PILOT STUDY

Research on Mindfulness-Based Stress Reduction in Breast Cancer Patients Undergoing Chemotherapy: An Observational Pilot Study

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ABSTRACT

Objective • Mindfulness-Based Stress Reduction (MBSR) therapy has been very effective intervention across worldwide. Herein we aimed to investigate the effect of MBSR intervention on anxiety, depression among breast cancer patients undergoing postoperative chemotherapy.

Methods • 225 breast cancer patients in our hospital were divided into two groups, 106 patients in the MBSR group received Mindfulness-Based Stress Reduction intervention, while 111 patients in the control group were given routine nursing. The Self-rating Anxiety Scale (SAS), self-rating depression scale (SDS), and functional assessment of cancer therapy-breast cancer (FACT-B) were used to assess the effect of MBSR intervention on breast cancer patients undergoing postoperative chemotherapy.

Results • There were significant differences in the scores of physiological statuses, social and family status, emotional status, functional status, additional attention and total score after intervention between two groups ($P < .05$). The difference between SDS and SAS were statistically significant between the two groups ($P < .05$). The score of SDS and SAS were significantly improved in the MBSR group compared with the control group ($P < .05$).

Conclusion • MBSR therapy could effectively improve the quality of life of patients with breast cancer patients with chemotherapy, mainly focusing on psychological aspects, while the effect of the physiological intervention was not significant. (*Altern Ther Health Med.* 2023;29(5):228-232).

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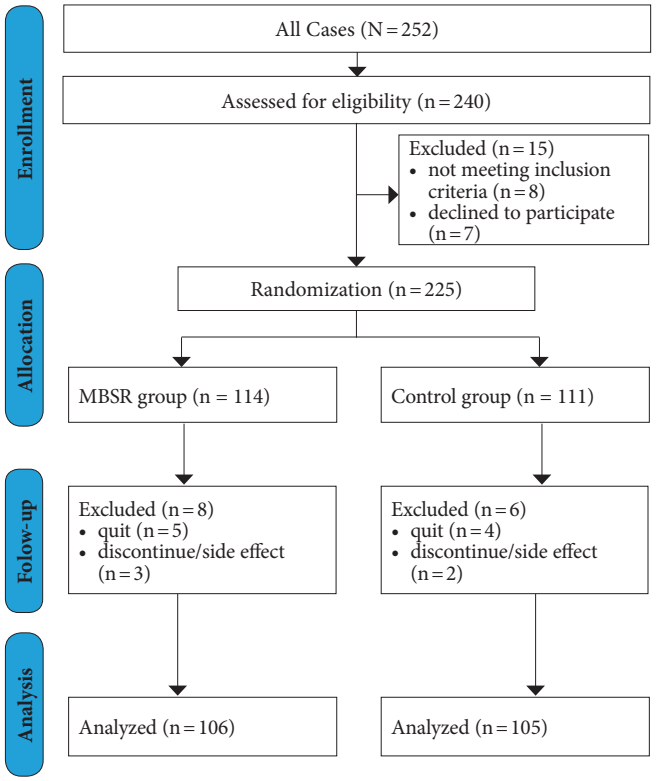
INTRODUCTION

Breast cancer (BC) is the most common malignant tumor in women. According to the national cancer statistics report in 2022, breast cancer is still the first killer threatening women lives in the world.[1] It is estimated that by 2030, the number of breast cancer cases and deaths in the world will reach 2.64 million and 1.7 million.[2] Surgery is one of the most important methods for the treatment of breast cancer, including modified radical mastectomy and total mastectomy. The choice of operation should be based on the comprehensive evaluation of the cancer stage and patient's physical condition, and an individualized combination of chemotherapy and endocrine therapy during the perioperative period.[3,4]

The duration of pain is short during operation, however, during the long period of chemotherapy, patients will bear the double burden of body and mind, and they are easy to suffer from anxiety, depression and other mental diseases.[5] On the one hand, the body shape changes of patients after radical mastectomy, namely, the lack of female secondary sexual characteristics. On the other hand, during chemotherapy, various physiological reactions, such as pain, nausea, vomiting, alopecia, temporary skin changes, bring painful experiences to patients. If you have had a bilateral mastectomy, it means that you may lose yourself and live with scars that cannot be repaired after the operation. Given the psychological and social problems of breast cancer patients after chemotherapy, there are cognitive behavior therapy, Morita therapy, comprehensive psychotherapy, hypnotherapy, mindfulness and group therapy.[6-8] Among many intervention methods, MBSR therapy has become a new and recognized intervention method, which has been studied by many scholars.[9]

Mindfulness-Based Stress Reduction (MBSR) therapy was founded by Kabat KZinn, an American psychologist.[10] MBSR therapy is a kind of management method based on

Figure 1. Flow chart showing recruitment



emotional and stress meditation, which aims to relieve stress, improve cognition, improve mental health through mindfulness training Managing emotions, adapting to diseases and ultimately improving the quality of life are widely concerned in the field of psychology and medicine.[11] Parswani et al.[12] conducted mindfulness decompression training for patients with coronary heart disease for 8 weeks, once a week, 1.5h each time. The results showed that the patients in the intervention group who received mindfulness training had decreased awareness of pressure, enhanced the ability to manage emotions, and significantly decreased blood pressure and body mass index compared with the control group, indicating that patients could gradually form a good disease coping style through systematic mindfulness intervention. Matousek et al.[13] found that mindfulness decompression therapy can improve the anxiety of patients with chronic diseases through randomized controlled trials. However, the application of MBSR therapy in BC patients with postoperative chemotherapy is small, and the research in behavioral psychology is rarely reported.

In our study, MBSR therapy was used to intervene in breast cancer patients with chemotherapy, and the effects of different intervention methods on depression and anxiety of breast cancer patients were compared. We explore the effective intervention measures to improve the psychological behavior of breast cancer patients undergoing chemotherapy, to provide the basis for diversified adjuvant treatment of breast cancer.

MATERIALS AND METHODS

Clinical data

The patients should be chosen from those who have no anxiety and depression. 225 patients in our hospital from January 2018 to December 2020 met the inclusion and exclusion criteria and were randomized allocated into two groups: the MBSR group (n = 106 cases) and the control group (n = 111 cases). A significant difference in intensity of symptoms between the two groups ($t = 6.32$, $P < .0001$) demonstrates the ability of the CAS to differentiate between subjects with and without constipation and thus provides evidence of construct validity of the scale. The researchers systematically explained the role, purpose and process of the study to the patients and their families. The flowchart is shown in Figure 1.

Ethics

The patients and their families voluntarily signed the informed consent form to participate in this study.

Inclusion and exclusion standard

Inclusion criteria. (1) Postoperative pathological examination confirmed breast cancer, and received chemotherapy treatment; (2) Age≥18 years old; (3) All the subjects were clear-minded, without hearing and mental retardation. They were able to read and understand the questionnaire; (4) Consistent with the diagnosis of breast cancer; (5) No history of mental illness; (6)the subjects were willing to cooperate and implement the experiment.

Exclusion criteria (1) Had serious cardiac disorder, severe liver malfunction or renal failure; (2) The pregnant woman and the breast-feeding period woman; (3) Had a history of concurrent autoimmune disease; (4) Breast cancer is the metastasis of other malignant tumors rather than primary cancer; (5) Unwilling to participate our research.

Intervention

The Control group. The subjects were only treated with routine nursing. These nursing care include breast cancer postoperative routine nursing, chemotherapy routine nursing and psychological nursing. Firstly, the nurse explained to the patient how to observe the postoperative wound, dietary taboos, activity precautions, and appropriate upper limb exercise every day. Secondly, the nurses introduced the chemotherapy plan to the patients, the effects and side effects of chemotherapy drugs, the possible adverse reactions, how to prevent falls and other health education. Furthermore, the nurses told the patients how to carry out self-care during the intermission of chemotherapy. Thirdly, the nurses provided psychological and social support in the whole process of breast cancer surgery and chemotherapy, they should patiently answer questions of patients and their families and encourage communication between patients.

The MBSR group. The subjects were treated with MBSR intervention based on routine nursing. The subjects were given MBSR training once a week. The specific application

techniques include body scanning, mindfulness yoga, mindfulness meditation, mindfulness meditation and three-minute breathing space. During the course of MBSR, the researcher organizes each course. After the practice, the participants share their feelings. After the course, the organizer takes notes to reflect on the problems in each course and make the next teaching plan.

Evaluation standard of clinical therapeutic effect

Self-rating Anxiety Scale (SAS). The SAS was designed and compiled by Zung in 1971.[14] It is used to measure the degree of individual anxiety symptoms. There are 20 items in the table, of which 5, 9, 13, 17 and 19 items are scored reversely. The scale was graded 1-4. It is divided into no or little time, 2 into a small part of the time, 3 into a considerable amount of time, and 4 into most or all time. The higher the standard score, the more serious the individual anxiety.

Self-rating Depression Scale (SDS). The SDS was designed and compiled by Zung in 1965 to measure the degree of individual anxiety symptoms.[15] There are 20 items on the scale, of which 10 items (2, 5, 6, 11, 12, 14, 16, 17, 18 and 20) are scored reversely. The scale adopted a 1-4 grade scoring method (1 for no or little time; 2 for a small part of the time; 3 for quite a lot of time; 4 for most of all-time). The higher the standard score, the more serious the degree of depression.

Functional Assessment of Cancer Therapy-Breast Cancer (FACT-B).[16] A 36-item measure of psychological wellbeing. It included physical status, social or family status, emotional status, functional status and additional attention. And if the scores are higher, indicating patients had a greater level of peace, meaningfulness and faith.

Statistical analysis

All data were analyzed by SPSS 22.0. The statistical results are expressed by mean ± standard deviation ($\bar{x} \pm s$), the data comparison is conducted by t-test and the correlation analysis is conducted by person linear phase, $P < .05$ was the difference with statistical significance.

RESULTS

Each patient has received seven weeklies 2h group sessions of training. The specific course arrangement is shown in Table 1. Table 2 shows the characteristics of the participants. The research included 211 patients, involved 106 patients in the MBSR group, a mean age (48.97 ± 8.52) year, while in the control group, a mean age (49.97 ± 7.88) year. The body mass index (BMI) in the MBSR group was (20.85 ± 1.24) kg/m^2, and in the control group was (20.45 ± 1.02) kg/m^2, there was no statistical significance between the two groups ($P < .05$).

The marital status had three statuses: married, single, divorced or separated. And there was no statistical significance between the two groups in marital status, religious belief, education, and residence. The result of the FACT-B score was shown in Table 3. There were significant differences in the FACT-B score and each dimension score before and after the intervention. The physiological condition was significantly changed after the intervention. The social and family situation as well as emotional status was also significantly improved after the intervention.

There were significant differences in the scores of physiological statuses, social and family status, emotional status, functional status, additional attention and total score after intervention between two groups ($P < .05$). The score of SDS and SAS were significantly decreased after the intervention in MBSR group ($P < .05$), but not for the control group ($P < .05$) (Table 4).

Table 1. Content of MBSR program

Times of week	Topics	Contents	Homework
The first week	Understanding MBSR therapy	(1) Introduce the basic knowledge of mindfulness decompression therapy and the content and requirements of intervention course to patients; (2) Distribution of CD and related manuals; (3)Establish WeChat group to enhance the sense of belonging; (4) Introduce mindfulness breathing, explain breathing meditation methods, and discuss how to use mindfulness to face and solve stress in life	Mindfulness breathing training
The second week	Mindfulness drinking water	Inform the patients of the connotation and requirements of mindfulness drinking water, follow the music practice, share the patients' mindfulness drinking experience and analyze	Mindfulness water training
The third week	Accept our bodies	Inform the patients of the method and connotation of body scanning, increase and strengthen the breast awareness content, establish the connection between body and mind, explain the precautions, follow the music practice and communication	Body scan training
The fourth week	No distractions	Inform the method and connotation of meditation, guide the patients to mindfulness breathing, mindfulness listening, mindfulness thinking, mindfulness observation, until they enter into no choice awareness, and discuss and communicate	Meditation training
The fifth week	No distractions	Inform the method, connotation and precautions of walking Zen, guide patients to experience and accept the feeling of body and mind when walking, and discuss and communicate	Zen training
The sixth week	Life is full of love	Inform patients of the connotation and precautions of loving meditation, guide patients to feel the power of loving, accept imperfect self and others, encourage patients to capture negative emotions and guide them to analyze and communicate	Loving meditation training
The seventh week	Explore yourself and embrace the future	Inform the patients of the method and connotation of mindfulness self-exploration and the four stretching exercises involving the whole body, review all the previous contents, encourage internalization, formulate a suitable model for themselves, and integrate mindfulness into life	Mindfulness self-exploration training

Table 2. Comparison of clinical data between the two groups

	MBSR group (n = 106)	Control group (n = 105)	t/χ^2	*P* value
Age(years)	48.97 ± 8.52	49.97 ± 7.88	2.135	.255
BMI	20.85 ± 1.24	20.45 ± 1.02	1.39	.281
Marital status			8.73	.182
Married	63 (59.4%)	69 (65.7%)		
Single	16 (15.1%)	14 (13.3%)		
Divorced or separated	27 (25.5%)	22 (21%)		
Religious belief			5.58	.217
Had	90 (84.9%)	92 (87.6%)		
No	16 (15.1%)	13 (12.4%)		
Education			2.37	.843
high school or below	53 (50%)	57 (54.3%)		
junior college or undergraduate	47 (44.3%)	41 (39%)		
Master degree or above	6 (5.7%)	7 (6.7%)		
Residence			6.79	.0961
Country	85 (80.2%)	81 (77.1%)		
Rural	21 (19.8%)	24 (22.9%)		

Note: Compared with the control group, significant difference as $P < .05$.

Table 3. Comparison of FACT-B between the two groups before and after intervention (points, $\bar{x} \pm s$)

Time	MBSR group (n = 106)	Control group (n = 105)	*t*	*P* value
Physiological condition				
Before intervention	16.89 ± 18.75	17.19 ± 16.01	3.89	.089
After intervention	19.63 ± 17.35	18.79 ± 15.42	8.15	.000
t	4.19	1.38	-	-
P value	.042	.267	-	-
Social and family situation				
Before intervention	15.42 ± 2.37	15.01 ± 5.69	1.54	.327
After intervention	18.67 ± 4.89	16.39 ± 4.32	3.32	.041
t	4.91	5.153	-	-
P value	.013	.536	-	-
Emotional status				
Before intervention	14.53 ± 3.48	14.02 ± 3.49	1.84	.516
After intervention	18.85 ± 4.36	15.25 ± 3.44	5.24	.025
t	7.83	3.85	-	-
P value	.000	.088	-	-
Functional status				
Before intervention	13.98 ± 5.71	14.55 ± 4.99	2.43	.082
After intervention	19.74 ± 3.40	15.21 ± 4.81	6.344	.000
t	7.57	2.75	-	-
P value	.000	.077	-	-
Additional attention				
Before intervention	19.24 ± 5.77	19.77 ± 6.84	1.53	.121
After intervention	23.71 ± 6.84	20.12 ± 6.15	4.43	.006
t	4.91	2.73	-	-
P value	.006	.251	-	-
Total score				
Before intervention	76.58 ± 18.75	74.31 ± 16.21	2.28	.671
After intervention	94.21 ± 17.71	80.12 ± 18.61	19.32	.000
t	12.38	3.154	-	-
P value	.000	.034	-	-

Note: Compared with the control group, significant difference as $P < .05$.

Table 4. Comparison of SAS and SDS between the two groups before and after intervention (points, $\bar{x} \pm s$)

Time	MBSR group (n = 106)	Control group (n = 105)	*t*	*P* value
SAS				
Before intervention	50.13 ± 9.35	49.57 ± 9.65	1.32	.083
After intervention	40.54 ± 10.98	48.88 ± 9.26	15.18	.000
t	11.68	1.78	-	-
P value	.000	.161	-	-
SDS				
Before intervention	54.67 ± 11.33	54.03 ± 10.69	1.24	.207
After intervention	42.75 ± 12.49	50.26 ± 13.17	13.22	.000
t	8.91	2.917	-	-
P value	.000	.068	-	-

Note: Compared with the control group, significant difference as $P < .05$.

DISCUSSION

Breast cancer patients usually have a lot of psychological problems in the process of diagnosis, treatment and rehabilitation. Among them, anxiety and depression often appear as symptom groups at the same time. Domestic surveys show that 75% of breast cancer patients have anxiety, depression and other unstable psychology.[17] Some patients even have emotional shock due to a strong psychological impact after diagnosis. In this study, the scores of anxieties and depression in the MBSR group were lower than those in the control group after the intervention, and the differences were statistically significant ($P < .05$), indicating that MBSR therapy can effectively improve the anxiety and depression of patients with breast cancer of postoperative chemotherapy, which is consistent with the research results of Richard R et al.[18] Mindfulness meditation practice helps to cultivate patients' mindfulness attitude of letting nature take its course without judgment, guide patients to accept their various psychological activities peacefully and without distinction, and coexist harmoniously with flowing psychological activities.[19] Farbna et al.[20] points out that mindfulness meditation practice can strengthen individual insular function, change brain circuits, and make individual emotions tend to be optimistic.

In our study, the total scores of qualities of life of the two groups were significantly increased after the intervention ($P < .05$), indicating that the quality of life of patients with breast cancer will increase with the extension of treatment, the reason may be the improvement of physical function of patients by postoperative exercise. The results showed that the scores of each dimension in the MBSR group were significantly improved after the intervention ($P < .05$), and the scores of each dimension in the control group were increased after the intervention, there was no statistical significance ($P > .05$). The results showed that the total scores of life quality, social and family status, emotional status and functional status in the intervention group were significantly higher than those in the control group ($P < .05$), which indicated that MBSR therapy could effectively improve the

quality of life of patients with breast cancer patients with chemotherapy, mainly focusing on psychological aspects, the effect of the physiological intervention was not significant. The possible reason is that MBSR therapy increases the opportunity for patients and their friends to communicate and learn from each other, and it helps patients get more peer support, to improve their quality of life.[21] Moreover, studies have shown that anxiety, depression and other negative emotions can enhance the physical discomfort of patients and reduce the quality of life of patients.[22] Previous studies have shown that MBSR seems to benefit patients with lung cancer, mood disorders or chronic pain, so it may also benefit women with breast cancer.[23] In our study, MBSR therapy significantly reduced the scores of anxieties and depressions. In the process of MBSR intervention, nursing staff patiently answer patients' questions and help patients build up the confidence to fight disease and face life actively. In addition, Wittmann V et al.[24] pointed out that improving posttraumatic growth is of great significance to improve the long-term quality of life of breast cancer patients, and MBSR therapy in this study significantly improves the level of posttraumatic growth of patients which is also a possible reason for the improvement of quality of life of patients.

However, there are also limits of this study. First, the number of patients was not so large, which made the results not so scientific. Second, the underlying mechanism was not so clear, which needs further exploration.

In conclusion, MBSR therapy can significantly improve the anxiety and depression of patients with breast cancer in the early stage of postoperative chemotherapy, improve the cognitive emotion regulation strategy of patients, promote patients to adopt positive cognitive emotion regulation strategy in the face of physical and mental trauma, which is conducive to the generation of positive psychology of patients, and significantly improve the quality of life of patients.

DATA AVAILABILITY

The data used to support this study are available from the corresponding author upon request.

ETHICAL APPROVAL

This study was approved and recognized by the ethics committee of our hospital.

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DECLARATION OF INTEREST

No potential conflicts of interest relevant to this article were reported.

AUTHOR CONTRIBUTIONS

Data collection: Leifang Yuan, Leihua Yuan
Resources: Leifang Yuan, Leihua Yuan
Software: Leifang Yuan
Supervision: Leihua Yuan
Writing – original draft: Leifang Yuan
Writing – review & editing: Leihua Yuan

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