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*Original Article*

# Effect of mindfulness cognitive behavior intervention on self-efficacy, self-management ability and self-perceived burden in elderly patients with hip fracture fixation

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**Abstract:** Objective: The aim of this study was to evaluate the effect of mindfulness cognitive behavior intervention (MCBI) on self-efficacy, self-management ability and self-perceived burden in elderly patients with hip fracture fixation. Methods: Patients with hip fracture fixation admitted to our hospital from May 2018 to May 2020 were included and randomly divided into an observation group (n=50) and a control group (n=50). Patients in the control group were given routine postoperative nursing, while those in the observation group received MCBI on the basis of routine postoperative nursing. After 120-day follow-up, self-perceived burden, self-management ability, self-efficacy score, Harris hip joint score and Barthel index of patients in both groups were measured before intervention and at 30, 60, 120 and 180 d after intervention. Results: Before and at 120 d after intervention, patients in the observation group had significantly higher score of general self-efficacy scale (GSEC) and significantly lower final score of self-perceived burden than those in the control group ($P < 0.05$). Conclusion: MCBI is able to appropriately improve the mindfulness cognition level of elderly patients with hip fracture fixation. On this basis, it can not only improve self-management ability, self-efficacy and self-perceived burden of patients, but also effectively promote their recovery after surgery, which has a positive significance for postoperative recovery. Therefore, MCBI is worthy of wide application in clinical recovery.

**Keywords:** Mindfulness cognitive behavior, intervention study, fracture fixation, self-perceived burden

## Introduction

With the increase of aging population, elderly patients have a growing incidence of osteoporosis or bone tissue necrosis, eventually leading to hip fracture [1]. Hip fracture fixation is currently the most commonly used treatment for hip fracture, with good reduction and fixation effect, less bleeding and fewer pain due to fractures. However, many patients may experience postoperative psychological changes and negative emotions, which directly affect their postoperative recovery. Mindfulness cognitive behavior intervention (MCBI) originated in meditation [2]. It helps people pay attention to the current events and ensure sufficient attention and vigilance, which mainly aims to reduce psychological burden of patients, relieve the impact of negative emotions and improve postoperative recovery rate [3, 4]. Relevant researches have shown that, on the one hand, MCBI helps patients reduce the impact of negative emotions, and on the other hand, it effectively alleviates the postoperative stress reaction of patients, so as to increase the therapeutic effect of surgery [5]. This randomized and controlled study was designed to investigate the effects of MCBI on self-efficacy and self-perceive in elderly patients with hip fracture fixation. The details are as follows.

## Materials and methods

### *General materials*

A total of 100 elderly patients with hip fracture fixation admitted to our hospital from May 2018 to May 2020 were included and randomly divided into an observation group and a control group, with 50 cases in each group.

Inclusion criteria: (1) Patients aged between 65 and 82 years; (2) Those with unilateral fracture in line with the surgical indication of fixation; and (3) Those who had the ability to communicate normally. This study was approved by the Ethics Committee of Huzhou Cent Hospital, Affiliated Cent Hospital Huzhou University. The research objects and their families were informed and signed a fully-informed consent form.

Exclusion criteria: (1) Patients with bilateral fracture; (2) Those with the history of contralateral femoral fracture; (3) Those with comminuted fracture; (4) Those with severe organ dysfunction such as heart, liver, kidney, *etc*.; (5) Those with cognitive impairment; and (6) Those loss of follow up.

*Intervention methods*

After the internal fixation of hip fracture, patients in the control group and the observation group were given routine nursing. Patients in the control group could move corresponding quadriceps femoris and perform ankle helix as well as the isometric contraction training of hamstring muscles at 6 h after surgery. Training intensity, depending on the patient's pain tolerance, is usually maintained at 400 to 500 times per day. About a week after surgery, patients need to gradually practice high knee lift, lateral leg lift and backward leg lift of the straight leg. Patients in the observation group additionally received MCBI based on training in the control group, which usually began a week after surgery. During this process, patients were required to close their eyes and constantly felt the changes in various parts of their body under the trainer's instructions. After that, the trainer also guided patients to have abdominal breathing and focus on the resultant abdominal movement. Two to three weeks after surgery, the trainer started training patients with mindfulness relaxation. During the exercise process of postoperative rehabilitation, patients were required to maintain absolute attention and calm in the current exercise process to fully concentrate. Staying calm during training was helpful for patients to fully understand the degree of muscle tightness and enhance the sensitivity of muscle tightness training. Four weeks after surgery, the training of mindfulness facial features was started. The trainer guided patients to feel the changes of the things around them from the five senses of sight, touch, hearing, taste and smell. More than that, trainer should not analyze, criticize or react. In the whole postoperative rehabilitation training, the changes of patients' emotion and psychological thinking were observed. Patients were asked to carefully feel the process of emotion generation and disappearance, and then consolidate this training. After the whole set of training, the trainer organized patients to practice the sequence method repeatedly, with usually once or twice a week and 90 minutes each time. Besides, trainer also encouraged patients to continue to practice this training as a healthy lifestyle at home after discharge.

*Observation index and assessment standard*

*Comparison of mindfulness cognition level before and after intervention:* Mindful attention awareness scale (MAAS) was used to evaluate mindfulness cognition level of the patients before MCBI and at 30, 60, 120 and 180 d after MCBI, respectively. MAAS consists of 10 items, including cognitive, psychological, emotional and physiological status. All the items are rated on a 6-point scale, and higher scores indicate higher mindfulness cognition level.

*Comparison of self-perceived burden before and after intervention:* Before MCBI and at 30, 60, 120 and 180 d after MCBI, self-perceived burden scale (SPBC) was used to evaluate self-perceived burden of the patients, which contains 10 items, with each item scored by a 5-grade method. Higher scores refer to heavier self-perceived burden.

*Comparison of self-efficacy scores before and after intervention:* The self-efficacy of patients was evaluated by general self-efficacy scale (GSES) before MCBI and at 30, 60, 120 and 180 d after MCBI, respectively. GSES has 10 items including symptom management, generality management, *etc*., using a 4-point scale. Higher scores indicate higher self-efficacy.

*Comparison of Harris hip score before and after intervention:* Harris hip joint index was used to evaluate joint function before MCBI and at 30, 60, 120 and 180 d after MCBI, respectively, which includes pain degree, rehabilitation walking gait, daily activity ability, walking distance, whether patients use walking aids in recovery process, the postoperative

**Table 1.** Comparison of general clinical indices between the two groups ($\bar{x} \pm s$)

| General materials | | Observation group (n=50) | Control group (n=50) | *t* | *P* |
|---|---|---|---|---|---|
| Gender | Male | 26 | 30 | 0.649 | 0.420 |
| | Female | 24 | 20 | | |
| Average age (years) | | 72.53±5.72 | 72.27±5.53 | 0.231 | 0.818 |
| Fracture site | Femoral neck fracture | 23 | 22 | 0.488 | 0.784 |
| | Intertrochanteric fracture | 17 | 20 | | |
| | Intertrochanteric fracture | 10 | 8 | | |

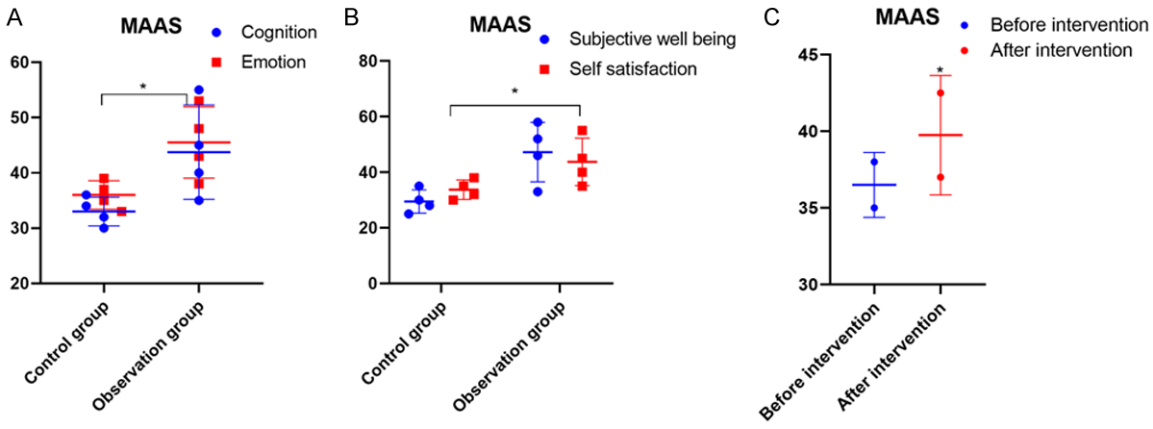


**Figure 1.** Comparison of mindfulness cognition level before and after intervention between the two groups. Before intervention, there was no significant difference in MAAS score between the two groups ($P > 0.05$). At 30, 60, 120 and 180 d after intervention, MAAS scores of two groups were higher than those before intervention. The observation group had significantly higher scores in cognition, emotion, subjective well-being and self-satisfaction (*$P < 0.05$).

motion range of hip joint, postoperative deformities, *etc*. The full score of Harris hip joint is 100. Score ≥ 90 refers to excellent, < 90 and ≥ 80 refers to good, < 80 and ≥ 70 refers to poor and < 70 refers to very poor.

*Comparison of Barthel index before and after intervention:* Barth index was used to evaluate activities of daily living of the patients before MCBI and at 30, 60, 120 and 180 d after MCBI, respectively. Barth index comprises 15 items including self-care index, activities of daily living index, *etc*. All the items are rated on a 4-point scale, and higher scores indicate stronger ability of activities of daily living after surgery.

*Statistical analysis*

SPSS 20.0 software was performed for statistical analysis. Measurement data were expressed as $\bar{x} \pm s$, and differences between groups were compared by Student's *t* test. Counting data were expressed as *n* (%), and differences between groups were compared by chi-square test. $P < 0.05$ was considered statistically significant.

## Results

*Comparison of general clinical indices between the two groups*

There was no significant difference in general clinical indices including gender, average age or fracture site between the two groups ($P > 0.05$), which were comparable (**Table 1**).

*Comparison of mindfulness cognition level before and after intervention between the two groups*

Patients between the two groups had no significant difference in MAAS score before intervention ($P > 0.05$). After intervention, MAAS scores of the two groups were significantly higher than those before intervention ($P < 0.05$, **Figure 1**).

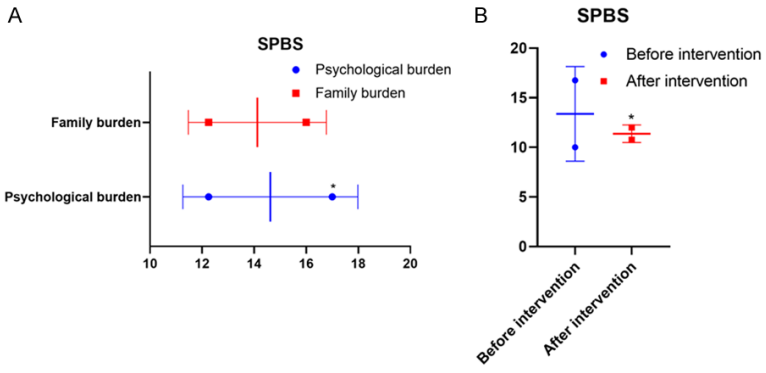


**Figure 2.** Comparison of SPBS scores before and after intervention between the two groups. The SPBS scores of patients between the two groups show no significant difference before intervention ($P > 0.05$), while after intervention patients in the observation group had significantly lower SPBS score than those in the control group ($^*P < 0.05$).

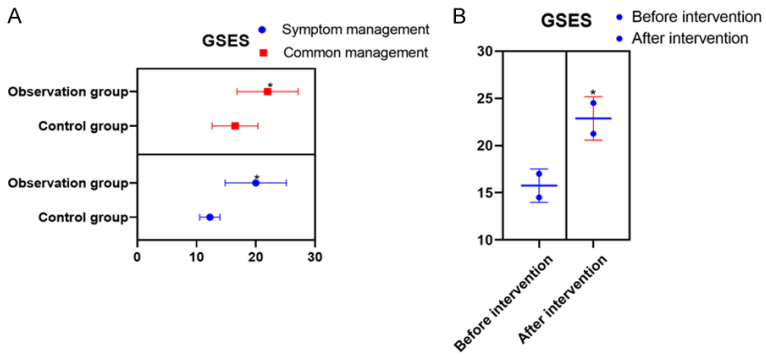


**Figure 3.** Comparison of GSES scores before and after intervention between the two groups. Before and after intervention, no significant difference was shown in each dimension of GSES scores between the two groups ($P > 0.05$). After intervention, GSES scores of both groups were significantly higher than those before intervention ($^*P < 0.05$).

*Comparison of SPBS scores before and after intervention between the two groups*

The SPBS score of patients between the two groups showed no significant difference before intervention ($P > 0.05$), while patients in both groups had significantly lower SPBS score after intervention ($P < 0.05$), and the score of the observation group was significantly lower than that of the control group after intervention ($P < 0.05$, **Figure 2**).

*Comparison of GSES scores before and after intervention between the two groups*

Before and after intervention, there was no significant difference in all dimensions of GSES scores between the two groups ($P > 0.05$). After intervention, GSES scores in both groups were significantly higher than those before treatment ($P < 0.05$, **Figure 3**).

*Comparison of Harris hip scores before and after intervention between the two groups*

Harris hip scores between the two groups showed no significant difference before intervention ($P > 0.05$). After intervention, both groups had significantly elevated Harris hip scores, showing statistical difference ($P < 0.05$, **Figure 4**).

*Comparison of Barthel index before and after intervention between the two groups*

Patients between the two groups had no significant difference in Barthel index before intervention ($P > 0.05$), which was significantly increased after intervention ($P < 0.05$), and Barthel index in the observation group was significantly higher than that in the control group ($P < 0.05$, **Figure 5**).

## Discussion

Among the many causes of disability in the elderly, hip fracture accounts for an extremely high proportion, which may not only affect the physical and psychological status, but also the normal social and quality of life [6, 7]. Besides, hip fracture brings heavy financial burden on the family and society. Therefore, the trainer conducted the rehabilitation treatment to the elderly combined with MCBI, accelerated postoperative recover and reduced the adverse impact on the elderly, family and society due to fracture [8].

As a novel way of rehabilitation exercise in the medical treatment of fractures, MCBI can skillfully combine rehabilitation medicine with psychology [9, 10]. MCBI starts with patients' consciousness and thought and helps patients

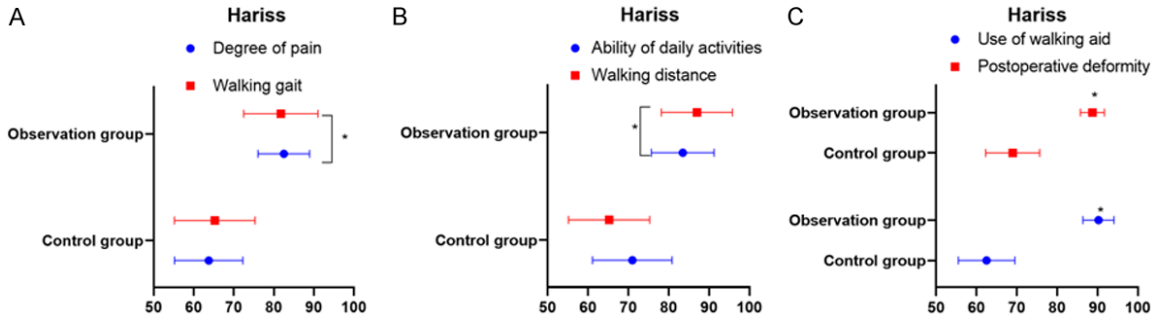


**Figure 4.** Comparison of Harris hip scores before and after intervention between the two groups. Harris hip scores between two groups showed no significant difference before intervention ($P > 0.05$), while both groups had significantly higher Harris hip scores after intervention ($^*P < 0.05$).

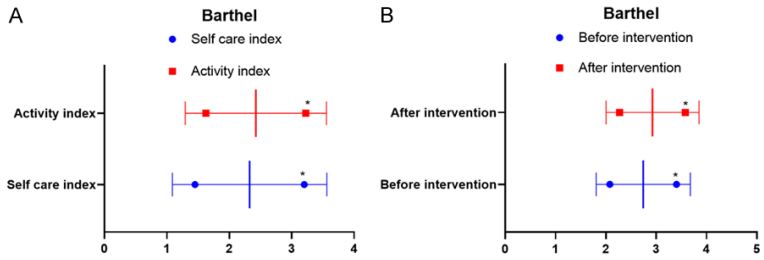


**Figure 5.** Comparison of Barthel index before and after intervention between the two groups. Patients between the two groups had no significant difference in Barthel index before intervention ($P > 0.05$), while after intervention, Barthel index of both groups were significantly higher than those before intervention ($^*P < 0.05$).

slowly extend to the control and training of breath, muscle and bone [11]. Robertson et al. believed that MCBI could effectively enhance individuals to experience emotion, and it can also facilitate patients to actively alleviate their postoperative stress behavior and develop a good way of self-behavior regulation [12]. Nie et al. have found that MCBI can enhance the gray matter thickness in frontal cortex and hippocampus, which also augments patients' ability to regulate emotions and control brain responses [13]. Similarly, some medical researchers believe that MCBI effectively reduces the activity of amygdaloid body and enhances the activity signals of forehead brain region, consequently alleviating the postoperative negative emotions, such as anxiety, depression and other symptoms [14]. Lin et al. other researchers find that MCBI is also helpful to improve the emotional state of patients, which not only helps patients recover after surgery, but also improves their quality of life [15, 16].

In this study, the researchers incorporated MCBI into the postoperative recovery of elderly patients with hip fracture fixation and found that patients in the observation group with MCBI had significantly improved self-perceived burden, self-management ability and self-efficacy [9, 10] compared with patients in the control group with postoperative routine nursing. Hereto, some researchers have identified that self-efficacy is the most favorable determinant to improve human behavior, which affects people's behavior choice, effort level, persistence and psychological and emotional response to a great extent [8, 11, 17]. Li et al. selected 60 elderly patients with hip fracture fixation in the randomized controlled study, and the results showed that MCBI can significantly improve the psychological state of elderly patients and improve their quality of life [18], which was consistent with the results of this study. The postoperative low level of self-efficacy is attributed to the varying degrees of pain in most elderly patients which makes it difficult for them to perform well such movements as leg lifting, leg extension, leg flexion, standing or walking, leading to their inability to perform good rehabilitation training. In addition, patients with limited self-living ability need the assistance of others to complete and maintain daily activities. All the above situations will lead to certain negative psychological emotions of patients [19], which make them suffer from postoperative distress and worry for a long term, weaken their understanding and control of their own situation, impair their confidence in disease management and affect self-efficacy elevation [20]. Therefore, the ability to improve patients' self-efficacy is also one

of the critical factors to evaluate the feasibility of treatment. In this study, patients in the observation group adopted MCBI (also a kind of psychotherapy intervention), which well combined psychotherapy and external medical treatment, achieving targeted treatment effect.

As for the two groups of patients with scores of different dimensions of different scales after intervention, this study also found that there were significant differences in SPBS and GSES scores between patients with and without MCBI.

Davidson et al. used multi-factor regression analysis to verify that the cognitive level of mindfulness is a protective factor for the family rehabilitation effect after hip fracture fixation in the elderly, and concluded in their study that the cognitive level of mindfulness is positively correlated with the Barthel index and Hariss score of the patients [21]. The above view is also supported by the conclusion drawn from the comparison of indices such as MAAS score and SPBS score in this study. Shapiro et al. believed that early muscle contraction training can reduce muscle edema and prevent postoperative adhesion and disuse muscle atrophy [22]. The accumulation of the deposition of calcium ions in bone can increase bone density, promote postoperative recovery after fracture, improve local and systemic blood circulation and enhance bone tissue's absorption of external nutrients. During the process of postoperative rehabilitation, MCBI is gradually integrated into postoperative rehabilitation training. As patients become more receptive to the negative emotional effects of fractures, their abilities of self-behavior management and self-emotion regulation are also enhanced, which is not only conducive to the recovery of postoperative muscle function, but also directly affects the quality of life of patients after discharge. In this study, the use of MCBI can not only enable patients to actively alleviate their self-perceived burden, but also effectively promote the recovery of patients after surgery, which has a strong positive significance for the postoperative recovery of patients. Therefore, this method is worthy of wide application in clinical recovery.

## Disclosure of conflict of interest

None.

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