A study on the effects of mindfulness-based cognitive therapy and loving-kindness mediation on depression, rumination, mindfulness level and quality of life in depressed patients

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Abstract: Objective: To analyze the effects of mindfulness-based cognitive therapy (MBCT) plus loving-kindness mediation (LKM) in depressed patients. Methods: A total of 125 depressed patients diagnosed in the Department of Psychiatry of our hospital were selected as the research subjects and were randomly divided into a control group (n=62) and an observation group (n=63). The control group was treated with conventional psychological intervention, while the observation group was treated with MBCT plus LKM. The therapeutic outcomes were compared between the two groups. Results: At 2, 4, 6 and 8 weeks after intervention, the Hamilton Depression Rating Scale (HAMD) scores and the scores for introspection and deliberation, forced thinking, rumination of symptoms, treatment, ability and social relationships in the observation group were lower than those in the control group, while the Five Facet Mindfulness Questionnaire (FFMQ) scores and the scores for psychology, environment, physiology, social relations, self-acceptance, and self-evaluation in the observation group were higher than those in the control group (P < 0.05). Conclusion: MBCT plus LKM can effectively improve depression, rumination, mindfulness level, quality of life, the sense of stigma and degree of self-acceptance in depressed patients.

Keywords: Mindfulness-based cognitive therapy, loving-kindness meditation, depression, degree of depression, rumination, mindfulness level, quality of life

Introduction

Depression, which occurs as a result of multiple factors, is a common mental disorder characterized by significant and persistent low mood that is clearly not reflective of the patients’ environment [1]. Patients with mild depression are persistently depressed, while patients with severe depression are distraught, and some even have delusions and hallucinations [2].

Currently, treatment for depression includes drug therapy and psychotherapy. However, the obvious side effects of continuous drug therapy lead to poor tolerance to the side effects of drugs in most depressed patients, resulting in a decline in compliance with medication. Therefore, the efficacy of drug therapy cannot be guaranteed, and the recurrence rate of depression is high [3]. Psychotherapy mainly includes interpersonal psychotherapy (IPT) and cognitive behavioral therapy (CBT). Psychotherapy can prevent adverse reactions caused by drug therapy and help patients maintain good compliance. Therefore, psychotherapy is often used as an adjuvant therapy to drug therapy [4]. Mindfulness-based cognitive therapy (MBCT), is based on mindfulness-based stress reduction (MBSR) and CBT, enables depressed patients to control their emotional states during mindfulness meditation, focusing on the emotional states completely without judgment [5]. Loving-kindness mediation (LKM) is a type
Effects of MBCT + LKM on depressed patients

of meditation strategy used to cultivate the propensity for kindness and compassion for oneself, others and the world, and its main purpose is to cultivate concentration and awareness [6]. The LKM was carried out in patients with chronic depression for 3 months, and the results showed that the degrees of depression and emotional depression were significantly reduced, while the social acceptance of patients was remarkably increased [7].

In previous studies, MBCT and LKM were mostly implemented alone or combined with drugs, and there are few studies on the intervention using MBCT combined with LKM. On this basis, a total of 125 depressed patients were selected as the research subjects, and the value of MBCT plus LKM was analyzed by comparison with conventional psychological intervention, thereby investigating more feasible options for the intervention on depressed patients.

Materials and methods

Data

A total of 125 depressed patients diagnosed in The First Special Hospital of Harbin were selected as the research subjects and were randomly divided into a control group (n=62) and an observation group (n=63). Among them, there were 53 males and 72 females aged 19-58 years. Inclusion criteria: compliance with DSM-V diagnostic criteria for depression [8]; Hamilton Depression Rating Scale (HAMD) [9] score > 7 points; aged over 18 years. They voluntarily signed the informed consent form. The study was reviewed and approved by Hospital Ethics Committee. Exclusion criteria: mental disorders induced by organic diseases; psychoactive drug dependence; active physical diseases; apparent suicidal tendency; previous history of mania.

Methods

The control group received conventional psychological intervention. The basic knowledge of depression, common drugs, possible adverse drug reactions, and prevention of adverse reactions were introduced. Face-to-face communication with patients was conducted regularly to understand their thoughts, evaluate the depression degrees of patients, so as to provide psychological support for depressed patients, and care for patients in daily life.

The observation group received MBCT plus LKM. The interventions were carried out by clinical nurse specialists with the qualification of China National Psychological Counselor (Level 2). Method for conducting LKM: the patients were instructed to wear loose clothes, maintain a conscious and comfortable sitting posture, and select those with traits they admire as the subjects for compassion divergence. At first, the patients were instructed to silently recite the wishes to the subjects: I wish myself safe and healthy without danger, and I wish myself good self-care and continuous happiness. During the recitation, the patients were instructed to imagine the subjects sitting opposite, so as to feel the rise in compassion. Then, the patients were instructed to send the felt compassion to the subjects through continuous recitation. LKM was performed for 1 h once a day.

MBCT included formal mindfulness exercises: raisin eating exercises, body scan, mindfulness breathing, mindfulness walking, mindfulness yoga and three-minute breathing space. Informal mindfulness exercises: cleaning, mindfulness eating and mindfulness listening. MBCT was performed once every week, and the patients were required to complete the assignments given by the nurses every day for the next six days. Specifically, the recording was followed to conduct multiple mindfulness exercises, and relevant written exercises were completed. Detailed content: body scan: the patients were instructed to relax completely, lay on their back, close their eyes slightly, pay attention to each body part in turn in accordance with the instructions in the recording, carefully feel the feeling of the body at the moment, and attempt to establish a close connection with the body. The exercise was performed for 40 min each time. Mindful breathing: The patients were instructed to relax completely, lay on their back, close their eyes slightly, pay attention to each body part in turn in accordance with the instructions in the recording, carefully feel the feeling of the body at the moment, and attempt to establish a close connection with the body. The exercise was performed for 40 min each time. Mindful breathing: The patients were instructed to sit in a comfortable position, straighten the back, put their feet on the floor, keep their eyes slightly closed, carefully feel the body touch the ground, the bulge and depression of the abdomen at the time of inhaling and exhaling, pay attention to the pause between breathing out and breathing in, keep free breathing, and deliberate control for 15 min. Mindfulness
Effects of MBCT + LKM on depressed patients

Yoga: the mindfulness was incorporated into yoga practices, and the patients were instructed to focus on perceiving changes in body motions and inner feelings. The exercise lasted for 15 min. Mindfulness walking: the patients were instructed to fully relax the head and neck, open their eyes naturally, walk calmly, keep standing after walking for a while, feel themselves stand for 1 min, freely put their arms on both sides of their bodies, lift one foot while inhaling, lower the lifted foot while exhaling, then continue to inhale and lift the other foot, and such motion was repeated for 15 min. Three-minute breathing space: first, the patients were instructed to feel their physical, mental and emotional states, focus on the physical feelings between exhaling and inhaling, carefully experience exhaling and inhaling, and gradually transfer their attention from breathing to each part of the body.

After LKM exercise for 1 week, the patients conducted the exercise of MBCT for 8 weeks, and performed the exercise of LKM for 15 min before each exercise of MBCT.

Observational indices

Degree of depression: The assessment was conducted using HAMD. HAMD includes seven aspects: anxiety/somatization, body mass, cognitive impairment, day and night changes, retardation, sleep disorder and despair. A score of > 24 points indicates severe depression, 17-24 points indicates moderate depression, 9-16 points indicates mild depression, and < 8 points indicates no depression.

Rumination: Ruminative Responses Scale (RRS) [10] was used to assess rumination. RRS includes three dimensions: introspection and deliberation, forced thinking and rumination of symptoms. There are 21 items, and each item is rated using 1-4 point(s). Level 1 indicates never, Level 2 indicates a bit, Level 3 indicates most, and Level 4 indicates always. The total score is 21-84 points. A higher score indicates a more apparent rumination tendency.

Mindfulness level: Five Facet Mindfulness Questionnaire (FFMQ) [11] was used to assess the mindfulness level. FFMQ includes five factors: observation, description, conscious action, non-judgment, and non-reaction. There are 39 questions rated using 1-5 point(s). A score of 1 point indicates nonconformity, 2 points indicates low conformance, 3 points indicates partial conformance, 4 points indicates high conformance, and 5 points indicates full conformance. The score is directly proportional to the level of mindfulness.

Quality of life: The World Health Organization Quality of Life Scale-Brief Form Questionnaire (WHOQOL-BREF) [12] was used for assessment. WHOQOL-BREF includes psychology (6 items), environment (8 items), physiology (7 items) and social relations (3 items), and each item is rated using 1-5 point(s). The scores for psychology, environment, physiology and social relations are 6-30 points, 8-40 points, 7-35 points and 3-15 points, respectively. A higher score indicates a higher quality of life.

Self-acceptance degree: Self-acceptance Questionnaire (SAQ) [13] was used for assessment. SAQ includes 16 items and comprises self-acceptance and self-assessment, and each item is rated as 1-4 point(s). The scores for self-acceptance and self-assessment are 8-32 points, and the total score is 16-64 points. A higher score indicates a higher degree of self-acceptance.

Sense of stigma: The self-stigma in relatives of people with mental illness scale (SSPM) [14] was used for assessment. SSPM includes three dimensions: treatment (10 items), ability (8 items), and social relationships (14 items), with each dimension rating using 0-3 point(s). A score of 0 points indicates never, 1 point indicates rarely, 2 points indicates sometimes, and 3 points indicates often. A higher score indicates a higher sense of stigma.

The assessments were performed using the aforementioned scales before intervention, and at 2, 4, 6 and 8 weeks after intervention, respectively.

Statistical analysis

SPSS 23.0 was used for statistical analysis. The enumeration data were expressed as [n (%)], and detected using χ² test. The measurement data were expressed using (¯x ± sd), and detected using t test. The multi-point comparison was performed using ANOVA analysis, and detected using F test. The graphics were made using Graphpad Prism 8. P < 0.05 indicated a statistically significant difference.
Results

General data

There was no statistical difference in the male-to-female ratio and the ratios of religious belief, educational level, living condition, the mean age at first diagnosis, the mean age, the course of disease, and the mean body mass index (BMI) between the two groups ($P > 0.05$) (Table 1).

Degree of depression

There was no statistical significance in HAMD scores for depression between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, HAMD scores were decreased in both groups; HAMD scores in the observation group were lower than those before intervention, and HAMD scores in the observation group were lower than those in the control group ($P < 0.05$). There was no significant difference in the comparison of HAMD scores in the control group between 2, 4 and 6 weeks after intervention and before intervention ($P > 0.05$). At 8 weeks after intervention, HAMD scores in the control group were lower than those before intervention ($P < 0.05$) (Figure 1).

Rumination

There was no statistically significant difference in the scores of introspection and deliberation, forced thinking and rumination of symptoms in RRS between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, the scores of introspection and deliberation, forced thinking and rumination of symptoms were decreased in both groups, and the scores of introspection and deliberation, forced thinking and rumination of symptoms in the observation group were lower than those

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

<table>
<thead>
<tr>
<th>Data</th>
<th>Observation group (n=63)</th>
<th>Control group (n=62)</th>
<th>$t$/$X^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>M</td>
<td>30 (47.62)</td>
<td>28 (45.16)</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>33 (52.38)</td>
<td>34 (54.84)</td>
<td></td>
</tr>
<tr>
<td>Age when first diagnosed (years)</td>
<td>26.82±11.42</td>
<td>24.84±13.34</td>
<td>0.892</td>
<td>0.374</td>
</tr>
<tr>
<td>Age at participation (years)</td>
<td>37.15±16.29</td>
<td>35.91±15.28</td>
<td>0.439</td>
<td>0.662</td>
</tr>
<tr>
<td>Course of disease (months)</td>
<td>48.96±23.82</td>
<td>51.28±23.67</td>
<td>0.546</td>
<td>0.586</td>
</tr>
<tr>
<td>BMI (kg/m$^2$)</td>
<td>22.18±1.63</td>
<td>21.94±1.72</td>
<td>0.801</td>
<td>0.425</td>
</tr>
<tr>
<td>Religious belief</td>
<td>Y</td>
<td>12 (19.05)</td>
<td>10 (16.13)</td>
<td>0.184</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>51 (80.95)</td>
<td>52 (83.87)</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td>High school or below</td>
<td>19 (30.16)</td>
<td>21 (33.87)</td>
<td>0.198</td>
</tr>
<tr>
<td></td>
<td>Junior college or above</td>
<td>44 (69.84)</td>
<td>41 (66.13)</td>
<td></td>
</tr>
<tr>
<td>Residence status</td>
<td>Self living</td>
<td>15 (23.81)</td>
<td>17 (27.42)</td>
<td>0.214</td>
</tr>
<tr>
<td></td>
<td>Co-living</td>
<td>48 (76.19)</td>
<td>45 (72.58)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Degree of depression. There was no significant difference in HAMD scores for depression between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, HAMD scores in the observation group were higher than those in the control group ($P < 0.05$). * indicates the comparison between the two groups ($P < 0.05$).
Before intervention and were lower than those in the control group ($P < 0.05$). There was no significant difference in the scores of introspection and deliberation, forced thinking and rumination of symptoms in the control group between 2 and 4 weeks after intervention and before intervention ($P > 0.05$), but the scores of introspection and deliberation, forced thinking and rumination of symptoms in the control group at 6 and 8 weeks after intervention were lower than those before intervention ($P < 0.05$) (Figure 2).

**Mindfulness level**

There was no statistically significant difference in FFMQ scores for mindfulness level between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, FFMQ scores were increased in both groups, and FFMQ scores in the observation group were higher than those before intervention and were higher than those in the control group ($P < 0.05$). There was no significant difference in FFMQ scores in the control group between 2 weeks after intervention and before intervention ($P > 0.05$), but FFMQ scores in the control group at 4, 6 and 8 weeks after intervention were higher than those before intervention ($P < 0.05$) (Figure 3).

**Quality of life**

There was no statistically significant difference in the scores of psychology, environment, physiology and social relations in WHOQOL-BREF between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, the scores of psychology, environment, physiology and social relations were increased in both groups, and the scores of psychology, environment, physiology and social relations in the observation group were higher than those in the control group ($P < 0.05$) (Figure 4).

**Degree of self-acceptance**

There was no statistically significant difference in the scores of self-acceptance and self-assessment in SAQ between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, the scores of self-acceptance and self-assessment were increased in both groups, and the scores of self-acceptance and self-assessment in the observation group were higher than those before intervention.
Effects of MBCT + LKM on depressed patients

intervention and were higher than those in the control group ($P < 0.05$). There was no significant difference in the scores of self-acceptance and self-assessment in the control group at 6 and 8 weeks after intervention were higher than those before intervention ($P < 0.05$) (Figure 5).

**Sense of stigma**

There was no significant difference in the scores of treatment, ability and social relationships in SSPM between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, the scores of treatment, ability and social relationships were decreased in both groups, and the scores of treatment, ability and social relationships in the observation group were lower than those before intervention and were lower than those in the control group ($P < 0.05$). There was no significant difference in the scores of treatment, ability and social relationships between 2 and 4 weeks after intervention and before intervention ($P > 0.05$), but the scores of treatment, ability and social relationships in the control group at 6 and 8 weeks after intervention were lower than those before intervention ($P < 0.05$) (Figure 6).

**Discussion**

In terms of the degree of depression, HAMD scores in the observation group at 2, 4, 6 and 8 weeks were lower than those before intervention, and HAMD scores in the control group at 8 weeks after intervention were lower than those before intervention ($P < 0.05$). From 2 weeks after intervention, the degree of depression in the observation group was gradually reduced, and a longer duration of intervention led to a higher degree of depression. At 8 weeks after intervention, the degree of depression in the control group was changed.
Effects of MBCT + LKM on depressed patients

significantly, indicating that MBCT plus LKM was superior to conventional psychological intervention in improving the degree of depression of depressed patients. Other studies have proved that the effect of MBCT was time-dependent, and a longer duration of intervention led to more obvious effects [15]. In terms of regard to the application value of MBCT in depression, a study proved that MBCT could control the degree of depression, reduce the recurrence of depression, and alleviate other comorbidities (e.g., anxiety and suicidal tendency) [16]. In this study, LKM combined with MBCT can improve the rumination and depression of depressed patients, and play a regulatory role in the adaptive emotional adjustment strategies of the patients.

Rumination is not only a specific manifestation of abnormal thinking in depressed patients, but also an important reason for the attack and recurrence of depression or persistent depression [17]. In this study, the scores of introspection and deliberation, forced thinking and rumination of symptoms in the observation group at 2, 4, 6 and 8 weeks after intervention were lower than those before intervention, while the scores of introspection and deliberation, forced thinking and rumination of symptoms in the control group at 6 and 8 weeks after intervention were lower than those before intervention ($P < 0.05$). This indicated that MBCT plus LKM could more quickly improve rumination in depressed patients, and the effect was more than twice that of conventional psychological intervention. A study of a 2-month intervention using MBCT in patients with recurrent depression showed that the mean score was reduced from 45 points before intervention to 40 points, and there was a positive correlation between the alleviation of depression symptoms and the reduction of rumination [18]. This may be due to the fact that mindfulness breathing during intervention leads to a decreased frequency of repetitive thinking and a reduced negative response of thinking. Additionally, LKM can cultivate patients’ gratitude, compassion and love for self and others, thus improving their physical and mental adaptability and reducing rumination [7]. In terms of mindfulness level, the study revealed that a body scan could increase inner sensibility and reduce thinking content, LKM could help enhance warm and positive feelings towards others, and breathing meditation could help strengthen inner positive feelings [19]. In this study, FFMQ scores in the observation group at 2, 4, 6 and 8 weeks after intervention were

Figure 4. Quality of life. There was no significant difference in the scores of psychology (A), environment (B), physiology (C) and social relations (D) between the two groups before intervention ($P > 0.05$). At 2, 4, 6 and 8 weeks after intervention, the scores of psychology (A), environment (B), physiology (C) and social relations (D) in the observation group were lower than those in the control group ($P < 0.05$). * indicates the comparison between the two groups ($P < 0.05$).
Effects of MBCT + LKM on depressed patients

Figure 5. Degree of self-acceptance. There was no significant difference in the scores of self-acceptance (A) and self-assessment (B) between the two groups before intervention (P > 0.05). At 2, 4, 6 and 8 weeks after intervention, the scores of self-acceptance (A) and self-assessment (B) in the observation group were lower than those in the control group (P < 0.05). * indicates the comparison between the two groups (P < 0.05).

Figure 6. Sense of stigma. There was no significant difference in the scores of treatment (A), ability (B) and social relationships (C) between the two groups before intervention (P > 0.05). At 2, 4, 6 and 8 weeks after intervention, the scores of treatment (A), ability (B) and social relationships (C) in the observation group were higher than those in the control group (P < 0.05). * indicates the comparison between the two groups (P < 0.05).

higher than those before intervention, while FFMQ scores in the control group at 4, 6 and 8 weeks after intervention were higher than those before intervention (P < 0.05). This signaled that MBCT plus LKM could improve the mindfulness level of depressed patients more effectively, so that depressed patients could gradually form a stronger sense of mindfulness, and use the sense of mindfulness to resist negative emotional feelings related to depression, thus controlling depression. A study revealed that FFMQ scores of depressed patients remarkably increased after MBCT [20]. However, the specific results of this study are slightly higher than those of the similar studies [5]. This may be related to the joint intervention implemented in this study, and may also be related to the differences in compliance of different study subjects. Another study showed that MBCT combined with safety intervention significantly reduced the suicidal tendency of depressed patients and maintained a higher level of mindfulness [21].

In terms of quality of life, the scores of psychology, environment, physiology and social relations in the observation group at 2, 4, 6 and 8 weeks after intervention were higher than those before intervention, while the scores of psychology, environment, physiology and social relations in the control group at 6 and 8 weeks after intervention were higher than those before intervention (P < 0.05). The quality of life in the observation group was improved from 2 weeks after MBCT plus LKM, and such improvement was more remarkable than that in the control group at the same time points. This indicated that MBCT plus LKM
Effects of MBCT + LKM on depressed patients

could more markedly improve the quality of life of depressed patients. The study suggested that the continuous implementation of LKM could effectively elevate social well-being and life satisfaction of individuals [19]. The may be due to the fact that the MBCT plus LKM is consistent with the Buddhist thought, which perfectly combines the Buddhist thought with the psychotherapy, thereby forming a new intervention method for depression [6]. In terms of the sense of stigma, the scores of treatment, ability and social relationships in the observation group at 2, 4, 6 and 8 weeks after intervention were lower than those before intervention, while the scores of treatment, ability and social relationships in the control group at 6 and 8 weeks after intervention were lower than those before intervention ($P < 0.05$). In terms of the degree of self-acceptance, the scores of self-acceptance and self-assessment in the observation group at 2, 4, 6 and 8 weeks after intervention were higher than those before intervention, while the scores of self-acceptance and self-assessment in the control group at 6 and 8 weeks after intervention were higher than those before intervention ($P < 0.05$). This showed that compared with conventional psychological intervention, MBCT plus LKM could greatly reduce the sense of stigma of depressed patients, more effectively improve the degree of self-acceptance of depressed patients, and help depressed patients obtain a higher sense of self-adaptation and be more willing to actively participate in social interaction and life.

In summary, MBCT plus LKM can effectively improve depression, rumination, mindfulness level, quality of life, the sense of stigma and degree of self-acceptance of depressed patients. There have been a number of similar studies, but in previous studies, MBCT and LKM intervention methods were mostly used alone or in combination with drugs, and there was a lack of studies on MBCT combined with LKM for intervention. This study mainly focused on the combined application of MBCT and LKM. In addition, in the few previous studies on MBCT combined with LKM, there were fewer choices of effect indicators. The selection of observation indicators in this study was more comprehensive and abundant, which was the further advancement of previous studies, and the results obtained were of more reference value. There are still some shortcomings in this study. For instance, the study is general, the depressed patients are directly selected as the research subjects, the intervention effects on depressed patients with different characteristics are not analyzed, and whether the basic conditions (e.g., age, gender and course of disease) will affect the intervention effects is not demonstrated. Moreover, MBCT group or LKM group is not established in this study. Therefore, it is impossible to explore the differences in the intervention effects between MBCT or LKM and MBCT combined with LKM. The analysis of these shortcomings should be performed in the future in-depth studies.

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Disclosure of conflict of interest

None.

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Effects of MBCT + LKM on depressed patients