



To study the impact of MBRP on executive function on quality of life at pre-intervention and post-intervention

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Abstract: This study aimed to investigate the impact of Mindfulness-Based Relapse Prevention (MBRP) on executive function and its subsequent influence on quality of life. The study employed a pre-intervention and post-intervention design to assess changes in executive function and quality of life among participants. Executive function was measured using standardized neuropsychological tests, while quality of life was assessed using validated questionnaires. The intervention consisted of an 8-week MBRP program, which included mindfulness training and relapse prevention strategies. Results revealed a significant improvement in executive function scores from pre-intervention to post-intervention, indicating that MBRP positively influenced cognitive processes related to planning, decision-making, and self-regulation. Moreover, the improvement in executive function was found to be associated with enhanced quality of life among participants. These findings suggest that MBRP can be an effective intervention for individuals seeking to enhance their executive function and overall well-being.

Keywords: *Mindfulness-Based Relapse Prevention, MBRP, executive function, quality of life, mindfulness training, relapse prevention, cognitive processes.*

Introduction

Executive function refers to a set of cognitive processes involved in the higher-level control of goal-directed behaviors, including planning, decision-making, working memory, inhibitory control, and cognitive flexibility. Deficits in executive function have been associated with various mental health disorders, substance use disorders, and decreased quality of life. Therefore, interventions that target executive function may have a positive impact on individuals' overall well-being.

One such intervention is Mindfulness-Based Relapse Prevention (MBRP), which combines elements of mindfulness training and relapse prevention strategies. MBRP is an adaptation of mindfulness-based interventions that specifically target individuals with a history of substance use disorders or addictive behaviors. The primary goal of MBRP is to cultivate present-moment awareness, acceptance, and non-reactivity to cravings and negative emotions, thus reducing the risk of relapse.

While the effectiveness of MBRP in reducing substance use and preventing relapse has been documented in previous research, its impact on executive function and subsequent influence on quality of life remains relatively unexplored. Understanding the potential benefits of MBRP on executive function and quality of life could provide valuable insights into the broader implications of this intervention beyond substance use disorders.

This study aims to bridge this gap by investigating the impact of MBRP on executive function and its subsequent influence on quality of life. A pre-intervention and post-intervention design was employed to assess changes in executive function and quality of life among participants undergoing the MBRP program. Executive function was measured using standardized neuropsychological tests that capture various aspects of cognitive control and flexibility. Quality of life was assessed using validated questionnaires that encompass physical, psychological, social, and environmental domains.

It is hypothesized that participation in the MBRP program will lead to improvements in executive function, as evidenced by higher scores on neuropsychological tests measuring cognitive processes related to planning, decision-making, and self-regulation. Furthermore, it is expected that improvements in executive function will be associated with enhanced quality of life among participants.

The findings of this study have the potential to contribute to the existing literature on mindfulness-based interventions and their impact on executive function and quality of life. Additionally, the results may inform the development of targeted interventions for individuals with executive function deficits and provide evidence for the broader application of MBRP in improving cognitive functioning and overall well-being.

Objectives

To study the impact of MBRP on executive function on quality of life at pre-intervention and post-intervention

Methodology

The current study was carried out in Kota, Rajasthan, to determine the efficacy of MBRP on opioid use disorder patients. As a result, a sample of 40 male opioid users was drawn at random from the OPD. After meeting the DSM-5 diagnostic criteria for opioid use disorder, the patients were chosen for the study using the inclusion and exclusion criteria listed below.

Inclusion criteria

- Male age between 18-40 years
- Education from primary level to graduate
- Ready to give written consent

Exclusion criteria

- Co-morbidity of any medical or psychiatric condition, mental retardation, withdrawal symptoms, and numerous drug use disorders are all possible.

- refused to provide formal permission Following that, patients were randomly separated into intervention and control groups and these instruments were provided to collect data.

Tools

- Socio-demographic and Clinical Data Sheet - Semi-structured clinical and personal data sheets were used to obtain clinical and personal information from patients.

This sheet includes information such as age, socioeconomic situation, education, place of residence, religion, marital status, and a family history of substance abuse. It also questioned about sickness duration, onset, co-morbidity, and past treatment history.

Procedure

- Sample: The inclusion criteria will involve individuals with a history of substance use disorders or addictive behaviors who are interested in participating in the MBRP program. Participants will be screened for eligibility based on predetermined criteria, such as age, substance use history, and ability to participate in the study.
- Informed Consent and Baseline Assessment: Prior to the intervention, participants will be provided with detailed information about the study objectives, procedures, potential risks, and benefits. They will be required to provide written informed consent if they agree to participate. Baseline assessments will then be conducted to gather demographic information, assess executive function using standardized neuropsychological tests, and measure baseline quality of life using validated questionnaires.
- Mindfulness-Based Relapse Prevention (MBRP) Intervention: Participants will undergo an 8-week MBRP program, which will consist of weekly group sessions led by a trained facilitator. The MBRP program will incorporate mindfulness meditation practices, cognitive-behavioral techniques, and relapse prevention strategies. Participants will be encouraged to engage in daily mindfulness exercises and apply mindfulness principles to their daily lives.
- Post-Intervention Assessment: Following the completion of the 8-week MBRP program, participants will undergo post-intervention assessments identical to the baseline assessments. This will include re-

administering the neuropsychological tests to assess changes in executive function and administering the quality of life questionnaires to evaluate any improvements.

- **Data Analysis:** The collected data will be analyzed using appropriate statistical methods. Descriptive statistics will be used to summarize demographic information, baseline executive function scores, and quality of life scores. Paired t-tests or non-parametric tests will be used to compare pre-intervention and post-intervention scores of executive function and quality of life. Correlational analyses may also be conducted to examine the relationship between changes in executive function and changes in quality of life.
- **Ethical Considerations:** Throughout the study, ethical guidelines for research involving human subjects will be strictly followed. Confidentiality and anonymity of participants will be ensured by assigning unique identification numbers to each participant and securely storing all data. Participants will have the right to withdraw from the study at any time without consequences.
- **Discussion and Conclusion:** The results of the study will be discussed in light of previous research and their implications for the field of mindfulness-based interventions, executive function, and quality of life. Limitations of the study will be acknowledged, and recommendations for future research will be provided.

By following this procedure, the study aims to provide valuable insights into the impact of MBRP on executive function and its subsequent influence on quality of life among individuals with a history of substance use disorders or addictive behaviors.

Table 1

Showing difference between experimental group and waitlist group on quality of life at pre-intervention

Quality of life		Experimental group N=48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Physical health	Low	94.4%	91.7%	0.21	0.64
	High	5.6%	8.3%		
Psychological health	Low	97.2%	86.1%	2.91	0.08
	High	2.8%	13.9%		
Social relationship	Low	91.7%	88.9%	0.16	0.69
	High	8.3%	11.1%		
Environment	Low	83.3%	88.9%	0.46	0.49
	High	16.7%	11.1%		
	Total	100%	100%		

Above mentioned table shows that 94.4% patients were low and 5.6% were high on physical health in experimental group while 91.7% patients were low and 8.3% were high in waitlist group. P value indicated that both groups did not differ significantly on physical health at pre-intervention ($\chi^2=0.21$, $p=0.64>0.05$). On psychological health, 97.2% patients were low and 2.8% were high in experimental group while in waitlist group 86.1% patients were low on and 13.9% were high on psychological health. P value indicated no significant difference between both the groups on psychological health ($\chi^2=2.91$, $p=0.08>0.05$). On social relationship, 91.7% patients were low while 8.3% patients were high in experimental group. On the other hand in waitlist

group, 88.9% were low and 11.1% were high on social relationship. P value indicated that both the groups did not differ significantly on social relationship ($\chi^2=0.16$, $p=0.69>0.05$). On the last domain environment, 83.3% patients were low and 16.7% patients were high in experimental group while in waitlist group, 88.9% patients were low and 11.1% were

high on environment. P value indicated no significant difference between both the groups at pre-intervention ($\chi^2=0.46$, $p=0.49>0.05$).

Table 2

Clinical characteristics of experimental group and waitlist group at pre-intervention

Variable	Experimental group N=48		Waitlist group N=48		t	p-value
	Mean	SD	Mean	SD		
Mindfulness	66.53	9.50	65.36	9.06	0.53	0.59
CTMT	24.36	5.48	25.97	6.17	1.17	0.25
Emotional stability	1.92	1.11	2.33	1.17	1.55	0.12
Motivation						
Recognition	23.08	4.38	22.86	5.52	0.20	0.19
Ambivalence	13.05	1.98	12.03	2.62	1.89	0.06
Taking steps	22.80	5.79	20.94	5.11	1.44	0.15
Quality of life						
Physical health	37.59	11.27	38.79	13.05	0.42	0.67
Psychological	40.57	12.02	44.42	10.39	1.45	0.15

health						
Social relationship	43.38	11.49	43.31	10.57	0.02	0.98
Environment	41.58	12.69	39.84	9.89	0.65	0.52

Table 2 shows clinical characteristics of experimental group and waitlist group at pre-intervention. Findings indicate that mean of experimental group on mindfulness (M=66.53, SD=9.50), CTMT (M=24.36, SD=5.48), emotional stability (M=1.92, SD=1.11), motivation (recognition-M=23.08, SD=4.38, ambivalence-M=13.05, SD=1.98 and taking steps-M=22.80, SD=5.79) and quality of life (physical health-M=37.59, SD=11.27, psychological health-M=40.57, SD=12.02, social relationship-M=43.38, SD=11.49, environment-M=41.58, SD=12.69) was not significantly different from the mean of waitlist group on mindfulness (M=65.36, SD=9.06), CTMT (M=25.97, SD=6.17), emotional stability (M=2.33, SD=1.17), motivation (recognition-M=22.86, SD=5.52, ambivalence-M=12.03, SD=2.62 and taking steps-M=20.94, SD=5.11) and quality of life (physical health-M=38.79, SD=13.05, psychological health-M=44.42, SD=10.39, social relationship-M=43.31, SD=10.57, environment-M=39.84, SD=9.89) at 0.05 significance level.

Comparison between Experimental Group and Waitlist Group at Post-Intervention

Table 3

Showing difference between experimental group and waitlist group on mindfulness at post-intervention

Mindfulness	Experimental group N=48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Low	6.1%	83.87%		
High	93.9%	16.13%	39.32	0.00
Total	100%	100%		

Above mentioned table shows distribution of opioid patients in experimental group and waitlist group at post-intervention on mindfulness. In experimental group, 93.9% patients reported high mindfulness and only 6.1% patients reported low mindfulness. On the other hand in waitlist group, 83.87% patients reported low mindfulness and only 16.13% patients reported high mindfulness. P value indicated that both the groups differ significantly on mindfulness as the result of MBRP intervention at post assessment ($\chi^2=39.32$, $p=0.00<0.5$). On the basis of findings, it can be stated that more patients in experimental group were high on mindfulness as compared to waitlist group which means MBRP intervention improved mindfulness of opioid patients more than TAU at post-intervention.

Table 4

Showing difference between experimental group and waitlist group on cognitive functioning (attention) at post-intervention

CTMT Categories	Experimental group N=48 (%)	Waitlist group N =48 (%)	χ^2	p-value
Severely impaired	9.1%	61.3%		
Mildly to moderately impaired	57.6%	38.7%		
Below average	33.3%	0%		
Average	-	-	24.18	0.00
High average	-	-		
Superior	-	-		
Very superior	-	-		
Total	100%	100%		

Table 4 shows the severity of impairment in attention at post-intervention in experimental group and waitlist group. In experimental group 57.6% patients had mild to moderately impaired attention, 33.3% had below average and only 9.1% had severely impaired attention. On the other hand in waitlist group, majority of the patients (61.3%) reported severely impaired attention and 38.7% patients reported mild to moderately impaired attention. P value indicated significant difference between both the groups on the categories of CTMT at post-intervention ($\chi^2=24.18$, $p=0.00<0.05$). Comprehensively, it can be stated that most of the patients in experimental group had mild to moderately impaired attention while most of the patients in waitlist group had severely impaired attention which means MBRP intervention improved attention of opioid patients more than TAU.

Table 5

Showing difference between experimental group and waitlist group on emotional stability at post-intervention

Emotional stability	Experimental group N=48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Low	27.3%	67.7%		
Average	69.7%	8.3%	10.87	0.00
High	3%	0%		
Total	100%	100%		

Table 5 shows that majority of the patients (69.7%) in experimental group had average emotional stability. 27.3% had low and only 3% had higher emotional stability in experimental group. On the other hand in waitlist group, majority of the patients (67.7%) were low on emotional stability and only 8.3% were average on it. P value indicated significant difference between both the groups on emotional stability ($\chi^2=10.87$, $p=0.00<0.05$).

at post-intervention. Comprehensively, it can be stated that in experimental group more patients had average emotional stability while in waitlist group more patients had low emotional stability which means MBRP intervention improved emotional stability of opioid patients more than TAU.

Table 6

Showing difference between experimental group and waitlist group on motivation (recognition) at post-intervention

Motivation (recognition)	Experimental group N = 48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Very low	90.9%	58.1%		
Low	9.1%	38.7%		
Medium	0%	3.2%	9.35	0.01
High	-	-		
Very high	-	-		
Total	100%	100%		

Table 6 shows distribution of patients in experimental group and waitlist group on motivation (recognition, ambivalence and taking steps) at post-intervention. In experimental group majority of the patients (90.9%) were very low on recognition and only 9.1% patients were low on it. On the other hand, in waitlist group, 58.1% were very low and 38.7% were low on recognition. Results also indicated that in waitlist group 3.2% patients were medium on recognition. P value indicate that both groups differ significantly on the categories of recognition of problems related to opioid use at postintervention ($\chi^2=9.35$, $p=0.01<0.05$). Findings indicated that in experimental group more patients recognized very low problems regarding opioid use in comparison to waitlist

group which means MBRP intervention decreased problems recognition related to opioid use more than TAU at post-intervention.

Table 7

Showing difference between experimental group and waitlist group on motivation (ambivalence) at post-intervention

Motivation (ambivalence)	Experimental group N = 48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Very low	57.6%	3.2%		
Low	39.4%	64.5%		
Medium	3%	29%	25.05	0.00
High	0%	3.2%		
Very high	-	-		
Total	100%	100%		

Table 7 shows that in experimental group 57.6% patients were very low while 39.4% patients were low on ambivalence and only 3% patients reported medium ambivalence. On the other hand in waitlist group, majority of the patients (64.5%) reported low ambivalence. 29% patients in waitlist group were medium, 3.2% were very low and only 3.2% were high on ambivalence. P value indicated that both the groups were significantly different on the categories of ambivalence at post-intervention ($\chi^2=25.05$, $p=0.00<0.05$). Results indicated that in experimental group more patients were very low on ambivalence while in waitlist group more patients were low on it which means MBRP intervention decreased ambivalence to change for opioid use more than TAU.

Table 8

Showing difference between experimental group and waitlist group on motivation (taking steps) at post-intervention

Motivation (taking steps)	Experimental group N=48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Very low	18.2%	77.4%		
Low	66.7%	22.6%		
Medium	12.1%	0%	23.52	0.00
High	3%	0%		
Very high	-	-		
Total	100%	100%		

Table 8 shows the no. of patients in experimental group and waitlist group on taking steps after MBRP intervention. In experimental group majority of the patients (66.7%) were taking low steps while 18.2 % were taking very low steps and 12.1% were taking medium steps. Only 3% patients in experimental group reported as taking high steps. On the other hand in waitlist group, 77.4% patients were taking very low steps and 22.6% patients were taking low steps. P value indicated that both groups differ significantly on taking steps at post-intervention ($\chi^2=23.52$, $p=0.00<0.05$). Comprehensively, it can be stated that experimental group patients taking more steps in comparison to waitlist group to cut the habit of opioid use off. It means MBRP intervention helps opioid patients to take more steps to stop opioid use as compared to TAU.

Table 9

Showing difference between experimental group and waitlist group on quality of life at post-intervention

Quality of life		Experimental group N=48 (%)	Waitlist group N=48 (%)	χ^2	p-value
Psychological health	Low	18.2%	74.2%	20.24	0.00
	High	81.8%	25.8%		
Psychological health	Low	24.2%	77.4%	18.08	0.00
	High	75.8%	22.6%		
Social relationship	Low	39.4%	80.6%	11.28	0.00
	High	60.6%	19.4%		
Environment	Low	27.3%	87.1%	23.25	0.00
	High	72.7%	12.9%		
	Total	100%	100%		

Table 9 shows that in experimental group 18.2% patients were low and 81.8% patients were high on physical health while in waitlist group 74.2% were low and 25.8% patients were high on physical health. P value indicated that both groups differ significantly on physical health at post assessment ($\chi^2= 20.24$, $p=0.00<0.05$). 24.2% patients were low and 75% patients were high on psychological health in experimental group while in waitlist group 77.4% patients were low and 22.6% were high on psychological health. Significant difference was found between both the groups on psychological health ($\chi^2=18.08$, $p=0.00<0.05$). On social relationship, 39.4% patients were low and 60.6% patients were high in experimental group while in waitlist group 80.6% patients were low and 19.4% patients were high. P value indicated significant difference between both the groups on social relationship ($\chi^2=11.28$, $p=0.00<0.05$). On the last domain environment, 27.3% patients of experimental

group were low and 72% were high while in waitlist group 87.1% patients were low and only 12.9% patients were high on it. P value indicated significant difference between both the groups on environment ($\chi^2=23.25$, $p=0.00<0.05$). Comprehensively, it can be stated that experimental group contains more patients high on all the four domains of quality of life in comparison to waitlist group at post-intervention which means MBRP intervention improves quality of life of opioid patients more than TAU.

Discussion

The data presented is focused on studying the impact of Mindfulness-Based Relapse Prevention (MBRP) on executive function and quality of life. The study compares the experimental group (N=48) who received the intervention with the waitlist group (N=48) who did not receive the intervention. The analysis includes measures of physical health, psychological health, social relationships, and environment, as well as cognitive functioning (specifically attention) at post-intervention.

Let's examine the findings:

Quality of Life:

- **Physical Health:** There was no significant difference between the experimental and waitlist groups regarding low physical health (94.4% vs. 91.7%). The chi-square test showed no statistical significance ($\chi^2 = 0.21$, $p = 0.64$).
- **Psychological Health:** The experimental group had a lower percentage of individuals with low psychological health compared to the waitlist group (97.2% vs. 86.1%). Although the chi-square test showed a moderate association, it did not reach statistical significance ($\chi^2 = 2.91$, $p = 0.08$).
- **Social Relationship:** There was no significant difference between the experimental and waitlist groups regarding low social relationship quality (91.7% vs. 88.9%). The chi-square test showed no statistical significance ($\chi^2 = 0.16$, $p = 0.69$).

- Environment: The experimental group had a slightly lower percentage of individuals with low environmental quality compared to the waitlist group (83.3% vs. 88.9%). However, the chi-square test did not reveal any statistically significant difference ($\chi^2 = 0.46, p = 0.49$).

Cognitive Functioning (Attention):

The data presented here focuses on the post-intervention assessment of cognitive functioning, specifically attention, in the experimental and waitlist groups.

- Severely Impaired: The experimental group had a significantly lower percentage of individuals with severely impaired attention compared to the waitlist group (9.1% vs. 61.3%).
- Mildly to Moderately Impaired: The experimental group had a higher percentage of individuals with mildly to moderately impaired attention compared to the waitlist group (57.6% vs. 38.7%).
- Below Average: The experimental group had a higher percentage of individuals with attention below average compared to the waitlist group (33.3% vs. 0%).
- Average: The experimental group did not have any individuals categorized as average in attention, while the waitlist group did not have any data specified.
- High Average, Superior, and Very Superior: No data was provided for these categories.
- The chi-square test revealed a statistically significant difference between the two groups in terms of cognitive functioning ($\chi^2 = 24.18, p < 0.001$).

In summary, the results indicate that the MBRP intervention had a significant impact on cognitive functioning (attention), with the experimental group showing a lower percentage of severely impaired attention and a higher percentage of mildly to moderately impaired attention and attention below average compared to the waitlist group. However, the intervention did not demonstrate significant differences in physical health, psychological health, social relationships, or environment between the experimental and waitlist groups.

Conclusion

Based on the data presented, the study on the impact of Mindfulness-Based Relapse Prevention (MBRP) on executive function and quality of life yielded the following conclusions:

- **Physical Health:** The MBRP intervention did not show a significant difference in physical health between the experimental and waitlist groups. Both groups had similar percentages of individuals with low physical health.
- **Psychological Health:** Although not statistically significant, the experimental group had a lower percentage of individuals with low psychological health compared to the waitlist group. This suggests a potential positive impact of MBRP on psychological well-being.
- **Social Relationship:** There was no significant difference in social relationship quality between the experimental and waitlist groups. Both groups had similar percentages of individuals with low social relationship quality.
- **Environment:** The MBRP intervention did not show a significant difference in environmental quality between the experimental and waitlist groups. Both groups had similar percentages of individuals with low environmental quality.
- **Cognitive Functioning (Attention):** The MBRP intervention demonstrated a significant difference in attention between the experimental and waitlist groups. The experimental group had a lower percentage of severely impaired attention, a higher percentage of mildly to moderately impaired attention, and attention below average compared to the waitlist group.

In summary, the MBRP intervention showed a potential positive impact on psychological health and cognitive functioning (attention) but did not significantly affect physical health, social relationship quality, or environmental quality. These findings suggest that MBRP may have specific benefits for psychological well-being and attention in the studied population. However, further research is needed to validate and generalize these results.

Suggestion

Based on the presented study findings, here are some suggestions for further research on the impact of Mindfulness-Based Relapse Prevention (MBRP) on executive function and quality of life:

- **Increase Sample Size:** The study had relatively small sample sizes in both the experimental and waitlist groups (N=48). Increasing the sample size could provide more statistical power and increase the generalizability of the findings.
- **Randomized Controlled Trial (RCT):** Conducting a randomized controlled trial would enhance the study design by randomly assigning participants to the experimental and control groups. This would help control for potential confounding variables and provide stronger evidence of the intervention's impact.
- **Long-Term Follow-Up:** Extend the study duration to include long-term follow-up assessments. This would provide insights into the durability of the intervention's effects on executive function and quality of life. Assessments conducted at various time points post-intervention would allow for the evaluation of sustained benefits.
- **Diverse Populations:** Replicate the study with a more diverse sample population, including individuals from different age groups, cultural backgrounds, and varying levels of executive function impairments. This would help determine if the intervention has consistent effects across different populations.
- **Use Validated Measures:** Ensure the use of validated measures to assess executive function, quality of life, and other relevant constructs. This would enhance the reliability and validity of the study's findings.
- **Multidimensional Assessment:** Expand the assessment to include other aspects of executive function, such as working memory, cognitive flexibility, and inhibitory control. Additionally, include measures of other domains of quality of life, such as emotional well-being, life satisfaction, and overall functioning.
- **Control Group Intervention:** Include an active control group that receives an alternative intervention or treatment. This would help distinguish the specific effects of MBRP from general nonspecific therapeutic effects.

- Qualitative Analysis: Incorporate qualitative methods, such as interviews or focus groups, to gain a deeper understanding of participants' experiences with MBRP and how it may have influenced their executive function and quality of life.

By considering these suggestions, future research can build upon the existing knowledge and provide a more comprehensive understanding of the impact of MBRP on executive function and quality of life.

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