

Original Article

A feasibility study of modified self-efficacy for the improvement of adverse emotions and quality of life in traumatic fracture patients

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Abstract: Objective: To investigate the changes in the adverse psychologies and psychological coping at the late stage of self-efficacy intervention in traumatic fracture patients. Methods: A total of 80 traumatic fracture patients admitted to our hospital were recruited as the study cohort and randomly divided into two groups. The control group (n=40) underwent conventional post-fracture nursing, and the study group (n=40) underwent self-efficacy intervention combined with conventional post-fracture nursing. After the intervention, the changes in the anxiety and depression, self-efficacy, quality of life, and the psychological coping scores were assessed and compared between the two groups. Finally, the correlations among the self-efficacy, adverse emotions, and psychological coping scores were analyzed. Results: Before the intervention, there was no marked difference in the anxiety and depression, self-efficacy, life satisfaction, and psychological coping scale scores between the two groups ($P > 0.05$). At 1, 3, and 6 months after the intervention, the study group had remarkably lower hospital anxiety and depression scale (HADS) scores and significantly higher self-efficacy, quality of life and psychological coping scale scores than the control group ($P < 0.05$). The correlation analysis showed that the general self-efficacy scale (GSES) scores were negatively correlated with the self-rating anxiety scale (SAS) and the self-rating depression scale (SDS) scores ($r = -0.8623$, $r = -0.6895$, $P < 0.05$) and were positively correlated with the psychological coping scale scores ($r = 0.7196$, $P < 0.05$). Conclusion: Self-efficacy intervention can markedly improve the adverse emotions and the self-efficacy and quality of life scores in traumatic fracture patients. The patients' self-efficacy is significantly positively correlated with the psychological coping scores. Therefore, self-efficacy intervention can be implemented to improve the traumatic coping abilities of traumatic fracture patients.

Keywords: Traumatic fractures, self-efficacy, adverse psychologies, psychological coping, analysis of changes

Introduction

In recent years, with the continuous advancement of China's industrialization and the burgeoning development of the construction industry, the incidence of multiple accidents (e.g., car accidents and occupational injuries) is on the rise, leading to an increasing number of trauma patients. Among trauma patients fractures of the extremities are very common and make up about 40.03% of all trauma cases [1]. According to domestic investigation statistics, there are as many as 1.1 million people with occupational injuries and over 400,000 invalids in China. Among them, the total number of

people with extremity disabilities is about 30%, indicating that traumatic fractures have become an important public health concern [2].

Traumatic fractures are a stressful event. Anguish, loss of extremity function and subsequent disabilities caused by instantaneous trauma may have a huge psychological impact on patients, causing them to suffer from severe psychological stress, and great mental and physical trauma. One investigation found that the psychological stress response of traumatic fracture patients is second only to that of cancer patients, and most of these patients show a

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series of physiological and psychological changes. About 80% of the patients have negative emotions such as anxiety, depression, fear, and pessimism due to their psychological trauma [3]. An investigation of 185 traumatic fracture patients found that about 45.4% of trauma patients have anxiety, about 22.2% of trauma patients suffer from depression, and 86.5% of trauma patients complain that their extremity functions may not be restored [4]. The above findings suggest that attention should be given to psychological nursing while strengthening the nursing of traumatic fractures, so as to improve patients' stress levels and prognoses [5, 6]. Self-efficacy intervention has been widely explored at home and abroad over the years. Multiple studies have proved that self-efficacy interventions help improve individual psychological health, behaviors, self-management abilities, life satisfaction, and negative emotions. One study found that self-efficacy interventions have a positive significance for the treatment and rehabilitation of trauma patients. For example, self-efficacy interventions can effectively improve the self-care abilities, depression, and life satisfaction of post-disaster survivors [7, 8]. To date, there are few studies on the implementation of self-efficacy interventions in traumatic fracture patients. The purpose of this study is to explore the feasibility and effectiveness of self-efficacy nursing in the treatment of traumatic fracture patients, so as to provide a theoretical basis for the improvement of the life satisfaction of traumatic fracture patients.

Materials and methods

General data

A total of 80 traumatic fracture patients admitted to our hospital from January 2019 to December 2019 were recruited as the study cohort and randomly divided into a study group (n=40) and a control group (n=40).

Inclusion criteria: (1) patients who underwent surgery for the treatment of fractures of the extremities induced by accidental trauma (with or without soft tissue and nerve injuries), (2) patients with a clear consciousness and the ability to cooperate with the study, (3) patients with complete clinical medical records, (4) patients ranging in age from 18-70 years old,

(5) the investigation was approved by the Hospital Ethics Committee of Jinzhou Medical University, and (6) patients who voluntarily signed the informed consent form.

Exclusion criteria: (1) patients also suffering from mental illnesses, (2) patients with severe hepatic or renal dysfunction, (3) patients who were in critical condition and were unable to cooperate with the study, (4) patients with consciousness disorders, (5) patients also suffering from malignant tumors, (6) patients with other physical functional or organic diseases, and (7) patients who were pregnant or lactating.

Rejection criteria: (1) deaths that occurred during the study, (2) voluntary withdrawal during the study, (3) loss to follow up during the study, (4) other accidental injuries during the study, (5) those who were unable to continue receiving interventions due to their critical condition during the study.

Intervention methods

The control group underwent conventional postoperative nursing for the treatment of their traumatic fractures. The specific measures were as follows: (1) Health education. The nurses comprehensively introduced health knowledge regarding the conditions to the patients, so as to help them understand their conditions as soon as possible and cooperate with the nursing intervention, (2) Regular diet. The patients were advised to consume non-fatty foods after their surgeries, avoid spicy and greasy foods, and try to eat high-quality protein and calcium-rich foods, (3) Pain nursing. Postoperative pain was common in the patients. The nurses performed active pain assessments and relieved the pain based on the specific conditions. Patients with severe pain were treated with analgesic drugs, and they could also relieve their pains by diverting their attention (e.g., listening to music, watching videos), (4) Prevention of complications. The patients' vital signs were closely monitored after their surgeries, the blood supply and functions of the injured extremities were regularly checked, and the patients were instructed to turn over and pat their backs to prevent complications, (5) Functional exercises. The patients were encouraged to conduct off-bed activities as early as

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possible, and the functional training step by step to prevent adhesion or muscle atrophy, (6) Out-of-hospital nursing. Regular follow-up was performed with the patients, the recovery conditions of the patients were recorded, the patients were regularly reminded to conduct follow-up visits, and the patients' questions were properly answered.

The study group additionally received self-efficacy intervention in addition to the treatment administered to the control group. The specific measures were as follows: (1) Incentive intervention. It was understood that the traumatic fracture patients were in a state of high stress, with marked psychological trauma. The nurses and the patients' families encouraged the patients to restore and build up their self-confidence and helped them go through their post-traumatic lives, (2) Verbal persuasion. The post-operative nursing staff actively listened to the patients' suggestions, had one-on-one conversations with the patients or their families, understood the patients' post-traumatic mentality from the patients' perspective, and spared no efforts to answer the questions the patients raised, so as to alleviate the patients' anxiety and depression, (3) Establishment of behavior contract. The responsible nurses formulated a behavioral intervention contract based on the patients' conditions to decompose the postoperative rehabilitation process and boost the patients' confidence in the treatment by continuously achieving small goals. It was divided into four stages. The first stage was to carry out postoperative muscle strength exercises and assist the patients to perform relaxation and contraction of the appendicular muscle exercises. The second stage was the stage when the joint activities were performed. The third stage was the stage when weight training was conducted when, at which time the patients' fractures were basically healed. The fourth stage was the stage when the self-care ability training was carried out, aiming to actively carry out self-management and improve their subjective initiatives through the establishment of the behavior contract. (4) Social support. Communication with the family members and friends of the patients was conducted, and the patients were provided with care and support and encouraged to adapt to their trauma and accept themselves as soon as possible.

Observational indices and assessment criteria

Analysis of the changes in the adverse emotions in the two groups before and after the intervention: Before the intervention, and at 1, 3, and 6 months after the intervention, the anxiety and depression levels in the two groups were assessed. The anxiety was assessed using the self-rating anxiety scale (SAS). SAS, which has been widely implemented clinically, comprises 20 items scored using a scoring system of 1-4 point(s). A higher score indicates a more serious anxiety disorder in the subjects. Their depression was assessed using the self-rating depression scale (SDS). SDS consists of 20 items, including 10 questions in forward order and 10 questions in reverse order. A higher score indicates a more serious depression disorder [9, 10].

Changes in self-efficacy in the two groups before and after the intervention: Before the intervention, and at 1, 3, and 6 months after the intervention, the self-efficacies in the two groups were assessed using the general self-efficacy scale (GSES). GSES comprises 10 items scored using a scoring system of 1-4 point(s). The total score is the sum of the scores of all the items. A higher score indicates better patient self-efficacy [11].

Changes in the quality of life in the two groups before and after the intervention: The World Health Organization Quality of Life-BREF (WHOQOL-BREF) instrument was used to assess the patients' quality of life. WHOQOL-BREF consists of five items scored from 1 point to 7 points (ranging from "totally disagree" to "totally agree"). The total score is the sum of the scores of all the items. A higher score indicates higher patient life satisfaction [12].

Changes in the psychological coping scores in the two groups before and after the intervention: The COPE scale was used to assess the psychological coping ability. The COPE scale was prepared by Conner in 2003. The COPE scale comprises 25 items scored using a Likert 5 scale, and it can be divided into three dimensions, namely tenacity, strength, and optimism. The total score ranges from 0 point to 100 points. A higher score indicates better patient psychological coping ability [13].

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Table 1. Comparison of general clinical indices between the two groups ($\bar{x} \pm s$)/[n (%)]

General clinical data		Study group (n=40)	Control group (n=40)	t/X ²	P
Gender	M	26	28	0.228	0.633
	F	14	12		
Mean age (years)		41.19 ± 3.22	41.01 ± 3.11	0.396	0.693
Mean weight (kg)		67.69 ± 3.21	68.29 ± 2.98	0.866	0.389
Education level	University and above	10	9	0.891	0.232
	High school	26	27		
	Junior high school and below	4	4		
Monthly income	< RMB 1000	5	6	1.022	0.198
	RMB 1000-5000	29	28		
	RMB 5000 and above	6	6		
Marital status	Married	30	26	1.211	0.187
	Divorced	5	8		
	Single	5	6		
Cause of injury	Car accident	30	28	0.251	0.617
	Occupational injury	10	12		
Injured site	Upper extremities	23	22	0.051	0.822
	Lower extremities	17	18		

Correlation analysis of the self-efficacy, adverse emotions, and psychological coping scores: The correlations among the GSES scores, the SAS scores, the SDS scores, and the COPE scale scores in the two groups were analyzed.

Statistical analysis

The collected data were input into an EXCEL table, and SPSS 22.0 was used for the statistical analysis. The collected data were detected using a normal distribution. The data conforming to a normal distribution were expressed using [n (%)]. The differences between the groups were analyzed using *Chi-square* tests. The measurement data were expressed using mean ± standard deviation. The differences between the groups were analyzed using *t* tests, and the correlation analysis was performed using Spearman. The plotting software used in this study was GraphPad Prism 8. *P* < 0.05 indicated a significant difference [14].

Results

Comparison of the differences in the general clinical data between the two groups

In this study, a total of 80 patients were enrolled, including 54 males and 28 females, aged 35-50 years, with an average age of (41.11 ± 2.98) years. Their general clinical data

such as gender, age, average weight, and education levels were recorded, and differences between the two groups were compared. There was no significant differences in the general clinical data, including gender, age, mean weight, mean course of the disease, underlying health conditions, etc. between the two groups (*P* > 0.05), so they were comparable (Table 1).

Analysis of the changes in the adverse emotions in the two groups before and after the intervention

There were no significant differences in the SAS and SDS scores between the two groups before the intervention (*P* > 0.05). After the intervention, the SAS and SDS scores in the two groups were remarkably decreased compared with the pre-intervention scores. The comparisons between the groups at 1, 3, and 6 months after the intervention suggested that the SAS and SDS scores in the study group were significantly lower than they were in the control group (*P* < 0.05) (Figure 1).

Analysis of the self-efficacy and quality of life changes in the two groups before and after the intervention

There was no marked difference in the GSES and WHOQOL-BREF scores between the two

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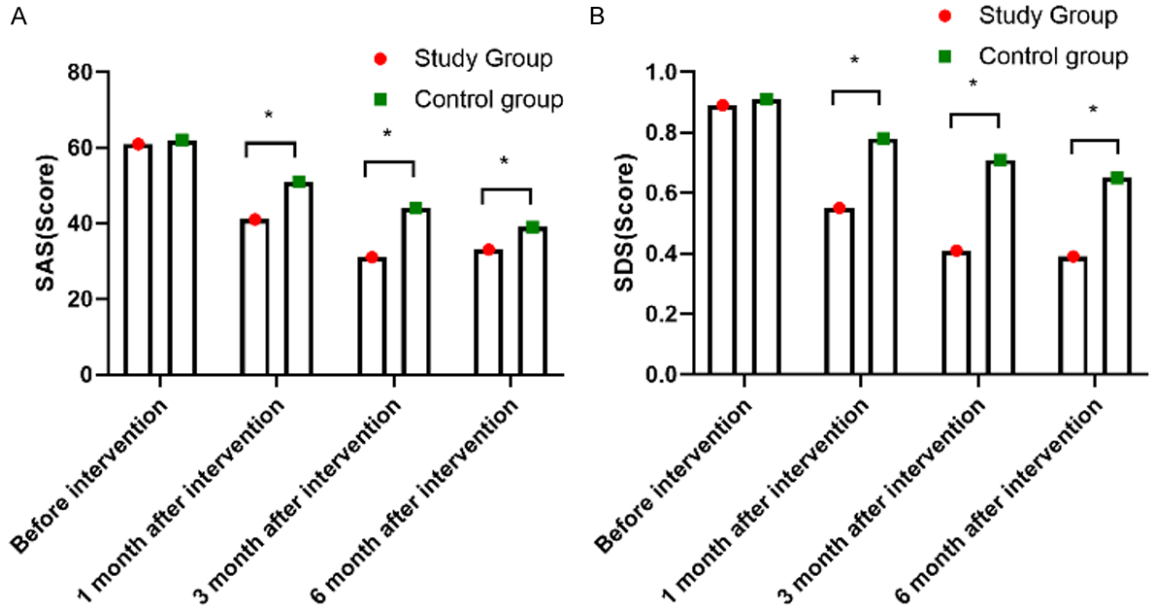


Figure 1. Analysis of the changes in the adverse emotions in the two groups before and after the intervention. There was no marked difference in the SAS scores between the two groups before the intervention ($P > 0.05$). At 1, 3 and 6 months after the intervention, the SAS and SDS scores in the study group were remarkably lower than they were in the control group ($P < 0.05$) (A and B). There was no significant difference in the SDS scores between the two groups before the intervention ($P > 0.05$). *indicates a statistically significant difference in the comparison of the same index at the same time between the two groups.

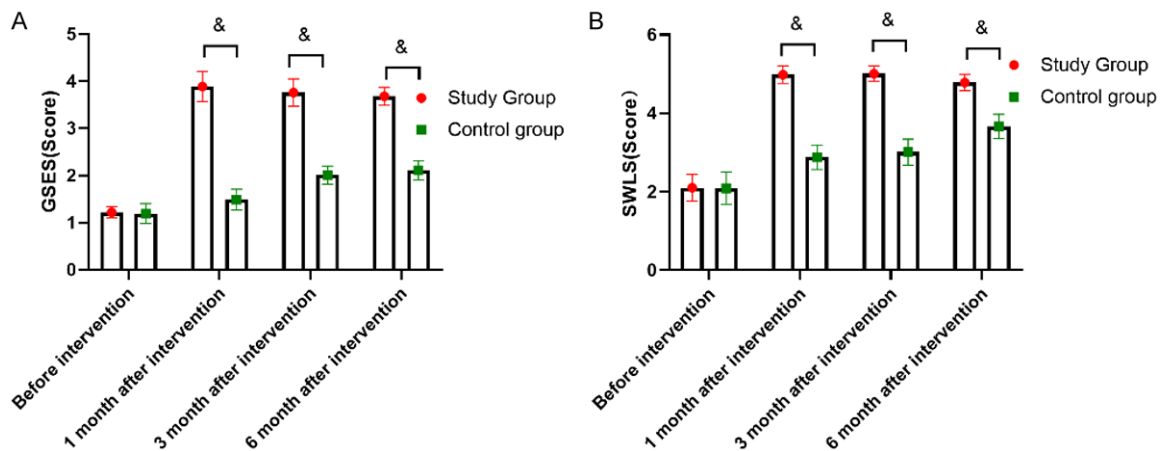


Figure 2. Analysis of the changes in self-efficacy and quality of life in the two groups before and after the intervention. There was no remarkable difference in the GSES scores between the two groups before the intervention ($P > 0.05$). At 1, 3, and 6 months after the intervention, the GSES and WHOQOL-BREF scores in the study group were markedly higher than they were in the control group ($P < 0.05$) (A and B). There was no significant difference in the WHOQOL-WHOQOL scores between the two groups before the intervention ($P > 0.05$). & indicates a statistically significant difference in the comparison of the same index at the same time between the two groups.

groups before the intervention ($P > 0.05$). After the intervention, the GSES and WHOQOL-BREF scores were significantly increased compared with the pre-intervention scores ($P < 0.05$). Meanwhile, a comparison between the groups

showed that at 1, 3, and 6 months after the intervention, the GSES and WHOQOL-BREF scores in the study group were markedly higher than they were in the control group ($P < 0.05$) (Figure 2).

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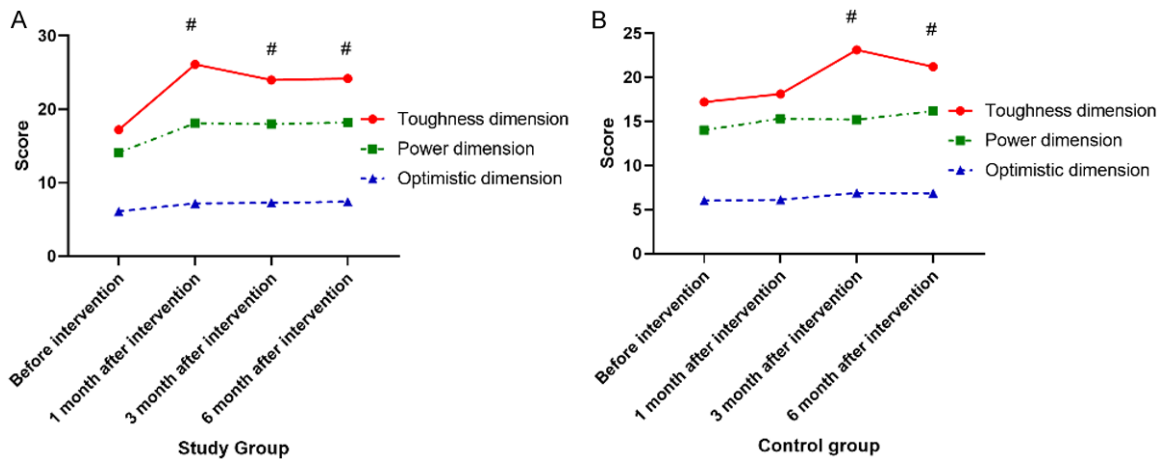


Figure 3. Changes in the psychological coping scores in the two groups before and after the intervention. After the intervention, the psychological coping scale scores in the study group were significantly elevated compared with the pre-intervention scores ($P < 0.05$) (A). Although the scores of psychological coping scale were increased in the control group after the intervention, there was a statistically significant difference in the scores of psychological coping scale in the control group between before intervention and at 3 months after the intervention ($P < 0.05$) (B). #represents a statistically significant difference between the groups before and after the intervention.

Changes in the psychological coping scores in the two groups before and after the intervention

The psychological coping scale scores in the study group after the intervention were markedly elevated compared with the pre-intervention scores ($P < 0.05$). Although the psychological coping scale scores were increased in the control group after the intervention, there were statistically significant differences in the psychological coping scale scores in the control group between before intervention and at 3 months after the intervention ($P < 0.05$). The comparisons between the groups suggested that the psychological coping scale scores in the study group were higher than they were in the control group at 1, 3, and 6 months after the intervention ($P < 0.05$) (Figure 3).

Correlation analysis of the self-efficacy, adverse emotions, and psychological coping scores of the traumatic fracture patients

The self-efficacy, anxiety, and depression scores of the enrolled subjects were included in the study, and the correlation of above three results were analyzed. The results showed that after the Spearman's correlation analysis was completed, the GSES scores of the traumatic fracture patients were negatively correlated with their SAS and SDS scores ($r = -0.8623$, $r = -0.6895$, $P < 0.05$), and were positively cor-

related with their COPE scale scores ($r = 0.7196$, $P < 0.05$) (Figure 4).

Discussion

Traumatic fractures are an exogenous traumatic event characterized by suddenness and unpredictability, and they can not only cause physical injuries to individuals, but they also greatly affect individual cognitive function and psychology, inducing the patients to have a strong stress response. One study found that since traumatic fracture patients have a sufficiently long therapeutic duration and restricted activities and have to undergo surgical treatment, they often have significant mental trauma. A clinical investigation of 1087 orthopedic inpatients showed that the incidence rate of anxiety of fracture patients was about 98%, and the patients' anxiety scale scores were significantly higher than normal. A study on fracture patients showed that the anxiety incidence rate in these patients was about 14% to 39% [15]. Clinical laboratory tests on traumatic fracture patients showed that fracture patients' serum norepinephrine and thyroxine levels elevated abnormally, which may have a certain impact on the patients' emotion, leading to a prolonged recovery duration [16].

Psychological coping, which originated in the 1970s, has been widely explored in the fields of psychology, clinical medicine, pedagogy, and

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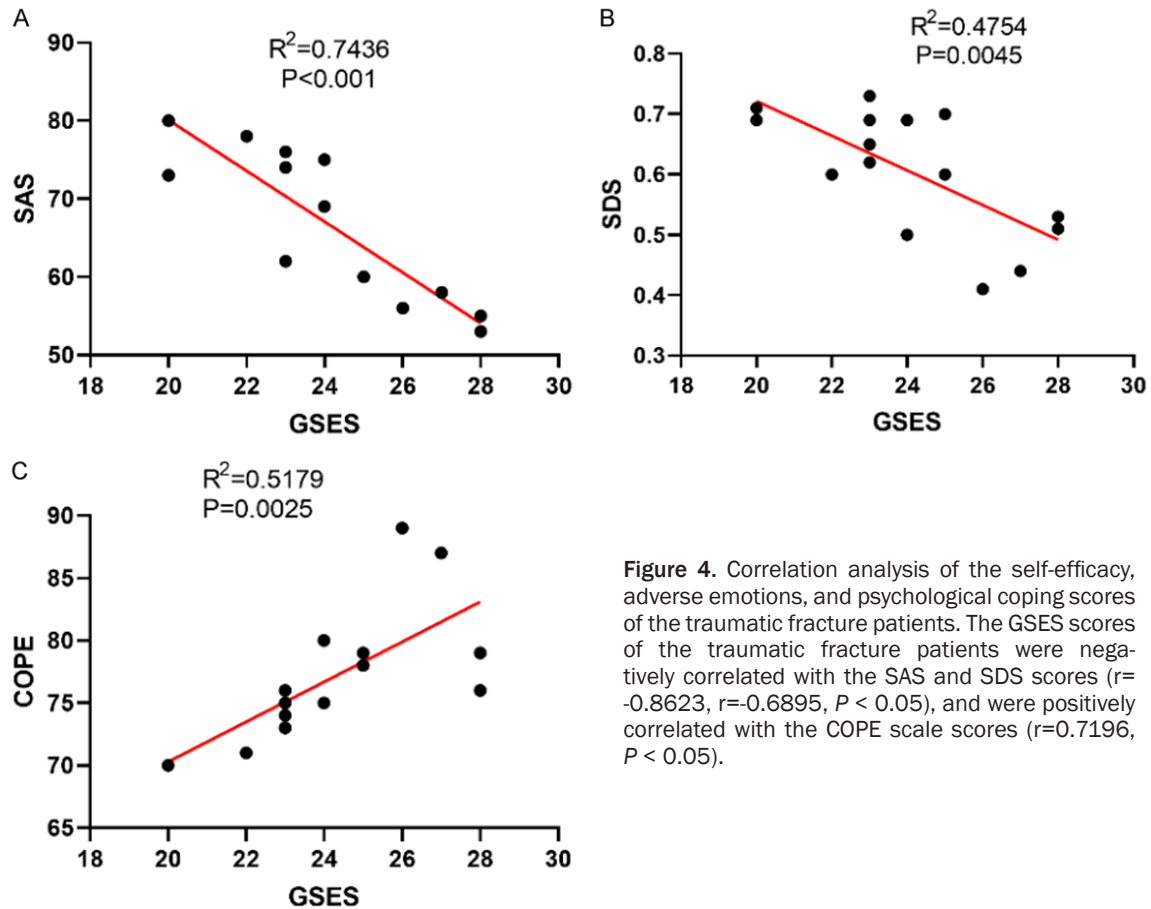


Figure 4. Correlation analysis of the self-efficacy, adverse emotions, and psychological coping scores of the traumatic fracture patients. The GSES scores of the traumatic fracture patients were negatively correlated with the SAS and SDS scores ($r=-0.8623$, $r=-0.6895$, $P < 0.05$), and were positively correlated with the COPE scale scores ($r=0.7196$, $P < 0.05$).

nursing. Psychological coping can be briefly described as a good adaptation process when individuals face great pressures (e.g., difficulties, trauma, and threats), and it is a coping capacity to handle difficulties [17, 18]. One study suggested that psychological coping is an important protective factor for individual psychological health. The correlation between the psychological coping and psychological health of college students shows that individual psychological health is positively correlated with psychological coping [19]. However, another investigation found that individual psychological coping directly affects patients' self-care abilities, therapeutic compliance, quality of life, and stress levels. An improvement in one's individual psychological coping can remarkably enhance individual self-efficacy and crisis coping abilities [20, 21].

In this study, two groups were established to analyze the adverse psychologies and psychological coping changes in traumatic fracture patients receiving self-efficacy interventions.

The results showed that the SAS and SDS scores in the study group undergoing self-efficacy interventions were remarkably lower than they were in the control group undergoing conventional nursing, suggesting that the self-efficacy intervention was conducive to improving the adverse psychologies of traumatic fracture patients. A controlled study on 100 traumatic fracture patients showed that a strengthened self-efficacy can remarkably alleviate patients' anxiety and depression. The anxiety scores of the patients were reduced from (87.29 ± 4.33) points to (50.19 ± 4.33) points, and their depression scores were reduced from (71.19 ± 4.33) points to (41.19 ± 3.11) points, which is similar to the results of this study [22]. The authors believe that self-efficacy is a positive clinical factor for the treatment and rehabilitation of patients. A higher self-efficacy can markedly boost patients' self-confidence in the treatment and improve depression symptoms and quality of life. This shows that self-efficacy is a decisive factor significantly affecting the organization and implementation of something

[23]. In this study, the self-efficacy and life satisfaction changes were assessed and compared between the two groups after the intervention. The results showed that the self-efficacy and life satisfaction in the study group were remarkably higher than they were in the control group after the intervention. One scholar indicated that the subjective well-being of fracture patients often was significantly decreased due to their extremity dysfunction, and self-efficacy intervention can markedly affect their life satisfaction and quality of life at this time [24]. The authors believe that psychological nursing and the formulation of the objectives in this study can effectively improve patients' confidence in the treatment, and their recognitions for their own abilities through continuously achieving small goals, thus improving their life satisfaction. The changes in the psychological coping scores in the two groups reveal that self-efficacy intervention can improve the psychological coping of traumatic fracture patients. An investigation into the psychological coping of 42 patients with spinal cord fractures during their hospital stays showed that psychological coping can remarkably affect individual emotions and postoperative rehabilitation. Patients with better psychological coping skills tend to be more cooperative with the treatment and rehabilitation, and they actively seek the help from the medical staff. Additionally, their psychological coping is remarkably changed through psychological intervention [25, 26]. The authors believe that psychological coping is closely related to individual psychological health. Psychological coping, an important predictive factor for reducing psychological stress responses and improving life satisfaction, contributes to post-traumatic neogenesis. The self-efficacy intervention can help patients tap their psychological potentials, and thus better adapt to the post-traumatic life and environment, giving full play to their subjective initiatives, and improving their psychological coping.

In summary, self-efficacy interventions can markedly improve the adverse emotions and self-efficacy and quality of life scores in traumatic fracture patients. The patients' self-efficacy is significantly positively correlated with the psychological coping scores. Therefore, self-efficacy intervention can be implemented to improve the traumatic coping abilities of

traumatic fracture patients. The innovation of this study lies in its detailed exploration of the intervention effects of self-efficacy on traumatic fracture patients from the perspectives of adverse emotions, quality of life, and psychological coping, thereby providing more detailed theoretical references for the subsequent treatment. The shortcomings of this study are as follows: (1) The changes in the adverse psychologies and psychological coping of patients with varying types of traumatic fractures undergoing self-efficacy intervention were not analyzed; (2) The small sample size led to a lack of comprehensiveness in the results. In view of the aforementioned shortcomings, we plan to perform the studies with a larger sample size and more groups, so as to provide a theoretical basis for the improvement of the prognoses of traumatic fracture patients.

Disclosure of conflict of interest

None.

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