

Original Article

The effects of mindfulness-based stress reduction therapy combined with intensive education on the effectiveness of the care and the awareness rate in patients with arthritis and diabetes

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Abstract: Objective: To explore the effect of mindfulness-based stress reduction (MBSR) therapy combined with intensive education on the effectiveness of the care and the awareness rate in patients with diabetes and arthritis. Methods: A total of 94 patients with diabetes and arthritis admitted to our hospital were recruited as the study cohort and randomly divided into two groups, with 47 patients in each group. Both groups underwent routine nursing interventions. The control group underwent an eight-week-long intensive education program, while the observation group was additionally cared for with MBSR for 8 weeks. The two groups were assessed using the Symptom Checklist 90 (SCL-90), the Hamilton Anxiety Scale (HAMA-14), the Hamilton Depression Scale (HAMD-17), the Simple Coping Style Questionnaire (SCSQ), the diabetes specificity quality of life scale (DSQL), and their cortisol levels and awareness/satisfaction rates. Results: The SCL-90 scores were lower in both groups after 8 weeks of nursing ($P < 0.05$), and the scores in the observation group were lower than the scores in the control group ($P < 0.05$). The observation group exhibited lower HAMA-14, HAMD-17, and negative coping scores ($P < 0.05$) and higher positive coping scores than the control group ($P < 0.05$). The DSQL scores and the cortisol levels in the observation group at 2, 4, 6, and 8 weeks after the nursing were lower than they were in the control group ($P < 0.05$). The satisfaction rate with the nursing methods, the nursing effectiveness, and the awareness rate with regard to regular review, knowledge of pathogenesis, and clinical manifestations in the observation group were higher than they were in the control group ($P < 0.05$). Conclusion: MBSR therapy combined with intensive education can improve patients' symptoms, reduce their anxiety/depression, improve their coping levels, quality of life, and cortisol levels as well as their satisfaction/awareness rates in diabetic patients with arthritis.

Keywords: Mindfulness-based stress reduction therapy, intensive education, diabetes, arthritis, nursing effect, awareness rate, cortisol level

Introduction

Diabetes mellitus is a metabolic disease characterized by high blood glucose levels, resulting in dysfunction of the eyes, heart, blood vessels and other tissues due to defective insulin secretion/impaired biological function or both [1]. The pathogenesis of diabetes has not been

clarified clinically, and it is generally believed that it is related to genetic and environmental factors, with common symptoms such as excessive drinking, eating, urination, and weight loss, which affects patients' health and lifestyles [2]. The common causes of arthritis include [3] inflammation, degeneration, infection, and trauma. Surveys have shown that there are

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Table 1. Comparison of the baseline data between the two groups

Baseline data		Observation group (n = 47)	Control group (n = 47)	χ^2/t	P
Gender	Male	26 (55.32)	28 (59.57)	0.781	0.415
	Female	21 (44.68)	19 (40.43)		
Age (years)		63.98±4.34	64.11±4.36	1.423	0.669
Body Mass Index (BMI)		23.16±2.61	23.18±2.63	0.216	0.531
Duration of diabetes (years)		8.39±1.23	8.41±1.24	1.119	0.601
Duration of arthritis (years)		3.16±0.17	3.18±0.19	1.693	0.314
Types of arthritis	Rheumatoid arthritis	23 (48.94)	21 (44.68)	0.661	0.773
	Compulsive spondylitis	20 (42.55)	21 (44.68)		
	Psoriatic arthritis	4 (8.51)	5 (10.64)		
Comorbidity	Hypertension	6 (12.77)	7 (14.89)	0.316	0.601
	Hyperlipidemia	3 (6.38)	4 (8.51)		
	Heart disease	4 (8.51)	5 (10.64)		
Education level	Below secondary school	15 (31.91)	13 (19.40)	0.782	0.447
	Middle school-high school	20 (42.55)	21 (44.68)		
	High school and above	12 (25.53)	13 (27.66)		

more than 100 million patients with arthritis in China, and the clinical manifestations of arthritis are mostly redness, heat, pain, and joint dysfunction, and patients with severe cases experience joint deformity and disability. For patients with diabetes mellitus and arthritis, the two diseases can aggravate and affect each other, and, coupled with a lack of knowledge and understanding of the disease, can lead to a poor long-term prognosis [4, 5]. Therefore, enhancing the treatment and care for patients with diabetes and arthritis is of great importance to improving patient prognosis.

Intensive education enables patients to consciously adopt health-friendly behaviors and lifestyles through planned, purposeful and systematic health education, and minimize the risk factors in the treatment course of the disease [6, 7]. Clinical studies have shown [8] that the implementation of intensive education can help patients understand the risk factors that influence their health and consciously adopt a set of behaviors that are beneficial to their health. Mindfulness-based stress reduction (MBSR), developed in 1979, is an evidence-based program that provides secular, intensive mindfulness training to assist people with stress, anxiety, depression, and pain. Studies have shown [9, 10] that MBSR can relieve patients from chronic pain and various disorders caused by stress. However, there are few studies on the clinical impact of MBSR combined with intensive education on the aware-

ness rate of patients with diabetes and arthritis [11]. Therefore, this study was designed to investigate the effects of MBSR therapy combined with intensive education on patients with diabetes and arthritis.

Materials and methods

Baseline data

Ninety-four patients with diabetes and arthritis admitted to our hospital were randomly selected and divided into two groups, with 47 patients in each group. This study was approved by the ethics committee of The Second Affiliated Hospital of Hainan Medical University, and written informed consents were obtained from the patients/families. The baseline data of the two groups showed no significant differences ($P > 0.05$, **Table 1**).

Inclusion and exclusion criteria

Inclusion criteria: patients (1) who met the diagnostic criteria for diabetes mellitus [11] in the *Guidelines for the Prevention and Treatment of Type 2 Diabetes* (China, 2017 Edition), (2) patients who also suffered from different degrees of arthritis, with clinical manifestations of joint pain and limb mobility [12], (3) patients who had a certain level of cognition and who were able to independently complete the surveys and the related evaluations.

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Exclusion criteria: (1) patients with cognitive abnormalities, psychiatric abnormalities, critical illnesses, or a confused consciousness, (2) patients with a hearing impairment, domestic calamity, or who were lost to follow-up, (3) patients with coagulation abnormalities, hematologic disorders, or major stressful life events or severe trauma.

Methodology

Both groups received routine care. The control group received intensive education. Information about and education on arthritis and diabetes was presented, including the pathogenesis of arthritis and diabetes, their clinical manifestations, drug guidance and complications, so as to enable the patients to have a comprehensive understanding of the disease and its treatment methods and outcomes. Their psychological changes before and after the onset of the disease were assessed to improve the awareness rates and treatment compliance [13].

The observation group received MBSR therapy on the basis of nursing interventions in the control group. (1) Session 1-2 (mindful breathing). Patients and their families were informed of the concept, background, and benefits of mindfulness meditation practice, informed of the treatment process, and given electronic manuals and exercise videos, etc., which showed the methods and procedures of mindful breathing. "Mindful breathing Workshops" were established through a social media platform. The patients were actively encouraged to master the skills and techniques of MBSR therapy, and their concerns were addressed. (2) Session 3-4 (body scanning). The body scan meditation paid attention to the physical sensations in the body. The practice was completed by "scanning" one's awareness through the entire body on a micro level. Attention was paid to every inch of the body to cultivate the ability and notice what is being experienced in the body, and this includes all of the body's systems, such as the bones, skin, internal organs, digestion, etc. The patients were instructed to repeat the exercise upon completion, assigned practice tasks and asked to record any problems they encountered during the exercise. (3) Session 5-6 (mindful yoga). Yoga encourages musculoskeletal strength, flexibility and bal-

ance, as well as inner stillness. Applied in conjunction with mindfulness techniques, yoga is a gentle but powerful form of body-oriented meditation. With continued practice, one can begin to fully inhabit the body, pay closer attention to its fluctuating states, and learn to cultivate an early warning system for the presence of stress, tension, or pain. With an attitude of mindfulness to both body and mind states, one has more information to work with in potentially handling the day-to-day stressful events in life. (4) Session 7-8 (mindfulness meditation). Through the WeChat platform, questions with regard to the assigned tasks and practices were answered. Patients consciously adopted an alert and relaxed body posture so that they could feel relatively comfortable without moving, and then they resided with a calm acceptance in the present without trying to fill it with anything. It helped a lot to adopt an erect and dignified posture, with your head, neck, and back aligned vertically. This allowed the breathing to flow most easily. It was also the physical counterpart of the inner attitudes of self-reliance, self-acceptance, and alert attention. Both groups completed 8 weeks of care and practices.

Outcomes measurement

(1) Symptom Checklist 90 (SCL-90). The SCL-90 was used to assess the mental health status of the two groups before and at 8 weeks after the completion of the nursing care in 9 dimensions, namely somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Each item was assessed using a 0-5 Likert scale. The lower the score, the better the mental health status [14]. (2) Psychological fluctuations and coping styles. Patients' anxiety and depression were assessed using the Hamilton Anxiety Scale (HAMA-14) and the Hamilton Depression Scale (HAMD-17) before and at 8 weeks after the nursing in both groups. Their coping styles were assessed using the Simple Coping Style Questionnaire (SCSQ), including: positive coping (questions 1-12) and negative coping (questions 13-20) using a 0-3 scale [15]. (3) Diabetes specificity quality of life scale (DSQL). The two groups were assessed using the DSQL scale before and at 8 weeks after completion of the care in terms of 4 aspects: physical,

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Table 2. Comparison of the SCL-90 scores between the two groups (points, $\bar{x} \pm s$)

Mental health	Observation group (n = 47)		Control group (n = 47)	
	Before nursing	At 8 weeks after the care	Before nursing	At 8 weeks after the care
Obsessive-compulsive disorder (OCD)	2.19±0.33	0.67±0.14 ^{a,b}	2.20±0.34	1.29±0.21 ^b
Somatization	2.12±0.29	0.81±0.21 ^{a,b}	2.14±0.31	1.56±0.24 ^b
Paranoid ideation	1.86±0.23	0.94±0.23 ^{a,b}	1.85±0.22	1.23±0.22 ^b
Anxiety	1.94±0.26	0.72±0.17 ^{a,b}	1.96±0.28	1.21±0.25 ^b
Hostility	1.78±0.21	0.56±0.14 ^{a,b}	1.79±0.22	1.31±0.20 ^b
Psychoticism	2.05±0.31	0.83±0.15 ^{a,b}	2.07±0.33	1.56±0.26 ^b
Depression	1.91±0.25	0.90±0.21 ^{a,b}	1.90±0.24	1.41±0.25 ^b
Interpersonal relations	2.21±0.34	1.11±0.31 ^{a,b}	2.20±0.33	1.49±0.32 ^b
Phobic anxiety	1.97±0.27	0.69±0.15 ^{a,b}	1.99±0.29	1.34±0.23 ^b

Compared with the control group, ^a $P < 0.05$; compared with before the treatment, ^b $P < 0.05$.

social, psychological, and therapeutic, respectively, with a total of 26 items using a 0-4 scoring system, with 104 points in total, with higher scores indicating a poorer quality of life [16]. (4) Cortisol level. In both groups, 3 mL of peripheral blood was taken before and at 2, 4, 6, and 8 weeks after the nursing. After centrifugation, the cortisol levels were measured using enzyme-linked immunosorbent assays [17]. (5) Awareness/satisfaction. Patient satisfaction (including the nursing methods, nursing effectiveness, and nursing content) and the awareness (regular review, pathogenesis and clinical manifestations) rates were evaluated using the general hospital questionnaire, with a total score of 100 points for each one, and ≥ 90 was defined as awareness/satisfaction [18].

Statistical analysis

The data were processed using SPSS 24.0 software. Excel was used for drawing the plots. The count data (%) were calculated using χ^2 tests. The measurement data were expressed as ($\bar{x} \pm s$) and were examined using t tests. $P < 0.05$ indicated a significant difference.

Results

Comparison of SCL-90 scores

There were no significant differences in the mental health status scores of the two groups before the nursing ($P > 0.05$). The SCL-90 scores at 8 weeks after the nursing were lower than the scores recorded before the treatment ($P < 0.05$), and the scores were lower in the observation group than they were in the control group ($P < 0.05$, **Table 2**).

Comparison of the psychological fluctuations and coping styles between the two groups

There were no significance differences in the coping styles or negative emotions in the two groups before the nursing ($P > 0.05$). At 8 weeks after the nursing, the HAMA-14, HAMD-17, and negative coping scores were all lower in both groups compared to before the nursing ($P < 0.05$), and the positive coping scores were higher than before the nursing in both groups ($P < 0.05$). The observation group exhibited lower HAMA-14, HAMD-17, and negative coping scores and higher positive coping scores than the control group after the nursing ($P < 0.05$, **Figure 1**).

Comparison of the DSQL scores between the two groups

The DSQL scores showed no significant difference in the two groups before the nursing ($P > 0.05$). At 8 weeks after the nursing, the physiological, social, psychological, and treatment scores in the two groups were lower than they were before the nursing ($P < 0.05$). At 8 weeks after the nursing, the physiological, social, psychological, and treatment scores in the observation group were lower than they were in the control group ($P < 0.05$, **Figure 2**).

Comparison of the cortisol levels between the two groups

The cortisol levels showed no significant differences in the two groups before the care ($P > 0.05$). The cortisol levels at 2, 4, 6, and 8 weeks after the care were lower than they were before the care in both groups ($P < 0.05$). The cortisol

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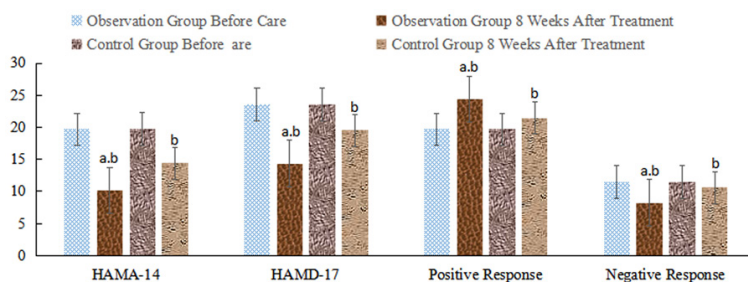


Figure 1. Comparison of the psychological fluctuations and coping styles.

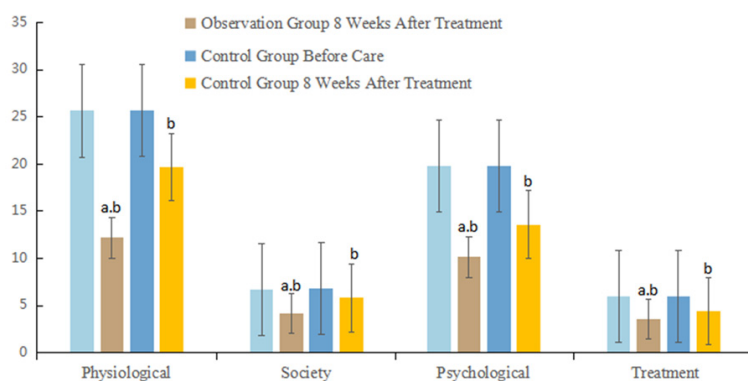


Figure 2. Comparison of the DSQL scores (points, $\bar{x} \pm s$).

levels at 2, 4, 6, and 8 weeks after the care in the observation group were lower than they were in the control group ($P < 0.05$, **Figure 3**).

Comparison of the awareness/satisfaction rates between the two groups

At 8 weeks after the nursing, the nursing satisfaction rates with the method of care, the nursing effect, content of care, periodic review, pathogenesis, and the clinical manifestations in the observation group were 95.74%, 97.87%, 95.74%, 97.87%, 91.49%, and 93.62%, which were all higher than the corresponding values in the control group (80.85%, 78.72%, 76.60%, 74.47%, 70.21%, and 72.34%) ($P < 0.05$, **Table 3**).

Discussion

Diabetes and arthritis are common clinical diseases, and having one may mean that it is more likely to develop the other. In fact, research shows that RA raises the risk for diabetes by about 50%, and diabetes raises the risk of having arthritis, including RA and arthritis-related issues, by about 20% [19]. With the

increasing aging of the population in China, the incidence of these two diseases has increased, increasing the difficulty of the clinical treatment. Both diabetes and arthritis are chronic diseases that can trigger negative emotions and have a negative impact on the prognosis [19]. Routine nursing performed around the patients' diet, exercise and medication only meets the basic needs and neglects the patients' stress response caused by the long duration of the disease and the recurrent attacks [20]. Meanwhile, the lack of disease knowledge leads to a low awareness rate, affecting patients' treatment compliance and prognoses [21].

MBSR therapy combined with intensive education has achieved satisfactory results in patients with diabetes and syndromic arthritis [22]. In this study, the SCL-90 scores in the observation group were lower than they were in the control group at 8 weeks after the care ($P < 0.05$), indicating that MBSR combined with intensive education can improve patients' psychological symptoms and facilitate their recovery. Intensive education is a new type of nursing intervention that can incorporate knowledge about diabetes, arthritis, risk factors, etc. [23]. It can eliminate/mitigate risk factors that affect health status, and help improve patients' quality of life and awareness rates. Clinical studies have shown [24] that health education can help patients establish health awareness, improve their lifestyles, and allow them to develop good habits, thus minimizing the risk of diabetes/arthritis. Studies have shown [25] that health education can improve the individuals' health status, their interpersonal relationships, and their self-care abilities. In this study, the observation group exhibited lower HAMA-14, HAMD-17, and negative coping scores and higher positive coping scores than the control group ($P < 0.05$), indicating that intensive health education can improve the coping styles, reduce the negative emotions, strengthen patient confi-

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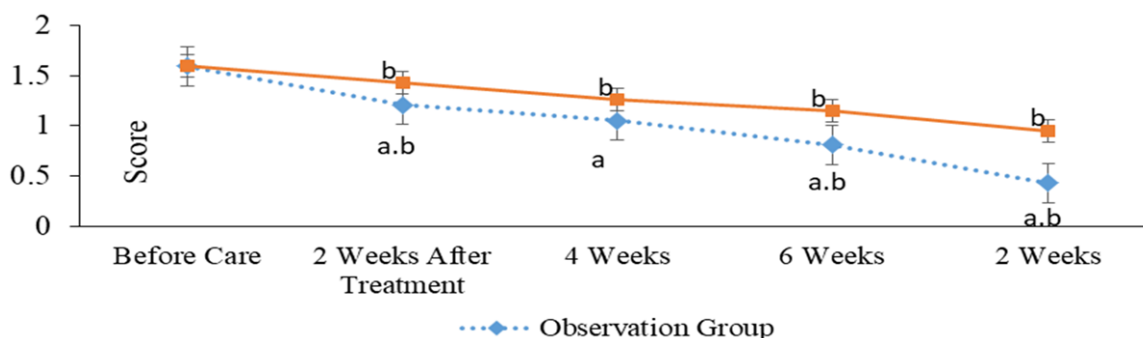


Figure 3. Comparison of the cortisol levels between the two groups ($\bar{x} \pm s$).

Table 3. Comparison of the awareness/satisfaction rates [n (%)]

Grouping	Cases	Satisfaction rate			Awareness rate		
		Method of care	Nursing effect	Content of care	Periodic review	Pathogenesis	Clinical manifestation
Observation group	47	45 (95.74)	46 (97.87)	45 (95.74)	46 (97.87)	43 (91.49)	44 (93.62)
Control group	47	38 (80.85)	37 (78.72)	36 (76.60)	35 (74.47)	33 (70.21)	34 (72.34)
χ^2	/	6.392	5.158	9.144	6.109	6.326	7.102
P	/	0.032	0.045	0.015	0.035	0.032	0.019

dence in overcoming the disease and foster a good nurse-patient relationship.

MBSR therapy is a psychological intervention that requires patients to free their minds and bodies from their thoughts and feelings and to resist endogenous and exogenous negative emotions, thereby creating a healthy mental outlook, and building an inner harmonious atmosphere [26]. Scholars [27] have performed MBSR in breast cancer patients, and the results showed that MBSR can improve the quality of life, negative emotions, and self-efficacy. In this study, the DSQL scores in the observation group at 8 weeks after the care were lower than the control group's scores ($P < 0.05$), indicating that MBSR can improve the quality of life and better control patients' blood glucose levels via exercise and diet. Studies have shown that MBSR can improve patients' negative emotions, enhance their emotional experiences, and reduce their anxiety and depression. During the nursing process, the patients were more aware of the risk factors of diabetes and arthritis [28]. Studies also found [29] that reading with positive feedback during MBSR can help patients adjust their moods on a cognitive level, regulate their relevant gray matter density and increase the activity of their prefrontal cortexes, thus achieving a neuro-

physiological regulation of mood. In this study, the cortisol levels in the observation group were lower than they were in the control group ($P < 0.05$), indicating that MBSR therapy combined with intensive education can reduce the stress response and improve treatment compliance. A study grouped the diabetic patients into two groups, among which the control group received conventional care, and the observation group was additionally cared for using MBSR, and the results showed that MBSR can improve quality of life, which may be caused by the improvement in emotions. Clinically, MBSR therapy in combination with intensive education can leverage the advantages of different care approaches and improve patient knowledge levels and satisfaction rates [30], which is consistent with the results of this study.

In summary, MBSR combined with intensive education in patients with diabetes and arthritis can improve patients' symptom assessment skills, reduce their anxiety/depression, improve their coping styles, quality of life, knowledge levels, and satisfaction rates.

Disclosure of conflict of interest

None.

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