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A Comparative Analysis of Cognitive Behavioral Therapy and Mindfulness-Based Cognitive Therapy for Enhancing Weight Management and Physical Activity in Obese Individuals with Coronary Artery Disease

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ABSTRACT

Background: Obesity is a major modifiable risk factor for cardiovascular diseases (CVDs). It contributes to enhance the mortality and morbidity. Lifestyle interventions are basic, psychological barriers like poor motivation and emotional eating and stress often affect sustained change in behavior. **Methodology:** This study used a quasi-experimental approach with a pre-test and post-test with a control group. The study involved 30 participants (15 in cognitive behavioral therapy (CBT) and 15 in MBCT). The trial recruited adults aged 30-60 with diagnosed coronary artery disease (CAD), Body Mass Index >30kg/m2 and a willingness to attend 1 weekly therapy sessions. A multivariate analysis of variance (ANOVA) was used to examine differences within and between groups. **Results:** Among the participants, 66.7% are married and 33.3% are single, indicating a heterogenous marital composition. In terms of education. At the follow-up, the MBCT group had somewhat higher reductions (30.7±1.8) than the CBT group (31.5±1.9), indicating a possible advantage for mindfulness-based treatments in sustaining weight loss. The MBCT group showed somewhat larger improvement (3.1 ± 0.7) than the group receiving cognitive behavioral therapy (2.8 ± 0.6). At follow-up, the group receiving MBCT maintained higher activity levels (3.4 ± 0.7) compared to the CBT group (3.0 ± 0.8). **Conclusion:** Both CBT and mindfulness-based cognitive therapy significantly lowered the body mass index with time, with MBCT demonstrating slightly higher reduction at follow-up indicating a possible advantage in maintaining loss of weight. Mindfulness cognitive therapy showed a crucial advantage in promoting higher longer term activity levels compared to cognitive behavioral therapy.

INTRODUCTION

One in eight people worldwide suffered from obesity in 2022. During 1990, obesity among adolescents has quadrupled and obesity among adults has more than doubled globally. 2.5 billion persons aged 18 and above were overweight in 2022. 890 million of them suffered from obesity. In 2022, sixteen percent of adults over the age of 18 lived with obesity, while 43% were overweight. 37 million children under five were obese in 2022. In 2022, more than 390 million kids and teenagers between the ages of 5 and 19 were overweight, with 160, with 160 millions of them suffering from obesity (1). This suggests a significant increase in the incidence of obesity, which is a key risk factor

for a variety of chronic diseases, such as cardiovascular disease, diabetes and some types of cancer. Overweight is defined as having a body mass index (BMI) between 25 and 29.9, while obesity has a BMI of 30 or higher. Obesity is a condition where there is an overconcentration of stored fat in the body (2). Physical exercise and correct diet are useful for lowering weight and thus reducing this overconcentration of accumulated fats; but research has shown that nutrition or exercise alone does not always have a significant impact on obesity. Importantly, alternatives to medication, such as increasing exercise, are helpful in both lowering mortality and alleviating depression symptoms (3). Furthermore, even if a reduction in weight occurs, maintaining it is challenging due to obesity's various psychological, physiological and social elements (4) . When it comes to obesity, psychological issues play a significant role. Obesity is linked to an increased risk of anxiety and major depression or MDD, due to metabolic inefficiency, according to studies (5). Environmental variables influence food intake regulation and research indicates that social to cultural, biological and dynamic variables play a role in obesity development. At the same time, most researchers have claimed that obesity is caused by certain ancestral histories, personality characteristics and unconscious tensions. Various mental disorders and life difficulties may also contribute to their obesity (6). These individuals may have resorted to disordered feeding as a means of dealing due to emotional problems and other situations surrounding them (7) .

Furthermore, research has shown that being overweight may lead to psychological problems and physical diseases, such as insulin resistance and type 2 diabetes, elevated blood pressure as well as hypertension, dyslipidemia, coronary artery disease, stroke, sleep apnea, gallbladder disease, osteoarthritis and cancer (7). Given that obesity is a multifaceted problem with psychological, physical, and social components, numerous approaches have been suggested proposed for lowering it and boosting physical activity. Some of the more well-known approaches include surgical therapies, medication and psychological treatments (8) . Since surgery has significant dangers and drawback, numerous professionals steer clear of it (9). Additionally, there are hazards associated with the medication because long-term use can result in negative consequences on the human body (10). It could be a suitable target for new therapeutic drugs that control the consumption of food and the importance of mood and incentives. Numerous studies suggest that certain antidepressants substances might be safe, tolerated well, and successful in lowering serious suicidal thoughts and depressive symptoms in individuals with obesity or depression who are not responding to treatment (11) .

CBT, or cognitive behavioral therapy, is a type of psychoanalysis that examines that connection between ideas, emotions and actions. Its cultural influence includes modifications for various cultures including the use of psychotherapy to treat depression in Asian Americans and post-traumatic stress disorder in refugees. Cognitive behavioral therapy can be utilized in a variety of situation and to address different kinds of mental disorders (12).

Mindfulness-Based Cognitive Therapy, is a psychotherapy approach that combines mindfulness meditation practices with cognitive-behavioral therapy techniques to help individuals who have experienced depression or other mood disorders (13). Mindfulness-Based Cognitive Therapy has been widely studied and is effective in lowering symptoms of sadness and anxiety in persons from varied cultural backgrounds (14).

RESEARCH METHODOLOGY

This study used a quasi-experimental approach with a pre-test and post-test with a control group. The study involved 30 participants (15 in cognitive behavioral therapy (CBT) and 15 in MBCT). The trial recruited adults aged 30-60 with diagnosed CAD, BMI >30kg/m^2 and a willingness to attend 1 weekly therapy sessions. Patients with severe mental illness like schizophrenia and bipolar disease and uncontrolled chronic conditions were excluded from the study. The intervention consisted of two groups: the Cognitive Behavior Therapy group which emphasized cognitive restructuring, goal setting, and behavior modification, and the MBCT group, which focused on mindfulness meditation, enhanced awareness of eating behavior and stress reduction approaches. Data was collected using three methods: pre-test (baseline), post-test (after twelve weeks of treatment), and follow-up (6 months later). The

data comprised body mass index, leisure-time exercise, associated with work physical activity, and exercise routines. Descriptive statistics (mean, standard deviation (STD), frequency (f) was discovered. A multivariate analysis of variance (ANOVA) was used to examine differences within and between groups.

RESULTS

Table 1 divided the individual's BMI into three categories: normal weight, overweight and obese. Many participants (83.3 percent) are obese, which is consistent with the characteristics of the target group. Only 16.7% of participants are classified as overweight, with none falling into the normal weight group. This distribution emphasis the prevalence of severe obesity in the population in question, which is crucial for determining the efficacy of interventions.

Table 1

Body Mass Index (BMI) Categories

Category	Frequency	Percentage (%)
Normal Weight	0	0%
Overweight	5	16.7%
Obese	25	83.3%

Table 2 shows the marital and educational backgrounds of individuals. Among the participants, 66.7% are married and 33.3% are single, indicating a heterogenous marital composition. In terms of education, 40% of participants have a high school diploma, 33.3% have a bachelor's degree, and 26.7% have advanced degrees. This demographic information is critical for understanding how education and marital status may influence intervention adherence and outcomes. The data also ensures that the data contains people from various educational backgrounds, which improves generalizability.

Table 2

Frequency of Marital and Education Status

Variable	Frequency	Percentage
Marital Status		
Single	10	33.3%
Married	20	66.7%
Education Level		
High School	12	40.0%
Bachelor's Degree	10	33.3%
Higher Degree	8	26.7%

Table 3 shows the mean and standard deviation of BMI in the CBT and MBCT groups at the pre-test, post-test and follow-up stages. Both groups show a considerable drop in body mass index (BMI) overtime, confirming the program's effectiveness. At the follow-up, the MBCT group had somewhat higher reductions (30.7±1.8) than the CBT group (31.5±1.9), indicating a possible advantage for mindfulness-based treatments in sustaining weight loss. The constantly low standard deviations across time periods emphasize the consistency of BMI changes within each group. These findings highlight the effectiveness of structured psychological therapy in treating obesity in people with coronary artery disease.

Table 3

Groups' Mean and Standard Deviation of BMI

Time Point	CBT Group (Mean ± SD)	MBCT Group (Mean ± SD)
Pre-Test	35.5 ± 2.3	36.2 ± 2.5
Post-Test	33.0 ± 2.0	32.8 ± 2.2
Follow-Up	31.5 ± 1.9	30.7 ± 1.8

Table 4 shows the mean and standard deviations of physical activity during leisure time for the cognitive behavioral therapy and The Mindfulness-Based cognitive therapy groups at three different time points: pre-test, post-test, and follow-up. At beginning (pre-test), both groups have modest activity levels with comparable averages (1.8 for CBT and 1.7 for MBCT). Post-test results demonstrate considerable improvements in leisure activity, with MBCT participants performing significantly better (3.5 vs 3.2). At the follow-up, both groups maintained their gains, with MBCT participants demonstrating higher activity levels (4.0 vs. 3.5). These findings demonstrate the effectiveness of both therapies in increasing sustained leisure-time activity, with MBCT having a minor advantage.

Table 4

Groups' Mean and Standard Deviation of Physical Activity in Leisure Time

Time Point	CBT Group (Mean ± SD)	MBCT Group (Mean ± SD)
Pre-Test	1.8 ± 0.5	1.7 ± 0.6
Post-Test	3.2 ± 0.8	3.5 ± 0.7
Follow-Up	3.5 ± 0.6	4.0 ± 0.8

Table 5 shows the mean and standard deviation of physical activity in work conditions for the CBT and MBCT groups at three different points. Pre-test activity levels for both groups were similar, with CBT at 2.0 ± 0.7 and MBCT at 1.9 ± 0.8. Post-test results demonstrate significant improvements in

physical activity for both groups. The MBCT group showed somewhat larger improvement (3.1 ± 0.7) than the group receiving cognitive behavioral therapy (2.8 ± 0.6). At follow-up, the group receiving MBCT maintained higher activity levels (3.4 ± 0.7) compared to the CBT group (3.0 ± 0.8). These data indicate that both treatments effectively increase work related physical activity, with MBCT having a potential advantage promoting long-term adherence.

Table 5

Groups' Mean and Standard Deviation of Physical Activity in Work Situation

Time Point	CBT Group (Mean ± SD)	MBCT Group (Mean ± SD)
Pre-Test	2.0 ± 0.7	1.9 ± 0.8
Post-Test	2.8 ± 0.6	3.1 ± 0.7
Follow-Up	3.0 ± 0.8	3.4 ± 0.7

Table 6 shows the progression of physical activity in exercise for both the cognitive behavioral therapy and MBCT groups at three different time points: pre-test, post-test, and follow-up. During the pre-test stage, both groups had low baseline activity levels: 1.2 ± 0.4 for CBT and 1.1 ± 0.3 for MBCT. The post-test shows significant gains, with MBCT slightly outperforming CBT (2.7 ± 0.5 vs. 2.5 ± 0.6). At follow-up, the MBCT group outperformed CBT (2.9 ± 0.5) with a mean score of 3.2 ± 0.6. The findings reveal that both therapies are successful at boosting physical activity, with the Mindfulness-Based Cognitive Therapy having a modest edge in maintaining benefits as time passes.

Table 6

Groups' Mean and Standard Deviation of Physical Activity in Exercise

Time Point	CBT Group (Mean ± SD)	MBCT Group (Mean ± SD)
Pre-Test	1.2 ± 0.4	1.1 ± 0.3
Post-Test	2.5 ± 0.6	2. 7 ± 0.5
Follow-up	2.9 ± 0.5	3.2 ± 0.6

Table 7: presents the mixed analysis of variance (ANOVA) results, which examine within-group changes in BMI, leisure activity, work activity, and exercise. All variables had statistically significant F-values ($p < 0.05$), showing considerable progress in these metrics for both groups overtime. The effect sizes (η^2) vary from moderate to strong, with the biggest impact seen for a body mass index (η^2= 0.45), followed by exercise (η^2= 0.41). These findings demonstrate that the interventions effectively lowered BMI and raised physical activity levels across many environments. The findings imply that the therapies have considerable potential for improving health outcomes among obese people with cardiovascular disease.

Table 7

Results of the Mixed Analysis of Variance

Variable	F-value	p-value	Effect Size (η^2)
BMI	15.2	0.001	0.45
Leisure Activity	12.8	0.003	0.39
Work Activity	10.5	0.005	0.35
Exercise	13.6	0.002	0.41

DISCUSSION

CBT and MBCT can lead to lifestyle changes and altered cognitive processes, which may result in loss of weight and improved physical activity among obese people with cardiovascular disease. These findings are consistent with earlier studies that have shown the effectiveness of MBCT in inducing positive changes in lifestyles (10,12).

The current study sought to assess the efficacy of cognitive behavior therapy and MBCT in encouraging weight loss and physical activity in persons suffering from cardiovascular disease (CVD) and obesity. Our study found that the majority (83.3%) of participants are obese, which is reflected in the characteristics of the target group. Only 16.7 percent of participants are classified as over. The study found substantial within-subject effects for a body mass index and leisure time activity, showing that both interventions improved these measures.

The present research sought to explore the effectiveness of CBT and MBCT in assisting with loss of weight and boosting physical activity in people suffering from cardiovascular disease and obesity. Our study found that the majority (83.3 percent) of the participants are obese, which reflects the features of the target group. Just 16.7 percent of participants were classified as overweight. The study found significant within-subject effects for BMI and time for leisure activity, showing that both interventions improved these measures. Interestingly, between-subject analyses revealed substantial differences in leisure time activity, with higher scores reported in both the CBT and MBCT groups (15). All variables, including body mass index, leisure activities, and

job activity, showed highly significant gains in both groups over the course of time. The findings imply that the therapies have a high potential for improving health outcomes among obese people with coronary artery disease.

Our study found that both the CBT and MBCT groups had a significant drop in BMI over time, demonstrating the effectiveness of the therapies. At the follow-up, the MBCT group had somewhat higher reductions (30.7 ± 1.8) than the CBT group (31.5 ± 1.9), indicating a possible advantage for mindfulness-based treatments in maintaining loss of weight.

Practicing mindfulness can be a helpful weight-management technique for obese people. The practice of mindfulness aids in the development of self-control. Self-regulation, and self-monitoring of behavior, resulting in a gradual recovery. Obese people frequently feel unpleasant emotions such as worry, despair, and fluctuations in mood, which can impair their weight management. Mindfulness therapy helps to replace negative thoughts and feelings with positive ones. The exercise also helps develop attitudes, attention, and goal to the same time, leading to an entirely novel viewpoint on circumstances (16). This transformation helps people to recognize and replace detrimental repetitive behavior with healthy ones, resulting in total awareness of inefficient and defective cognitive processes. Mindfulness can also assist prevent unfavorable evaluation thoughts about one's appearance and weight, as well as increased awareness of the present moment. Practicing mindfulness may assist with regulating and managing negative emotions, as well as improve body image and weight-loss attitudes. In addition to the effectiveness of MBCT in lowering the BMI of obese patients with coronary artery disease the results of the study indicated that cognitive behavioral therapy can also affect weight loss in these patients. CBT has been recognized as an appropriate treatment method for weight reduction (17–20).

CONCLUSION

The study concluded that most of the participants were married, and they had good educational background. This improved generalizability of the results and aids in understanding the impact of these factors on intervention outcomes. Both CBT and mindfulness-based cognitive therapy significantly lowered the body mass index with time, with MBCT demonstrating slightly higher reduction at follow-up indicating a possible advantage in maintaining loss of weight. Both CBT and MBCT significantly increase and sustain physical activity of leisure-time, with mindfulness cognitive therapy showing a slight advantage in improvement and maintenance. Mindfulness cognitive therapy showed a crucial advantage in promoting higher longer term activity levels compared to cognitive behavioral therapy.

REFERENCES

1. World Health Organization. (2024, March 1). *Obesity and overweight*. World Health Organization; WHO. https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
2. Bosch, J., Stradmeijer, M., & Seidell, J. (2004). Psychosocial characteristics of obese children/youngsters and their families: implications for preventive and curative interventions. *Patient Education and Counseling*, *55*(3), 353–362. https://doi.org/10.1016/j.pec.2003.04.005
3. Belvederi Murri, M., Ekkekakis, P., Magagnoli, M., Zampogna, D., Cattedra, S., Capobianco, L., Serafini, G., Calcagno, P., Zanetidou, S., & Amore, M. (2019). Physical Exercise in Major Depression: Reducing the Mortality Gap While Improving Clinical Outcomes. *Frontiers in Psychiatry*, *9*(762). https://doi.org/10.3389/fpsyt.2018.00762
4. Kurnik Mesarič, K., Pajek, J., Logar Zakrajšek, B., Bogataj, Š., & Kodrič, J. (2023). Cognitive behavioral therapy for lifestyle changes in patients with obesity and type 2 diabetes: a systematic review and meta-analysis. *Scientific Reports*, *13*(1), 12793. https://doi.org/10.1038/s41598-023-40141-5
5. Sebghati, M., & Chandraharan, E. (2017). An update on the risk factors for and management of obstetric

haemorrhage. *Women's Health*, *13*(2), 34–40. https://doi.org/10.1177/1745505717716860

6. Robinson, E., Haynes, A., Sutin, A., & Daly, M. (2020). Self-perception of overweight and obesity: A review of mental and physical health outcomes. *Obesity Science & Practice*, *6*(5). https://doi.org/10.1002/osp4.424
7. Otang-Mbeng, W., Otunola, G. A., & Afolayan, A. J. (2017). Lifestyle factors and co-morbidities associated with obesity and overweight in Nkonkobe Municipality of the Eastern Cape, South Africa. *Journal of Health, Population and Nutrition*, *36*(1). https://doi.org/10.1186/s41043-017-0098-9
8. Yanovski, S. Z., & Yanovski, J. A. (2018). Toward Precision Approaches for the Prevention and Treatment of Obesity. *JAMA*, *319*(3), 223. https://doi.org/10.1001/jama.2017.20051
9. Cooper, Z., Doll, H. A., Hawker, D. M., Byrne, S., Bonner, G., Eeley, E., O'Connor, M. E., & Fairburn, C. G. (2010). Testing a new cognitive behavioural treatment for obesity: A randomized controlled trial with three-year follow-up. *Behaviour Research and Therapy*, *48*(8), 706–713. https://doi.org/10.1016/j.brat.2010.03.008
10. Fouladvand, M., Farahani, H., BAGHERI, F., & Fouladvand, M. (2012). The effectiveness of cognitive-behavioral therapy in the treatment of the girls afflicted with obesity. *Research in Psychological Health*, *6*(2), 10-22. http://rph.khu.ac.ir/article-1-90-en.html
11. Lam, R. W. (2011). Adjunctive Medication Strategies for Treatment- Resistant Depression. *The Canadian Journal of Psychiatry*, *56*(6), 315–316. https://doi.org/10.1177/070674371105600601
12. Hinton, D. E., & Patel, A. (2017). Cultural Adaptations of Cognitive Behavioral Therapy. *Psychiatric Clinics of North America*, *40*(4), 701–714. https://doi.org/10.1016/j.psc.2017.08.006
13. Segal, Z., Williams, M., & Teasdale, J. (2012). *Mindfulness-based cognitive therapy for depression*. Guilford press.
14. Kim, Y. W., Lee, S.-H., Choi, T. K., Suh, S. Y., Kim, B., Kim, C. M., Cho, S. J., Kim, M. J., Yook, K., Ryu, M., Song, S. K., & Yook, K.-H. (2009). Effectiveness of mindfulness-based cognitive therapy as an adjuvant to pharmacotherapy in patients with panic disorder or generalized anxiety disorder. *Depression and Anxiety*, *26*(7), 601–606. https://doi.org/10.1002/da.20552
15. Dehghani-Arani, F., & Kangarshahi, A. L. (2023). A Comparative Study Of Cognitive Behavioral Therapy and Mindfulness-Based Cognitive Therapy for Weight Reduction and Activity Increase in Obese Individuals with Coronary Artery Disease. *Annals of Clinical and Medical Case Reports*, *11*(6). https://acmcasereports.com/articles/acmcr-v11-1953.pdf
16. Tovote, K. A., Fleer, J., Snippe, E., Peeters, A. C. T. M., Emmelkamp, P. M. G., Sanderman, R., Links, T. P., & Schroevers, M. J. (2014). Individual Mindfulness-Based Cognitive Therapy and Cognitive Behavior Therapy for Treating Depressive Symptoms in Patients With Diabetes: Results of a Randomized Controlled Trial. *Diabetes Care*, *37*(9), 2427–2434. https://doi.org/10.2337/dc13-2918
17. Pagoto, S., Schneider, K. L., Whited, M. C., Oleski, J. L., Merriam, P., Appelhans, B., Ma, Y., Olendzki, B., Waring, M. E., Busch, A. M., Lemon, S., Ockene, I., & Crawford, S. (2013). Randomized controlled trial of behavioral treatment for comorbid obesity and depression in women: the Be Active Trial. *International Journal of Obesity*, *37*(11), 1427–1434. https://doi.org/10.1038/ijo.2013.25
18. Alimoradi, Z., Golboni, F., Griffiths, M. D., Broström, A., Lin, C.-Y., & Pakpour, A. H. (2019). Weight-related stigma and psychological distress: A systematic review and meta-analysis. *Clinical*

Nutrition, *39*(7). https://doi.org/10.1016/j.clnu.2019.10.016

19. Wilfley, D. E., Kolko, R. P., & Kass, A. E. (2011). Cognitive-Behavioral Therapy for Weight Management and Eating Disorders in Children and Adolescents. *Child and Adolescent Psychiatric Clinics of North America*, *20*(2), 271–285. https://doi.org/10.1016/j.chc.2011.01.002

20. Pondenejadan, A. A., & Malihi, R. (2013). Comparing efficacy of diet therapy, diet therapy combined with cognitive behavioral therapy or exercise in life satisfaction and weight loss: A randomized clinical trial. *Eur J Sci Res*, *112*(1), 152-160.