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Original Article

The influence of self-efficacy intervention on the mental resilience of patients with traumatic fractures

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Abstract: Objective: A traumatic fracture significantly affects a patient's psychological state and further affects the patient's treatment compliance and rehabilitation effect. This study aimed to analyze the influence of self-efficacy intervention on the mental resilience of traumatic fracture patients. Methods: Seventy-five traumatic fracture patients admitted to our hospital from March 2017 to March 2019 were selected as the study cohort for a retrospective analysis and divided into two groups according to the sequence of admission, with 37 patients in the control group who received routine nursing intervention and 38 patients in the observation group who received self-efficacy intervention on the basis of routine nursing intervention, so as to compare the mental resilience, Symptom Checklist-90 scores, self-efficacy, acute stress reaction, life satisfaction, and nursing satisfaction in the two groups. Results: (1) The CD-RISC scores of the observation group were higher than those of the control group at 2, 4, 6, and 8 weeks after the intervention ($P<0.05$). (2) The SCL-90 scores of the observation group were much lower than the control group's scores after the intervention ($P<0.05$). (3) The observation group's GSES scores were much higher than the control group's scores after the intervention ($P<0.05$). (4) The observation group's scores for dissociative symptoms, re-experience, avoidance, irritability, and impairment were much lower than the control group's scores after the intervention ($P<0.05$). (5) The observation group's SWLS scores for life satisfaction were much higher than the control group's scores at 2, 4, and 8 weeks after the intervention ($P<0.05$). (6) The SCL-90 scores of the patients with good mental resilience were significantly lower than the scores of those with poor mental resilience, and their self-efficacy scores were significantly higher ($P<0.05$). Conclusion: The application of self-efficacy intervention to traumatic fracture patients can enhance their mental resilience and self-efficacy and improve their acute stress reactions.

Keywords: Traumatic fracture, self-efficacy intervention, mental resilience, influence

Introduction

Due to the remarkable development of transportation, architecture, and industry in the current society, the personnel in these fields are at a high-risk of accidents and demonstrate an increasingly high incidence of traumatic fractures caused by traffic accidents and occupational injuries [1]. Traumatic fractures, characterized by unpredictability and uncontrollability, often occur suddenly, so patients have to bear the physical pain and also the psychological, family, and social burdens at the same time [2].

Because traumatic fractures are a sudden and stressful event, the patients will suffer from obvious psychological stress and physical and mental trauma when they suddenly change from healthy to injured [3]. Traumatic stress includes various manifestations of physiological and psychological aspects. Therefore, if the patients' stress levels are extremely high in the physiological aspects, the body environment will be out of balance and even develop into a stage of stress failure in the serious cases, which directly threatens the life safety of patients [4, 5]. The psychological aspects mainly manifest as psychological disorders in different degrees and clearly negative emotions, which will further affect the quality of rehabilitation and life.

Considering the psychological stress of patients with traumatic fracture on the progress and

prognosis of disease, it is necessary to perform the proper interventions for the psychological stress of such patients. However, nursing interventions described in previous studies focused more on the disease itself, and have not conducted in-depth interventions in the psychological aspects, only focusing on the basic education and guidance. In this study, the self-efficacy intervention was applied in the nursing of patients with traumatic fracture so as to explore useful methods for enhancing the mental resilience of patients with traumatic fracture, thus ensuring that the patients can receive treatment and smoothly recover as soon as possible.

Materials and methods

Materials

Seventy-five traumatic fracture patients who were admitted to our hospital from March 2017 to March 2019 were selected as the study cohort for a retrospective analysis and divided into two groups according to the sequence of admission. There were 37 patients in the control group, including 21 men and 16 women, with the average age of 15-67 years; and there were 38 patients in the observation group, including 20 men and 18 women, with an average age of 17-65 years. (1) Inclusion criteria [6]: This study included patients who suffered limb fractures due to an accident and who also had soft tissue and nerve injuries; those treated with surgery; those aged 70 years old or below; those without cognitive disorders; and those who signed an informed consent form. In addition, this study was approved by the Ethics Committee of Nanchang Hongdu Hospital of TCM. (2) Exclusion criteria: This study excluded patients who suffered from non-traumatic fractures; those with other organic diseases; those unlikely to have a successful treatment due to their critical conditions; and those who were complicated with mental disorders and thus not able to complete the scale investigation component of the study.

Methods

The control group patients received routine nursing intervention, including basic health education, basic psychological counseling, position management, catheter nursing, pain nursing, diet management, complication prevention and nursing, and guidance in functional exercises, etc.

The observation group patients received self-efficacy intervention on the basis of the same nursing contents provided for the control group, with the specific methods shown below.

Deep implementation of health education: After the patients were admitted to the hospital, the nurses were required to conduct a basic evaluation and determine the contents of the health education based on the evaluation results. Then, the nurses provided the health brochure for the patients and introduced the key contents of the brochure to the patients in detail, such as fracture staging, common uncomfortable symptoms, security guidance, fracture healing and functional exercises. Finally, the patients were informed of the importance of functional exercises in the early stages after surgery, as well as the methods and specific precautions of the functional exercises, the psychological regulation methods, methods of preventing fracture complications, the superiority of persistence in functional exercises, and the reexamination times, etc. The nurses carried out the health education according to the admission process, hospitalization, and discharge so that the patients could have a good command of health knowledge.

Sufficient motivation to patients: The nurses were required to maintain effective communication with the patients, establish a harmonious nurse-patient relationship, and give sufficient care and nursing to the patients. The nurses may know the past experience of the patients in successfully coping with disease through their family members and take these events as the source of encouragement to guide the patients to deal with the disease properly, keep a positive and peaceful attitude, regulate their unhealthy emotions consciously and adapt to the post-traumatic life rapidly. Also, the nurses voiced encouragement at any progress made by the patients to enhance their confidence.

Verbal persuasion to patients: The nurses were required to occasionally communicate with the patients separately, and to think about the patients from the perspective of the patients, listen to the patients attentively, encourage the patients to raise questions, and provide the

patients with professional answers. In the process of answering, the nurses strengthened their persuasion based on scientific facts. The nurses did their best to relieve the patients' psychological burdens, alleviate their negative emotions, and maintain a nurse-patient relationship through constant persuasion.

Elimination of negative factors: The nurses were required to encourage the patients to express their inner troubles and then offer the correct guidance to the patients so as to reduce the patients' psychological stress levels. The nurses guided the patients to master the attribution method, helped them with self-relaxation, and led them to distract their attention by reading and listening to music. The patients were prevented from hearing any bad news. The nurses introduced funny people and things to the patients when possible to distract the patients' attention away from the disease.

The establishment of a "behavior contract": The nurses were required to formulate small stage goals together with the patients according to the patients' actual disease state so as to form a behavior contract and divide the goal in each stage into smaller and easier goals to achieve the final overall goal by finishing all the smaller and easier goals step by step. For example, the postoperative functional exercise was divided into 4 stages. Therefore, Stage 1 which referred to the period within 2 weeks after surgery, included muscle strength exercise and isometric contractions of the appendicular and quadriceps femoris muscles; Stage 2 included the exercise of joint motion on the basis of muscle strength exercises; Stage 3 included weight training exercises in addition to the above exercises near the time of fracture healing; and Stage 4 mainly included the exercise of self-care ability. Moreover, the nurses guided the patients to record the contents, effects, and feelings of their own rehabilitation exercises through diaries so as to enhance the patients' consciousness.

Application of "vicarious experience": In fact, a vicarious experience, aiming to encourage the patients by taking advantage of examples, is especially applicable to patients without self-experience. The nurses held a symposium once a week and invited the patients with better rehabilitation efficacy to advise the others by using their own experiences, demonstrating their own exercise methods on the spot and introducing their own successful experiences to the other patients. Under the encouragement of nurses, the patients actively communicated with each other, shared their own experiences with others and proposed solutions. The patients' self-efficacy was improved through such symposiums many times.

Emphasis on family and social support: The nurses were required to provide health education for the patients' family members, friends, and colleagues to make these people realize the effect of social support on patient recovery. In addition, the nurses encouraged these people to care of and support the patients and express sufficient understanding and take care of the patients, so that the patients could feel the positive emotions from their family and society and return to their normal lives more rapidly after appreciating their self-worth and the enhancement of their confidence in the rehabilitation.

Observation targets

(1) Mental resilience: The mental resilience was evaluated using the Connor-Davidson Resilience Scale (CD-RISC) [7] before the intervention and at 2 weeks, 4 weeks, 6 weeks, and 8 weeks after the intervention, including the 5 dimensions of ability, tolerance to negative emotions, acceptance of changes, control, and emotional support. There were a total of 25 items each scored according to Grades 0-4, with 0-4 scores respectively representing never, seldom, sometimes, often, and always. The total possible score of this scale is 100. The higher scores indicated better mental resilience. A score above 50 is regarded as a good state of mental resilience, while a score below 50 is regarded as a poor state of mental resilience.

(2) Symptom improvement: The symptom improvement was evaluated using Symptom Checklist 90 (SCL-90) [8] respectively before and after the intervention. It examines 10 factors, i.e. psychotic symptoms, somatization, phobic symptoms, obsession and compulsion, depression, hostile emotions, sensitivity of interpersonal relationships, anxiety, paranoid symptoms, and others. There were a total of 90 symptoms scored according to Grades 1-5, with Grades 1-5 respectively representing no

Table 1. Comparison of the general data in the observation and control groups ($\bar{x}$±s)/[n (%)]

Data		Observation group (n=38)	Control group (n=37)	t/X^2	*P*
Gender	Male	20 (52.63)	21 (56.76)	0.129	0.720
	Female	18 (47.37)	16 (43.24)		
Age (years old)		47.53±14.95	48.62±15.73	0.308	0.759
Cause of injury	Traffic accident	17 (44.74)	19 (51.35)	0.329	0.566
	Occupational injury	21 (55.26)	18 (48.65)		
Injured part	Upper limbs	16 (42.11)	14 (37.84)	0.637	0.205
	Lower limbs	15 (39.47)	16 (43.24)		
	Forelimbs	7 (18.42)	7 (18.92)		

symptoms, mild symptoms, moderate symptoms, severe symptoms, and extremely severe symptoms. The scores of this scale ranged from 12 to 60. Scores from 12-24 indicated unobvious symptoms, scores from 25-36 indicated relatively obvious symptoms, and scores from 37-60 indicated extremely obvious symptoms.

(3) Self-efficacy: Self-efficacy was evaluated using the General Self-efficacy Scale (GSES) [9] before and after the intervention. There were a total of 10 items scored according to Grades 1-4, with the scores of 1-4 indicating complete incorrectness, little correctness, most correctness, and complete correctness. The scores of this scale were between 10 and 40. The higher scores indicated a stronger sense of self-efficacy.

(4) Acute stress reaction: The acute stress reaction was evaluated using the Stanford Acute Stress Reaction Questionnaire (SASRQ) [10] before and after the intervention, including dissociative symptoms (10 items), re-experience (6 items), avoidance (6 items), irritability (6 items), and impairment (2 items). There were a total of 30 items scored according to Grades 0-5, with the scores of 0 and 5 indicating no experience and frequent experience. The scores above 5 aspects were respectively 50, 30, 30, 30 and 10. The higher scores indicated stronger acute stress reactions.

(5) Life satisfaction: Life satisfaction was evaluated using the Satisfaction with Life Scale (SWLS) [11] before the intervention and at 2 weeks, 4 weeks, and 8 weeks after the intervention. This scale included 5 items scored according to Grades 1-7, with 1 and 7 representing complete disagreement and complete agreement. The possible scores of this scale ranged between 5 and 35. Higher scores indicated higher life satisfaction.

Statistical methods

SPSS 22.0 was used for the statistical analysis. The measurement data were represented as the mean ± standard deviation. Independent-samples *t* tests were used for the comparisons between groups and within a group. The enumeration data were represented by [n (%)]. X^2 tests were used for the comparisons between groups and within a group. $P<0.05$ indicated that a difference had statistical significance.

Results

Comparison of the general data in the two groups

There were no significant differences in terms of gender ratio, average age, proportion of traffic accident or occupational injuries, or the proportion of injuries in the upper limbs, lower limbs and forelimbs between the two groups ($P>0.05$) (**Table 1**).

Comparison of the mental resilience in the two groups

The CD-RISC scores for mental resilience were (23.63±4.48) in the observation group and (22.19±4.15) in the control group before the intervention; the scores were (32.59±5.75) in the observation group and (25.46±4.38) in the control group at 2 weeks after the intervention; the scores were (39.86±6.84) in the observation group and (33.65±5.49) in the control group at 4 weeks after the intervention; the scores were (48.63±7.27) in the observation group and (42.15±6.38) in the control group 6 weeks after the intervention; and the scores

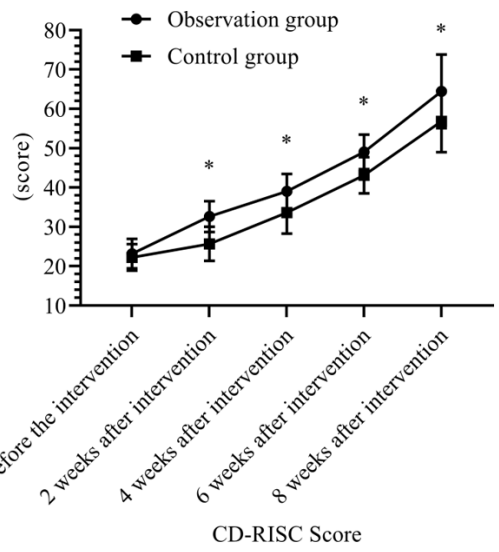

Figure 1. Comparison of the CD-RISC scores for mental resilience in the observation and control groups. There was little difference in the CD-RISC scores in two groups before the intervention (P>0.05). The CD-RISC scores in the observation group were much higher than of the scores in the control group at 2 weeks, 4 weeks, 6 weeks, and 8 weeks after the intervention (P<0.05). *means P<0.05 when two groups were compared at the same time.

were (64.53±8.23) in the observation group and (57.46±7.21) in the control group at 8 weeks after the intervention. There was little difference in the CD-RISC scores of the two groups before the intervention (*P*>0.05). The CD-RISC scores of the observation group were higher than the scores in the control group at 2 weeks, 4 weeks, 6 weeks, and 8 weeks after the intervention (*P*<0.05) (**Figure 1**).

Comparison of the symptom improvement in the two groups

There were no significant differences in the SCL-90 scores in the two groups before the intervention (*P*>0.05). The SCL-90 scores in the two groups were reduced after the intervention in comparison with the scores before the intervention (*P*<0.05). The SCL-90 scores in the observation group were much lower than the scores in the control group after intervention (*P*<0.05) (**Table 2**).

Comparison of the self-efficacy in the two groups

There was little difference in the GSES scores in the two groups before the intervention (*P*>0.05). The GSES scores in the two groups increased after intervention in comparison with those in the groups before the intervention (*P*<0.05). The GSES scores of the observation group were much higher than those of the control group after the intervention (*P*<0.05) (**Table 3**).

Comparison of the acute stress reactions in the two groups

Before the intervention, the scores for dissociative symptoms were (38.45±5.61) in the observation group and (37.55±4.96) in the control group; the scores for re-experience were (20.31±3.64) in the observation group and (20.64±3.85) in the control group; the scores for avoidance were (21.65±3.84) in the observation group and (20.16±3.94) in the control group; the scores for irritability were (20.89±4.65) in the observation group and (21.06±4.38) in the control group; and the scores for impairment were (5.63±2.37) in the observation group and (5.84±2.61) in the control group.

After the intervention, the scores for dissociative symptoms were (15.64±3.30) in the observation group and (20.45±4.62) in the control group; the scores for re-experience were (10.84±1.61) in the observation group and (14.87±2.13) in the control group; the scores for avoidance were (9.68±1.64) in the observation group and (13.67±1.84) in the control group; the scores for irritability were (10.43±1.82) in the observation group and (14.22±2.03) in the control group; and the scores for impairment were (3.29±0.84) in the observation group and (3.88±0.86) in the control group.

There was little difference in the scores for dissociative symptoms, re-experience, avoidance, irritability, and impairment in the two groups before the intervention (*P*>0.05), and the scores in the observation group were much lower than of the scores in the control group after the intervention (*P*<0.05) (**Figures 2**, **3**).

Comparison of life satisfaction in the two groups

The SWLS scores for life satisfaction were (10.25±2.61) in the observation group and (10.84±2.63) in the control group before the

Table 2. Comparison of the changes in the SCL-90 scores in the observation and control groups ($\bar{x}$±s, scores)

Group	Number of cases	Before intervention	After intervention	*t*	*P*
Observation group	38	34.52±4.49	20.16±3.89	14.901	0.000
Control group	37	33.86±4.51	24.84±4.18	8.923	0.000
t		0.635	5.021		
P		0.527	0.000		

Table 3. Comparison of the GSES self-efficacy scores before and after the intervention in the observation and control groups ($\bar{x}$±s, scores)

Group	Number of cases	Before intervention	After intervention	*t*	*P*
Observation group	38	8.24±1.96	22.85±5.64	15.084	0.000
Control group	37	8.51±1.65	17.96±4.81	11.304	0.000
t		0.645	4.035		
P		0.521	0.000		

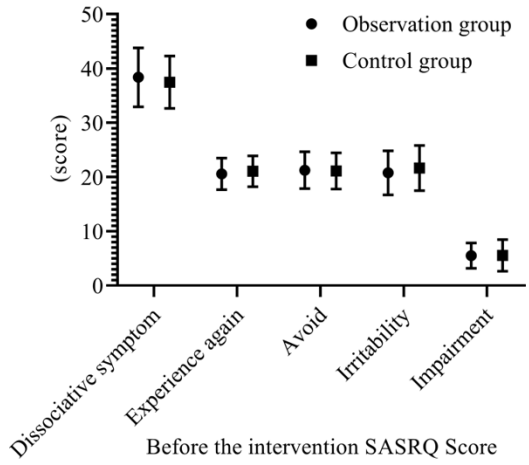

Figure 2. Comparison of the acute stress reactions before the intervention in the observation and control groups. There was little difference in dissociative symptoms, re-experience, avoidance, irritability and impairment in the two groups before the intervention (*P*>0.05).

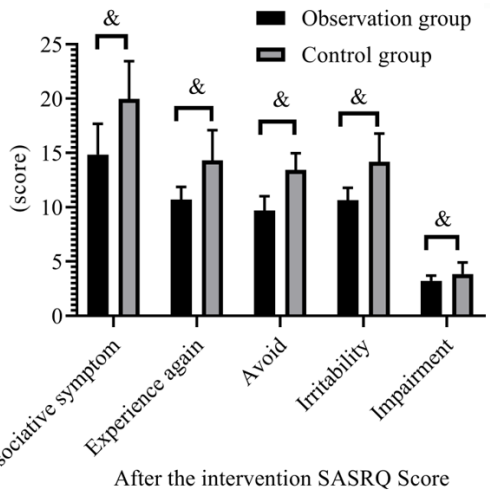

Figure 3. Comparison of the acute stress reactions after the intervention in the observation and control groups. The dissociative symptom, re-experience, avoidance, irritability and impairment scores in the observation group were much lower than they were in the control group after the intervention (*P*<0.05). &means *P*<0.05 with regard to the comparison of the same indicator.

intervention; the scores were (15.78±3.21) in the observation group and (12.72±2.64) in the control group 2 weeks after the intervention; the scores were (20.64±3.85) in the observation group and (16.38±3.51) in the control group at 4 weeks after the intervention; and the scores were (26.75±4.13) in the observation group and (21.13±3.85) in the control group at 8 weeks after the intervention. There was little difference in the SWLS scores for life satisfaction in two groups before the intervention (*P*>0.05). The SWLS scores for life satisfaction in the observation group were much higher than they were in the control group at 2 weeks, 4 weeks, and 8 weeks after the intervention (**Figure 4**).

The correlation between mental resilience and symptom improvement

Among the 38 patients in the observation group, there were 26 patients with good mental resilience, and 12 patients with poor mental resilience. The SCL-90 score of the patients

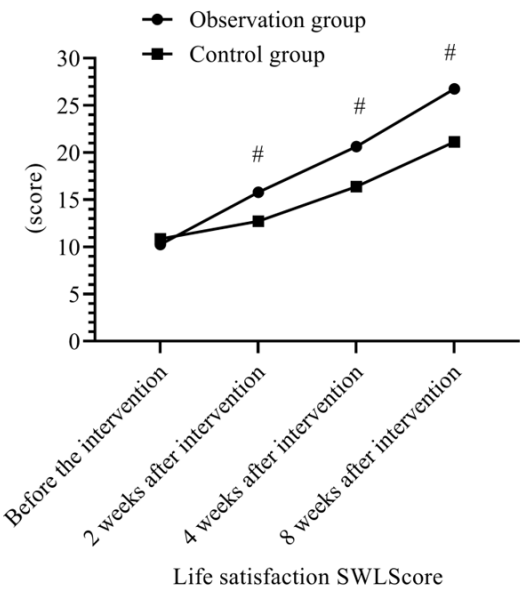

Figure 4. Comparison of the SWL scores for life satisfaction in the observation and control groups. There was little difference in the SWL scores in the two groups before the intervention ($P>0.05$). The SWL scores of the observation group were much higher than they were in the control group at 2 weeks, 4 weeks, and 8 weeks after the intervention ($P<0.05$). #means $P<0.05$ when the two groups were compared at the same time.

with good mental resilience was (21.16±2.21), which was significantly lower than the score of (26.83±3.36) of the patients with poor mental resilience ($P<0.05$).

The correlation between mental resilience and self-efficacy

Among the 38 patients in the observation group, the self-efficacy score of the 26 patients with good mental resilience was (24.68±3.42), which was significantly higher than the score of (20.13±2.38) in the 12 patients with poor mental resilience ($P<0.05$).

Discussion

Traumatic fracture refers to the damage to body integrity due to unpredictable and paroxysmal trauma, which can cause psychological stress reactions in different degrees [12]. Self-efficacy refers to the overall confidence level of an individual when this individual challenges different environments or deals with new things [13]. Stress refers to the systemic and nonspecific adaptive reaction of the body under different stimulating factors [14]. The stressor forms the stress reaction through intermediary factors, leading to various physiological and psychological effects. If the body is always under a higher stress level continuously, there will be obvious physiological and emotional changes, changes which significantly affect a patient's physical and psychological health [15, 16]. In this study, traumatic fracture was the stressor and the mental resilience of patients was the intermediate variable that affected the stress results [17]. This study aimed to analyze the influence of self-efficacy interventions on the mental resilience of traumatic fracture patients.

This study showed that the CD-RISC scores for mental resilience in the observation group were higher than of the scores in the control group at 2 weeks, 4 weeks, 6 weeks, and 8 weeks after the intervention, and the CD-RISC scores were also very different from those before the intervention ($P<0.05$). Furthermore, the SCL-90 scores in the observation group were much lower than of the scores in the control group after the intervention ($P<0.05$), an indication that the self-efficacy intervention can be used to help traumatic fracture patients achieve a higher mental resilience level and a higher degree of adaptability to sudden negative events. Ersan [18] et al. found that mental resilience and self-efficacy were closely related to each other in patients suffering from accident trauma, and self-efficacy is one of the protective factors in the mental resilience development model developed in studies. Hendrix et al. [19] indicated that traumatic fracture patients realized their own role in the treatment and rehabilitation of disease after receiving the persuasion, encouragement, information, and education from nurses, so patients were willing to participate in rehabilitation exercises with a higher confidence in the rehabilitation, and the nurse-patient cooperation model was also improved accordingly. In this study, the scores for dissociative symptoms, re-experience, avoidance, irritability and impairment in terms of acute stress reactions in the observation group were much lower than the scores in the control group after the intervention ($P<0.05$), which implied that the stress reaction of traumatic fracture patients was relieved obviously after the implementation of self-efficacy intervention and the patients, with better psychological self-adjustment abilities, a lower probability of developing negative emotions, and a higher compliance with nursing implementation, could

deal with the treatment and rehabilitation peacefully and achieve an ideal nursing quality [20].

As shown in this study, the SWLS scores for life satisfaction in the observation group were much higher than of the scores in the control group at 2 weeks, 4 weeks, and 8 weeks after the intervention, and the SWLS scores were much higher than those before the intervention ($P<0.05$), which implied that the method of self-efficacy intervention could be used to improve the quality of life of patients and thus enhance the patients' life satisfaction. It was determined that the nurses maintained a positive interaction with patients through professional, systematic, and accurate nursing interventions, and they also emphasized mental nursing in the process of intervention to relieve the unhealthy emotions of patients, so the patients could actively participate in the treatment and rehabilitation of disease, guarantee the quality of rehabilitation, and enhance the recovery effect of the quality of life [21]. Lloyd et al. [22] and Rayan et al. [23] indicated that the quality of life was related to the mental resilience of patients. Molla Jafar et al. [24] found in a study that the perceived negative stress and life satisfaction were negatively correlated to each other and that life satisfaction and mental resilience were positively correlated with each other. This implies that nurses should stress communication with patients and provide more moral encouragement and care for patients to improve their life satisfaction [25].

In conclusion, the application of self-efficacy intervention on patients with traumatic fractures can enhance their mental resilience and self-efficacy and improve their acute stress reactions. However, this is a single-center study with a small sample. The study included a small cohort, and the analysis of the results is not comprehensive, leading to biased results. In a future study, we will focus on gathering a larger sample size and conducting more comprehensive, in-depth research to obtain more scientific and representative research conclusions, so as to provide more guidance for the nursing intervention of patients with traumatic fractures.

Disclosure of conflict of interest

None.

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