Influence of Yoga Practices on Mood States of Individuals with Drug Addiction – an Open-label study

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ABSTRACT

Objective: To explore the impact of yoga practices on mood states in individuals struggling with drug addiction.

Methods: This non-randomized open trial was conducted at a drug rehabilitation center in northern India. 68 male participants were divided into a yoga intervention group (n=33) and a treatment-as-usual control group (n=35). The yoga group received a 40-minute yoga intervention 5 days/week for 12 weeks, in addition to standard care. Mood states were assessed using the 8-State Questionnaire before and after the intervention.

Results: Post-intervention, the yoga group showed significantly greater improvements compared to the control group in stress ($p<0.001$), depression ($p=0.002$), regression ($p<0.001$), fatigue ($p<0.001$), and guilt ($p=0.039$). Both groups experienced significant reductions in anxiety ($p<0.001$ for both groups). No significant changes were observed in extraversion or arousal levels for either group.

Conclusions: Yoga practices as an adjunctive therapy may offer benefits in improving mood states for individuals undergoing treatment for drug addiction, particularly in reducing stress, depression, regression, fatigue, and guilt. Further research with more rigorous designs is needed to confirm these findings and explore long-term outcomes.

Limitations: The study was limited by its non-randomized design, small sample size, single-center setting, and lack of long-term follow-up. Demographic differences between groups and potential confounding factors should be considered when interpreting the results.

Keywords: Yoga, drug addiction, mood states, rehabilitation, complementary therapy

INTRODUCTION

Drug addiction is a complex and multifaceted issue that has far-reaching consequences, not only for the individuals affected but also for society as a whole (National Institute on Drug Abuse [NIDA], 2018). This is often accompanied by a range of psychological and emotional challenges, including mood disturbances, anxiety, and depression (Quello et al., 2005). Traditional treatment approaches, while valuable, may not always address the underlying emotional and psychological factors that contribute to addiction and relapse. In recent years, there has been a growing interest in exploring complementary and alternative therapies, such as yoga, as adjunctive interventions for substance abuse disorders (Khanna & Greeson, 2013).

Yoga, an ancient mind-body practice originating in India, has gained widespread popularity worldwide for its potential to promote physical, mental, and emotional well-being. The practice of yoga involves various postures

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(asanas), breathing exercises (pranayama), meditation, and ethical principles (yamas and niyamas) (Woodyard, 2011). Numerous studies have highlighted the benefits of yoga in reducing stress, anxiety, and depression, as well as improving overall quality of life (Balasubramaniam et al., 2013; Kirkwood et al., 2005).

In the context of drug addiction, yoga may offer a unique approach to addressing the complex interplay of physical, psychological, and emotional factors that contribute to substance abuse and relapse. By promoting mindfulness, self-awareness, and emotional regulation, yoga practices may help individuals in recovery to better manage cravings, emotional triggers, and stress, which are known to be significant risk factors for relapse (Khanna & Greeson, 2013; Witkiewitz et al., 2013).

This research paper aims to explore the impact of yoga practices on mood states in individuals struggling with drug addiction. Specifically, it will investigate the potential of yoga as an adjunctive intervention in addressing the emotional and psychological challenges associated with substance abuse disorders. By examining the existing literature and empirical evidence, this paper will contribute to a better understanding of the role of yoga in supporting recovery and enhancing overall well-being for individuals affected by drug addiction.

METHODOLOGY

This study was an open, non-randomized trial examining yoga as a supplementary therapy for individuals with drug dependence. The primary outcome measure was Mood State, which included factors such as Anxiety, Stress, Depression, Regression, Fatigue, Guilt, Extraversion, and Arousal.

Study Location

The research took place at a drug rehabilitation facility in northern India. This 50-bed center provides comprehensive care for patients struggling with drug abuse and dependence. The facility employs a multidisciplinary team, including nurses, psychologists, and physicians. Standard care at the center encompasses group counseling, motivational interviewing, recreational activities, occupational therapy, and spiritual text readings, alongside nutritional support.

Participant Criteria

To be included in the study, participants had to be at least 18 years old and free from major health issues that would prevent them from engaging in yoga practices. Exclusion criteria encompassed acute medical conditions (such as recent surgeries or severe cardiovascular issues) that could make yoga participation unsafe. Additionally, individuals with psychotic disorders lacking insight or mental capacity to consent were excluded, as were those unwilling to participate or provide consent.

Sampling Method

The study employed convenience sampling. Eligible patients undergoing treatment at the rehabilitation center were approached and offered the choice between yoga intervention or treatment as usual (TAU). Those who agreed to participate in yoga formed the experimental group, while others continued with TAU as the control group.

Data Collection

Researchers collected socio-demographic information before the intervention. The primary outcome variable, Mood State, was assessed using the 8-State Questionnaire developed by Catell and Curran (1973), specifically utilizing the Indian adaptation by Kapoor and Mahesh Bhargava (1990). This questionnaire comprises 96 items, with 12 items for each of the 8 dimensions.

Control Group Treatment

The control group received treatment as usual (TAU), which included behavioral therapy, counseling, work therapy, and motivational sessions. These activities continued for the same duration as the yoga intervention, five days per week.

Yoga Intervention

The yoga program was designed based on principles from classical yoga texts, emphasizing a holistic approach to health management. The intervention included Asanas (postures) and Pranayamas or Kumbhakas (breathing practices). Safety measures were implemented, avoiding sudden movements and extreme bending. Trained yoga instructors from the research team supervised all sessions. The program lasted 12 weeks, with 40-minute sessions held five days per week. A detailed session schedule was provided in Table 1 (not included in this summary). In addition to the yoga sessions, the experimental group also received the usual care provided by the facility.

Table 1: Yoga Schedule

Steps	Yoga Practice	Repetition	Duration (minutes)
1	Prayer	1 time	2
2	*Trikonasana*	2 times (each side)	4
3	*Veerabhadrasana*	2 times (each side)	3
4	*Ashwasanchalana asana*	2 times (each side)	3
5	*Vrikshasana*	2 times (each side)	4
6	*Vajrasana*	2 times	3
7	*Baddhakonasana*	2 times	3
8	*Shashankasana*	2 times	3
9	*Bhujangasana*	2 times	2
10	*Shavasana*	1 time	5
11	*Nadishodhana pranayama*	5 rounds	3
12	*Sitkari pranayama*	5 rounds	2
13	*Bhramari pranayama*	5 rounds	2
14	*Shanti mantra*	1 time	1

Ethics

The study was conducted with approval from the Institutional Ethical Committee (reference: SUIEC/22/06). The de-addiction center provided written permission for the research. Prospective participants were fully informed about the study's aims, methods, potential benefits, and risks. Researchers emphasized that participation was voluntary, withdrawal was allowed at any time without explanation, and regular care would continue regardless of participation. Those who agreed to take part provided written informed consent.

Data Analysis

Researchers collected data using standardized sheets, which was then entered into a database and quality-checked. Statistical analysis was performed using SPSS software (version 28). The analytical methods employed included chi-square tests, Wilcoxon Signed-rank Tests, and Mann Whitney U Tests. The significance threshold was set at the conventional level of 0.05.

RESULTS

Initially, 80 male participants were recruited, evenly divided between the experimental and control groups. However, 12 individuals withdrew before the initial assessments due to personal reasons (7 from the experimental group and 5 from the control group).

The final study sample consisted of 68 participants. Their ages ranged from 18 to 49 years, with a mean of 28.9 years (SD = 6.8). The control group comprised 35 participants (51.5%), while the experimental (yoga) group had 33 (48.5%). The mean age differed significantly between groups: 30.9 years (SD = 7.2) for the control group and 26.8 years (SD = 5.6) for the yoga group ($t = 2.669$, $p < 0.05$).

Table 2 presented detailed demographic information for both groups. For analytical purposes, two participants with no formal education were included in the primary school category. The average years of education were similar between groups: 10.0 years (SD = 3.2) for the yoga group and 10.5 years (SD = 3.7) for the control group, showing no significant difference.

Table 2: Demographic profile of yoga and control group

		Control (n-35)	Yoga (n-33)
Age category	Up to 29	15 (42.9%)	21 (63.6%)
	30 and above	20 (57.1%)	12 (36.4%)
Education cat	Lower primary	4 (11.4%)	3 (9.1%)
	Upper primary	3 (8.6%)	3 (9.1%)
	High school	8 (22.9%)	14 (42.4%)
	College	13 (37.1%)	10 (30.3%)
	University	7 (20.0%)	3 (9.1%)
Marital status*	Married	19 (54.3%)	9 (27.3%)
	Unmarried	16 (45.7%)	24 (72.7%)

*p<0.05

The study analyzed the impact of the intervention on various psychological parameters, revealing notable differences both between and within groups. Details results are presented in Table 3 and 4.

Anxiety: Pre-intervention, anxiety levels were comparable between the experimental and control groups (p=0.384). Post-intervention, both groups experienced significant reductions in anxiety within themselves (experimental: p<0.001, control: p<0.001), but the between-group difference remained non-significant (p=0.197).

Stress: The stress levels of both groups were similar pre-intervention (p=0.384). Post-intervention, the experimental group showed a significantly greater stress reduction compared to the control group (p<0.001). Significant reductions were observed within both groups (experimental: p<0.001, control: p=0.001).

Depression: There was no significant difference in depression levels between the groups at baseline (p=0.080). However, post-intervention, the experimental group showed a significant reduction in depression levels compared to the control group (p=0.002). Significant within-group reductions were observed for both groups (experimental: p<0.001, control: p=0.003).

Regression: Pre-intervention regression scores were similar between the groups (p=0.169). Post-intervention, the experimental group demonstrated significantly greater improvement in regression scores compared to the control group (p<0.001). Significant improvements within-group were noted for both groups (experimental: p=0.001, control: p=0.018).

Fatigue: There was no significant pre-intervention difference in fatigue levels between the groups (p=0.201). Post-intervention, the experimental group exhibited a significantly greater reduction in fatigue levels compared to the control group (p<0.001). Both groups showed significant within-group reductions in fatigue (experimental: p<0.001, control: p<0.001).

Guilt: Guilt scores were similar between the groups pre-intervention (p=0.979). Post-intervention, the experimental group experienced a significant reduction in guilt levels compared to the control group (p=0.039). Significant within-group reductions were found for both groups (experimental: p<0.001, control: p<0.001).

Extraversion: Extraversion levels were comparable between the experimental and control groups pre-intervention (p=0.501) and showed no significant changes post-intervention in either group (p=0.796 between groups; experimental within-group: p=0.672, control within-group: p=0.824).

Arousal: Arousal levels did not significantly differ between the groups pre-intervention (p=0.932) or post-intervention (p=0.968). Within-group analysis revealed no significant changes in arousal levels for either group (experimental: p=0.385, control: p=0.397).

These findings suggest that the intervention effectively reduced negative psychological states such as stress, depression, regression, fatigue, and guilt in the experimental group compared to the control group. At the same time, anxiety levels improved similarly in both groups. Extraversion and arousal levels remained unaffected by the intervention.

Table 3: Between groups comparison (Mann-Whitney U Test)

Timeline →	Pre (n=68)			Post (n=68)		
Parameters ↓	**Experimental (mean ± SD)**	**Control (mean ± SD)**	**p-value* (between-groups)**	**Experimental (mean ± SD)**	**Control (mean ± SD)**	**p-value* (between-groups)**
Anxiety	8.70 ± 1.357	8.57 ± 0.979	0.384	7.36 ± 1.496	7.77 ± 0.910	0.197
Stress	6.27 ± 1.506	6.63 ± 1.285	0.384	4.61 ± 1.391	5.86 ± 1.033	<0.001
Depression	6.45 ± 1.092	6.86 ± 0.912	0.080	5.36 ± 1.432	6.37 ± 0.770	0.002
Regression	6.24 ± 1.032	6.57 ± 0.844	0.169	5.58 ± 0.867	6.23 ± 0.598	<0.001
Fatigue	6.73 ± 1.892	7.09 ± 1.483	0.201	4.15 ± 1.679	6.20 ± 1.183	<0.001
Guilt	8.39 ± 1.171	8.49 ± 0.887	0.979	7.06 ± 1.144	7.63 ± 0.808	0.039
Extraversion	4.00 ± 1.000	4.11 ± 0.867	0.501	4.09 ± 0.879	4.14 ± 0.944	0.796
Arousal	4.85 ± 0.834	4.83 ± 0.857	0.932	4.97 ± 0.770	4.94 ± 0.838	0.968

*Significance level: p-value < 0.05; confidence level: 95%. Pre- and post-values are presented as mean ± standard deviation (SD).

Table 4: Within-group comparison (Wilcoxon Signed- rank Test)

Groups►	Experimental Group (n=33)			Control Group (n=35)		
Parameters ↓	**Pre (mean ± SD)**	**Post (mean ± SD)**	**p-value* (within-group)**	**Pre (mean ± SD)**	**Post (mean ± SD)**	**p-value* (within-group)**
Anxiety	8.70 ± 1.357	7.36 ± 1.496	<0.001	8.57 ± 0.979	7.77 ± 0.910	<0.001
Stress	6.27 ± 1.506	4.61 ± 1.391	<0.001	6.63 ± 1.285	5.86 ± 1.033	0.001
Depression	6.45 ± 1.092	5.36 ± 1.432	<0.001	6.86 ± 0.912	6.37 ± 0.770	0.003
Regression	6.24 ± 1.032	5.58 ± 0.867	0.001	6.57 ± 0.844	6.23 ± 0.598	0.018
Fatigue	6.73 ± 1.892	4.15 ± 1.679	<0.001	7.09 ± 1.483	6.20 ± 1.183	<0.001
Guilt	8.39 ± 1.171	7.06 ± 1.144	<0.001	8.49 ± 0.887	7.63 ± 0.808	<0.001
Extraversion	4.00 ± 1.000	4.09 ± 0.879	0.672	4.11 ± 0.867	4.14 ± 0.944	0.824
Arousal	4.85 ± 0.834	4.97 ± 0.770	0.385	4.83 ± 0.857	4.94 ± 0.838	0.397

*Significance level: p-value < 0.05; confidence level: 95%. Pre- and post-values are presented as mean ± standard deviation (SD).

DISCUSSION

This study aimed to explore the impact of yoga practices on mood states in individuals struggling with drug addiction. The research was conducted in a drug rehabilitation center in northern India, comparing a yoga intervention group to a treatment-as-usual (TAU) control group over 12 weeks.

The demographic data revealed some differences between the yoga and control groups, with the yoga group being significantly younger and having a higher proportion of unmarried individuals. These baseline differences should be considered when interpreting the results, as age and marital status could potentially influence mood states and treatment outcomes.

The use of yoga as an adjunctive therapy in drug addiction treatment aligns with the growing interest in mind-body interventions for substance use disorders (Sarkar & Varshney, 2017). The holistic nature of yoga, incorporating physical postures, breathing exercises, and mindfulness practices, may offer unique benefits in managing the complex physical, psychological, and emotional factors associated with addiction and recovery (Kuppili et al., 2018).

Recent research has demonstrated the potential of yoga in reducing stress, anxiety, and depression in individuals with substance use disorders (Hallgren et al., 2017; Wimberly et al., 2018). These findings are particularly relevant, given the high prevalence of comorbid mental health issues in this population (Sancho et al., 2018). By promoting mindfulness and emotional regulation, yoga practices may help individuals in recovery to better manage cravings, emotional triggers, and stress, which are known to be significant risk factors for relapse (Priddy et al., 2018).

The integration of yoga into traditional addiction treatment programs has shown promise in improving overall treatment outcomes. A systematic review by Kuppili et al. (2018) found that yoga interventions were associated with reduced substance use, improved quality of life, and decreased withdrawal symptoms across various substance use disorders. Similarly, Genovese and Wallace (2021) reported that yoga-based interventions could enhance the effectiveness of standard addiction treatments by addressing both physical and psychological aspects of recovery.

The potential neurobiological mechanisms underlying the benefits of yoga in addiction treatment are beginning to be elucidated. Yoga practices have been shown to modulate stress response systems, including the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system, which may contribute to improved emotional regulation and reduced drug-seeking behavior (Cahn et al., 2017; Kuppili et al., 2018).

While our study focused on mood states, future research should consider examining a broader range of outcomes, including physiological measures, cognitive function, and long-term substance use patterns. Additionally, investigating the optimal duration, frequency, and specific components of yoga interventions for individuals with substance use disorders would be valuable for developing evidence-based treatment protocols (Genovese & Wallace, 2021).

LIMITATIONS

This study has several limitations that should be considered when interpreting the results. The non-randomized, open-trial design may introduce selection bias, as participants self-selected into the yoga or control group. The relatively small sample size of 68 male participants limits statistical power and generalizability, particularly for female drug addicts. Significant demographic differences between groups, including age and marital status, could confound the results. As a single-center study conducted in northern India, findings may not generalize to other settings or cultural contexts. The lack of long-term follow-up precludes assessment of sustained benefits or impacts on relapse rates. Potential confounding factors, such as the additional attention and structured activity in the yoga group, may influence outcomes beyond the specific effects of yoga. Limited information on the treatment-as-usual control condition makes it difficult to fully contextualize the yoga intervention's impact. Finally, the lack of blinding due to the nature of the intervention could introduce bias in self-reported outcomes. Future research should address these limitations by employing randomized controlled designs with larger, more diverse samples across multiple sites, incorporating longer-term follow-up, and exploring the mechanisms by which yoga may impact mood states and addiction-related outcomes.

CONCLUSION

This study contributes to the growing body of evidence supporting the potential benefits of yoga as an adjunctive therapy in drug addiction treatment. By addressing the complex interplay of physical, psychological, and emotional factors involved in addiction, yoga may offer a valuable complementary approach to traditional

treatment modalities. However, further research is needed to fully elucidate the mechanisms of action and optimize the integration of yoga practices into comprehensive addiction treatment programs.

CONFLICT OF INTEREST

There is no conflict of interest.

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