervention. It was found that the sleep quality score of patients in Group B was lower than that of Group A after intervention, indicating that patients in Group B had better sleep quality. This further supports the above experiment, and the patient's body and mind are relaxed to some extent. The incidence of adverse reactions after nursing intervention in group A and B was observed. It was found that the incidence of complications in group A was 18.97%, and that in group B was 5.45%. The incidence in

group B was evidently lower than that in group A, which indicated that evidence-based nursing was more effective for ACS patients and the clinical value of applying evidence-based nursing was reflected. After PCI, the patient's puncture site should be bandaged with salt bag for 12 hours, and the patient's puncture side should be bandaged to avoid wound bleeding [28]. Evidence-based nursing staff closely observed the direction of artery puncture in the side limbs of patients after operation, found the swelling and bleeding around them, eliminated abnormal conditions and effectively reduced complications. Investigation on nursing satisfaction of the two groups after intervention revealed that the scores of nursing environment, technology and ability, health education, psychological nursing, service initiative and life care of patients in group A were lower than those in group B, which fully explained the comprehensiveness of evidence-based nursing for clinical services and reflected its important significance. Finally, the self-management ability and quality of life were observed, and we found that the patients in Group B were better than those in Group A in bad habits, emotional cognition, disease knowledge, daily life and compliance, and the quality

## Effect of evidence-based nursing on patients with acute coronary syndrome



**Figure 5.** CSMS evaluation of two groups of self-management ability. A. Changes of bad habits before and after nursing in A and B. B. Changes of emotional knowledge before and after nursing in A and B. C. Changes of disease knowledge before and after nursing in A and B. D. Changes of daily life before and after nursing in A and B. E. Compliance changes of two groups before and after nursing. Note: \* indicates compared with before intervention, # indicates compared with group A.

**Table 4.** Quality of life of patients in A and B

|                      | Group A<br>(n = 58) | Group B<br>(n = 55) | t value | P value |
|----------------------|---------------------|---------------------|---------|---------|
| Physical functioning | 80.60±6.38          | 91.31±8.62          | 7.534   | < 0.001 |
| Social functioning   | 70.52±11.21         | 87.23±10.32         | 8.231   | < 0.001 |
| Symptoms             | 80.19±9.36          | 88.41±9.43          | 4.649   | < 0.001 |
| Cognitive function   | 70.29±10.29         | 80.55±11.65         | 4.968   | < 0.001 |
| Satisfaction         | 82.51±6.15          | 94.39±5.12          | 11.130  | < 0.001 |

of life in Group B was evidently improved, which further reflected the application effect of evidence-based nursing.

To sum up, evidence-based nursing can alleviate anxiety and depression of patients with ACS during perioperative period of percutaneous coronary intervention, and improve their

quality of life. However, the control nursing method for ACS patients proposed above is routine nursing without other nursing methods, and due to the short experimental time and less research participants, we need to increase the sample size for more detailed experimental research. These limitations will also be the focus of our future research, and we will conduct more effective experimental analysis as soon as possible to provide more accurate guidance for clinical practice.

### Disclosure of conflict of interest

None.

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## Effect of evidence-based nursing on patients with acute coronary syndrome

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