Effect of Online Mindfulness Cognitive Training on Anxiety Intervention in Medical Students

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Abstract: This study explores the effects of online group mindfulness cognitive training on alleviating anxiety among medical students, as well as the mediating role of mindfulness levels in the intervention's effectiveness. Medical students with anxiety symptoms were recruited through online psychological surveys and randomly assigned to either the mindfulness training group or the control group. The training group participated in an 8-week online mindfulness cognitive training program, while the control group received no intervention during this period. Mindfulness levels were measured using the Five Facet Mindfulness Questionnaire (FFMQ) before and after the training, and changes in anxiety symptoms were assessed using the Self-Rating Anxiety Scale (SAS) at baseline, the 4th week, and the 8th week. The results indicate that online group mindfulness cognitive training effectively reduces anxiety among medical students, with increased mindfulness levels playing a significant role in mitigating their emotional distress.

Keywords: online group intervention; mindfulness cognitive training; anxiety symptoms

1. Introduction

In the late 20th century, some Western clinicians and psychologists extracted the concept and training methods of mindfulness from Buddhism, stripping away its religious elements, and developed various mindfulness-based psychotherapies, such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT).[1,2] These therapies have received extensive empirical support for their effectiveness in individual interventions. Research has shown that mindfulness training is particularly effective in improving emotional issues [3]. MBCT, for instance, has a significant impact on alleviating symptoms of depression and anxiety, preventing depression relapse, enhancing effective emotional regulation, maintaining emotional stability, increasing subjective well-being, and improving the quality of life [4,5]. It has also shown positive intervention effects on university students in areas such as depression, anxiety, obsessive-compulsive symptoms, and subjective well-being [6,7,8].

This study utilizes online group mindfulness cognitive training to intervene with medical student participants, assessing their mindfulness and anxiety levels, and investigating the intervention's effectiveness in reducing anxiety symptoms. It explores new avenues for group interventions in the context of mental health education for university students.

2. Objectives and Methods

2.1 Objectives

This study employed a single-blind randomized controlled trial design. A psychological health survey was conducted among first to fourth-year students at a medical college, resulting in the identification of 127 individuals experiencing anxiety symptoms. Among these students, group members were recruited via QQ groups through advertising. After students submitted their application forms, psychology major students conducted individual telephone interviews.

Inclusion criteria: ① Age over 18 years; ② No prior experience with long-term meditation practice; ③ Strong motivation to participate in group training; ④ Exclusion of a history of psychiatric disorders, depression, bipolar disorders, and similar conditions. Eventually, 58 group members were selected and randomly assigned to two groups: the mindfulness training group and the

control group. The training group comprised 28 members, including 9 males and 19 females, while the control group comprised 30 members, including 12 males and 18 females.

2.2 Instruments

2.2.1 Five Facet Mindfulness Questionnaire (FFMQ)

Developed by Baer et al., this questionnaire consists of 39 items encompassing five facets: Observing, Describing, Acting with Awareness, Non-Judging, and Non-Reactivity. Responses are rated on a 1-5 scale, with higher scores indicating higher levels of mindfulness. In a Chinese sample, the internal consistency of each facet was reported as follows: Observing 0.746, Describing 0.843, Acting with Awareness 0.794, Non-Judging 0.659, and Non-Reactivity 0.448, with all facets demonstrating reliability exceeding 0.65[9].

3. Self-Rating Anxiety Scale (SAS)

Developed by Chinese-American professor Zung, this scale comprises 20 items rated on a four-point scale, including 5 items scored in reverse. The total score is calculated by summing the scores of each item and then multiplying by 1.25, rounding to the nearest whole number. A score below 50 is considered normal according to Chinese normative standards. The scale assesses the frequency of symptom occurrence, with a Cronbach's coefficient of 0.87.

3.1 Intervention Methods

The primary intervention method involved online group mindfulness cognitive training conducted via Tencent Meeting. However, explanations related to the principles of depression were omitted from the original content. The mindfulness training group participated in an 8-week training program (see Table 1 for specific training content). Training sessions occurred once a week, lasting 2 hours each, with 30 minutes of daily home practice. A mindfulness day (8 hours of continuous mindfulness training to review content) was included between the 6th and 7th weeks. The control group received no intervention during the intervention period and only received one day of mindfulness training after the 8-week intervention concluded. SAS questionnaires were administered to both groups before the training, in the 4th week of training, and in the 8th week of training, while FFMQ questionnaires were administered before the training and in the 8th week of training to assess their mindfulness levels and changes in anxiety symptoms.

Table 1: Mindfulness-based cognitive training content

Week	Training theme	Training content
Week 1	Identify automatic navigation	Raisin exercises; body scan
Week 2	Live in your head	Body scanning; mindfulness breathing; thoughts and feeling exercises
Week 3	Concentrated scattered heart	Sitting exercises; breathing space (routine); mindfulness stretching; thoughts and feeling exercises
Week 4	Identify and circumvent reactions	Mindfulness watching sound; sitting exercises; mindfulness walking; thoughts and feeling exercises
Week 5	Let it go	Mindful view of breath, body, voice, thoughts; breathing space (response)
Week 6	Ideas are just ideas	Mindful view of breath, body, sound, thoughts; breathing space (responsive, focus on ideas)
Mindfulness day	Mindfulness in daily life	Body scanning; mindfulness walking; mindfulness eating, sit-in exercises; mindfulness yoga; breathing space
Week 7	Self-Care	Mindful view of breathing, body, sounds, thoughts; list of pleasant and controlled activities; breathing space
Week 8	Use what you learn to deal with the future	Body scan; summary, sharing

3.2 Statistical Methods

SPSS version 21.0 was employed for statistical analysis. Independent-sample t-tests were used to compare inter-group differences before, during, and after the training, while paired-sample t-tests were

used to assess intra-group differences before, during, and after the training. Bootstrap analysis was utilized to examine the mediating effect of mindfulness levels in the improvement of anxiety symptoms among medical students due to mindfulness training. This analysis involved 5000 bootstrap samples, checking the 95% confidence intervals (CIs) for each path coefficient. If the 95% CI does not include zero, it indicates a statistically significant mediating effect.

4. Results

4.1 Intra-group Comparisons of SAS Scores Before, During, and After Training for Both Groups

As shown in Table 2, the SAS scores of the mindfulness training group were significantly lower in the 4th week of training compared to before training (P < 0.01). Furthermore, in the 8th week of training, the SAS scores were significantly lower than both before training and the 4th week of training (P < 0.01). In contrast, the control group exhibited no significant difference in SAS scores between the 4th week of training and before training, but the scores were lower in the 8th week compared to before training (P < 0.05).

Table 2: Within-group comparisons of the two groups in pre-, middle-and post-training SAS scores

Grouping	SAS score			①②compare		②③compare		①③compare	
	Before training①	Week 4 of training②	Week 8 of training③	*T* value	*P* value	*T* value	*P* value	*T* value	*P* value
T-group	56.29±5.01	54.69±3.90	49.60±5.91	3.258	0.003	5.837	0	5.962	0
Control group	55.50±4.08	54.54±3.17	53.50±3.72	1.973	0.058	2.033	0.051	2.511	0.018

4.2 Inter-group Comparisons of SAS Scores Before, During, and After Training

Before training, there was no statistically significant difference in SAS scores between the mindfulness training group and the control group. In the 4th week of training, SAS scores showed no significant difference between the two groups. However, in the 8th week of training, the SAS scores of the mindfulness training group were significantly lower than those of the control group (t = -2.984, P = 0.005).

4.3 Intra-group and Inter-group Comparisons of Mindfulness Levels for Both Groups

Table 3: Within-and between-group comparisons of both group mindfulness levels

Factor	T-group				Control group				①③compare		②④compare	
	Before training①	After training②	*T* value	*P* value	Before training③	After training④	*T* value	*P* value	*T* value	*P* value	*T* value	*P* value
Observe	22.64±3.87	24.39±3.70	-3.06	0.005	22.80±3.77	22.20±2.80	0.875	0.389	-0.157	0.876	2.535	0.014
Describe	26.54±3.14	26.93±2.42	-0.869	0.393	25.20±3.74	25.07±4.27	0.261	0.796	1.468	0.148	2.059	0.045
Sense of action	25.11±3.54	26.04±2.97	-2.755	0.01	25.57±3.45	25.20±3.73	0.718	0.479	-0.5	0.619	0.947	0.348
Do not judge	24.04±3.71	25.39±3.27	-2.139	0.042	23.73±3.15	23.63±2.99	0.218	0.829	0.335	0.739	2.141	0.037
Do not act	19.14±1.76	19.32±1.59	-0.667	0.51	19.23±1.92	19.30±1.84	-0.23	0.818	-0.187	0.853	0.047	0.962
Total points	117.43±10.48	122.11±7.28	-3.144	0.004	116.53±7.30	115.40±7.75	1.005	0.323	0.379	0.706	3.389	0.001

As indicated in Table 3, after training, the mindfulness training group exhibited significantly higher scores in the facets of "Observing" and the total score compared to before training (P < 0.01). Additionally, scores for "Acting with Awareness" and "Non-Judging" were higher than before training (P < 0.05), while scores for "Describing" and "Non-Reactivity" showed no significant differences before and after training. In contrast, the control group showed no significant differences in scores for any facet before and after training. Before training, there were no significant differences in scores for each facet between the two groups. However, after training, the mindfulness training group's total score was significantly higher than that of the control group, and scores for "Observing," "Describing," and "Non-Judging" were also higher than those of the control group, while scores for "Acting with Awareness" and "Non-Reactivity" were not significantly different from the control group.

4.4 Mediation Analysis of Mindfulness Levels on Improving Anxiety Symptoms

Bootstrap regression analysis was conducted with 5000 bootstrap samples. Group assignment was set as the independent variable, the difference in SAS scores before and after training was the dependent variable, and the difference in FFMQ total scores before and after training was the mediator. The results indicated that the total effect was 4.70, with a 95% confidence interval (CI) of (1.97, 7.43). The indirect effect was 1.67, with a 95% CI of (0.26, 3.96), and the direct effect was 3.03, with a 95% CI of (0.28, 5.78). None of the confidence intervals contained 0, indicating that the mediation effect of FFMQ total scores was statistically significant. Thus, mindfulness levels partially mediated the improvement of anxiety symptoms, with the indirect effect accounting for 35.5% of the total effect.

5. Discussion

The results of this study demonstrated that conducting online group mindfulness cognitive training via Tencent Meeting significantly reduced anxiety levels in medical students during the training period. This finding is consistent with previous research results [10-13]. It is worth noting that the anxiety levels of students in the control group also decreased after 8 weeks of training, which may be attributed to the fact that the participants in this study were non-clinical samples and did not have diagnosed anxiety disorders or other mental illnesses.

Furthermore, this study found that 8 weeks of online group mindfulness cognitive training significantly improved mindfulness levels in medical students. Specifically, scores for the facets of "Observing" and "Non-Judging" were higher than before training and higher than those in the control group. The enhancement of mindfulness levels played a partial mediating role in improving their anxiety symptoms, suggesting that the improvement of mindfulness levels is an essential factor in the effectiveness of online group mindfulness cognitive training. Through mindfulness cognitive training, medical students improved their ability to observe and perceive their inner thoughts and emotions more clearly, refrained from making immediate judgments about their thoughts and emotions, and thus became less influenced by external factors, leading to anxiety relief [14].

This study has some limitations. Firstly, it did not conduct long-term follow-up research on the experimental group, so the long-term effects of this training on reducing anxiety in medical students are unknown. Secondly, the study only included a blank control group; including other types of interventions (such as lectures, physical exercises, etc.) would enhance the credibility of the results. Therefore, future research should improve the experimental design and employ more appropriate research methods to further investigate the application of online group mindfulness cognitive training in university students.

6. Conclusion

The results of this study provide empirical support for promoting online group mindfulness cognitive training as an effective means of intervening in anxiety among medical students. It also offers valuable insights for future research and psychological health interventions.

Acknowledgment

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