

# Impact of Yoga on Stress, Anxiety, and Depression in Male Drug Addicts During Rehabilitation

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**Background:** Drug addiction is a significant global concern. Individuals suffering from drug addiction often experience high levels of Depression, Anxiety, and Stress (DAS). These psychological conditions can intensify the cycle of substance abuse and pose significant barriers to recovery. Although yoga is widely recognised for its benefits to physical and mental health, its specific effects on males with Substance Use Disorders (SUDs) during rehabilitation — particularly in managing DAS — remain underexplored.

**Material and Methods:** A randomised controlled trial was conducted with 80 male participants from a drug addiction rehabilitation centre. The participants were divided into two groups: a control group with 40 subjects and an experimental group with 40 subjects. This study used a pre-test-and-post-test design to evaluate participants' psychological states, measuring Depression, Anxiety, Stress levels using the DASS-21 scale both before and after the intervention. The experimental group engaged in an 8-week yoga program for 60 minutes daily, excluding Sundays, while the control group continued with other rehabilitation routine activities without yoga intervention.

**Results:** After the intervention, significant improvements were observed in the experimental group ( $p < 0.001$ ), where 97.5% of participants exhibited normal stress levels, 95% showed reductions in anxiety, and 85% experienced decreased symptoms of depression. These percentages were markedly greater than those recorded in the control group.

**Conclusion:** An 8-week yoga program significantly reduced DAS among male drug addicts as compared to the control group.

*Key words:* Stress, Anxiety, Depression, Drug Addicts, Substance use disorder

Drug addiction, affecting over 39.5 million people worldwide in 2021, remains a pervasive global issue with negative impacts on physical and mental health, families, and societies (UNODC, 2023). This complex brain disorder disrupts the frontal cortex impairing cognitive functions like decision-making, self-control, planning, and motivation, thereby increasing impulsivity and perpetuating the cycle of addiction (Carpenter, 2001; Crews & Boettiger, 2009; Goldstein & Volkow, 2002). Drug addiction frequently correlates with psychological issues like depression, anxiety, and stress (DAS).. These conditions exacerbate substance abuse, increase the risk of relapse and sustain the vicious cycle of addiction (Betel, 2006; Mohamed *et al.*, 2020; Piacentine, 2013).

Numerous studies have confirmed a strong association between DAS, and various Substance Use Disorders (SUDs), as reported by researchers such as (Chen *et al.*, 2021; Esmaeelzadeh *et al.*, 2018; Habibi *et al.*, 2013). The neurobiological basis of addiction highlights the significant role that stress plays in the development and persistence of SUDs. Chronic stress can induce drug cravings and reactivate drug-related memories in individuals recovering from addiction, increasing their vulnerability to relapse (Sinha, 2008; Zhao *et al.*, 2010). Furthermore, emotional dysregulation observed in disorders like major depressive disorder and post-traumatic stress disorder heightens the risk of substance abuse (Davis *et al.*, 2008; Tull *et al.*, 2015).

Relapse in SUDs is common, with global relapse rates post-treatment ranging from 40 to 75%, and is particularly high in low- and middle-income countries. This not only impacts social development goals and also burdens social services (Nagy *et al.*, 2022). Given the complexity of addiction, its treatment requires a multifaceted therapeutic approach (Liu & Li, 2018). Among the various interventions, yoga has shown benefits for brain health, and restoring balance to the nervous system, thereby reducing stress, anxiety, and depression. Yoga also plays a role in promoting balanced dopamine release and addressing "Reward Deficiency Syndrome," making it a valuable complementary therapy for SUDs (Singh & Negi, 2023;

De Manincor *et al.*, 2016; Gothe *et al.*, 2019; Miller *et al.*, 2015; Sinha, 2008; Streeter *et al.*, 2012). Research supports the benefits of yoga, highlighting its potential to enhance quality of life and its recommendation as a cost-effective, low-risk option in treatment contexts, particularly in India (Anju *et al.*, 2015). Despite the availability of various treatments, the scarcity of effective options for SUDs emphasises the need to explore new therapeutic avenues like yoga for their potential long-term efficacy and integration into treatment plans (Kuppili *et al.*, 2018). As a complementary therapy, Yoga upholds the therapeutic benefits for individuals with SUDs and related challenges (Sharma & Shukla, 1988).

The research aim to explore the effectiveness of an eight-week structured yoga program in reducing DAS among male drug addicts in rehabilitation. We hypothesised that participants in the experimental group will experience significant reductions in DAS psychological parameters compared to a control group, that has not undergone any intervention. It is hypothesized that subjects of the experimental group, who participate in the yoga intervention, will show notable decreases in DAS psychological measures compared to the control group, which will not receive any intervention.

This research aim to inform the integration of holistic mind-body practices into comprehensive treatment strategies, by examining the therapeutic potential of yoga, in addiction recovery. Ultimately facilitating more effective and compassionate care for those grappling with SUDs.

## MATERIALS AND METHODS

**Procedure & Participants:** This study employed a randomized controlled trial design, gathering data at two key times: before the intervention (Pre) and after the intervention (Post). A total of 100 male participants were randomly selected from drug addiction rehabilitation centers for inclusion in the study. All participants voluntarily provided informed consent, confirming their understanding and agreement to participate in the study without any pressure, using the "Depression, Anxiety, and Stress Scale-21" (DASS-21) (Lovibond & Lovibond, 1995) questionnaire pre-assessment. Out of these, 80

subjects met the inclusion criteria. Participants were evenly divided into a control group (CG) and an experimental group (EG). The EG engaged in 60 minutes of daily yoga practice for eight weeks (56 days), excluding Sundays, along with other routine activities of the rehabilitation center. All sessions of yoga were conducted under the supervision of the researcher. The CG followed only the other routine activities of rehabilitation without any yoga intervention. After eight weeks, the DASS-21 was administered to both groups again as a post-test. Figure 1 illustrates the study's design from start to finish.

#### Inclusion Criteria & Exclusion Criteria

The study included only male participants who were addicts of substances like heroin, cannabis, alcohol, or a combination thereof, and after they had undergone the initial severe withdrawal symptoms. Individuals with severe medical conditions (e.g., cardiac, renal, or hepatic diseases) or serious psychological issues were excluded from the experimental group that underwent yoga intervention. Those unwilling to participate were also excluded. All 80 eligible participants completed the DASS-21 questionnaire to assess their Pre- and Post-intervention state.

**Limitation-** Key limitations of the study include a relatively small sample size, the restricted age range of participants (20 to 55 years), the limitation to only males at specific rehabilitation centres, the lack of long-term follow-up to assess enduring effects, and the absence of

an active control group to more accurately measure intervention effectiveness.

#### Yoga Training Program

This program consisted of a 60-minute session incorporating various yoga practices, as outlined in Table 1.

## RESULTS

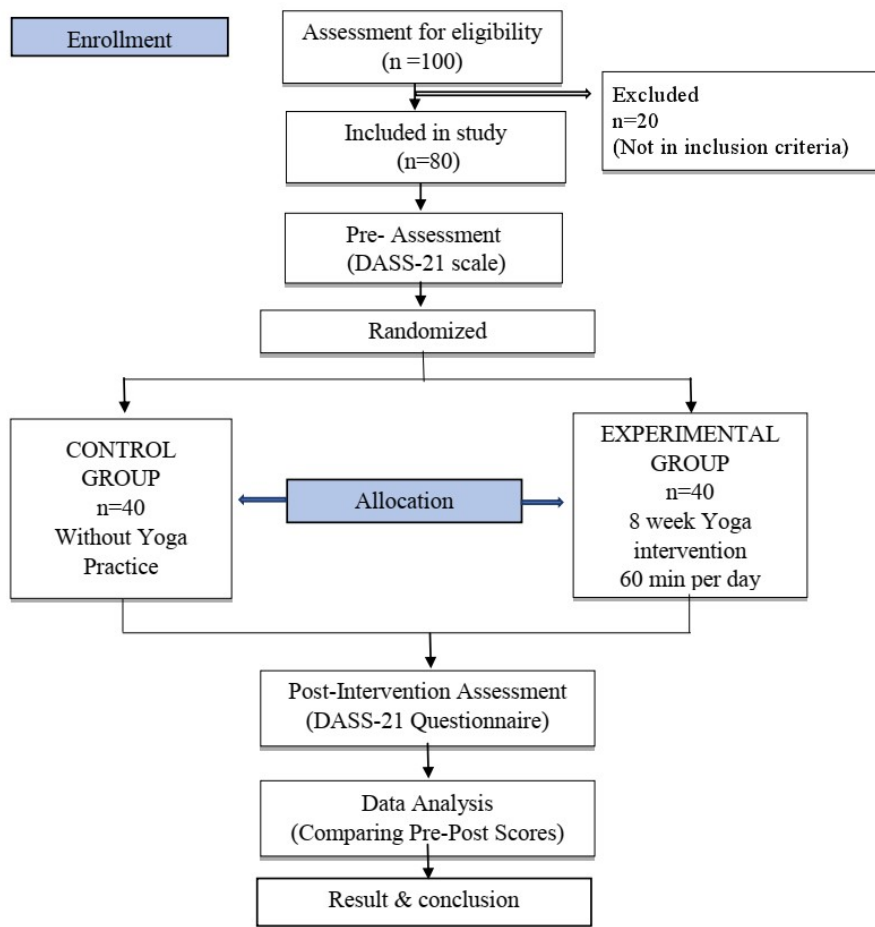
Data from the pre-test and post-test were analysed using SPSS software. This analysis substantiates the effectiveness of the eight-week yoga intervention, demonstrating significant reductions in DAS among male drug addicts in rehabilitation. Statistically significant improvements were observed in both the control and experimental groups ( $p < 0.001$ ), with the experimental group showing a markedly greater reduction in these psychological parameters compared to the control group.

#### Key Findings:

- Both groups showed statistically significant reductions in DAS levels.
- The experimental group had significantly lower DAS levels than the control group
- Table 2 & 3 demonstrates the efficacy of the 8-week yoga program in reducing psychological distress among the male drug rehabilitation residents in the experimental group as compared to the control group.

**Table 1.** Overview of Yoga Intervention Module

Type	Description	Duration
Prayer		2min
Yogic sukshma vyayama	Includes preparatory movements (Like neck movement, waist and Shoulder socket rotation light warm-up, and stretching.)	7min
Suryanamaskara	4 rounds of Suryanamaskara as part of the warm-up.	5 min
Shavasana	Rest in Shavasana.	1 min
Asanas Practice	Various simple asanas were practiced, including standing, sitting, and lying postures (prone and supine), such as Tadasana, Marjariasana, and Bhujangasana.	25 min
Pranayama	Nadishodhan without hold breath (6 min) and Bhramari (3 min)	9 min
Aum Chanting	Aum chant	9 min
Meditation	Meditation on breath	2 min
Total Duration		60 min



**Figure 1:** provides a flowchart of the study design, outlining the steps from enrollment through to the final analysis in the yoga intervention study.

**Table 2.** Comparative Assessment of Stress, Anxiety, and Depression Levels in Control and Experimental Groups Before and After Intervention

	Pre-Intervention		Post-intervention	
	Control group	Experimental Group	Control Group	Experimental Group
<b>Stress Levels</b>				
Normal	32.5%	47.5%	67.5%	97.5%
Mild	10.0%	7.5%	25.0%	2.5%
Moderate	30.0%	20.0%	5.0%	-
Severe	20.0%	20.0%	-	-
Extremely severe	7.5%	5.0%	2.5%	-
<b>Anxiety Levels</b>				
Normal	27.5%	30.0%	57.5%	95.5%
Mild	5.0%	7.5%	7.5%	2.5%
Moderate	17.0%	15.0%	17.5%	2.5
Severe	20.0%	20.0%	12.5	-
Extremely severe	30.0%	27.5%	5.0%	-
<b>Depression Levels</b>				
Normal	20.0%	25.0%	25.0%	85.0%
Mild	7.5%	10.0%	22.5%	7.5%
Moderate	32.5%	17.5%	40.0%	7.5%
Severe	20.0%	17.5%	7.5%	-
Extremely severe	20.0%	30.0%	5.0%	-

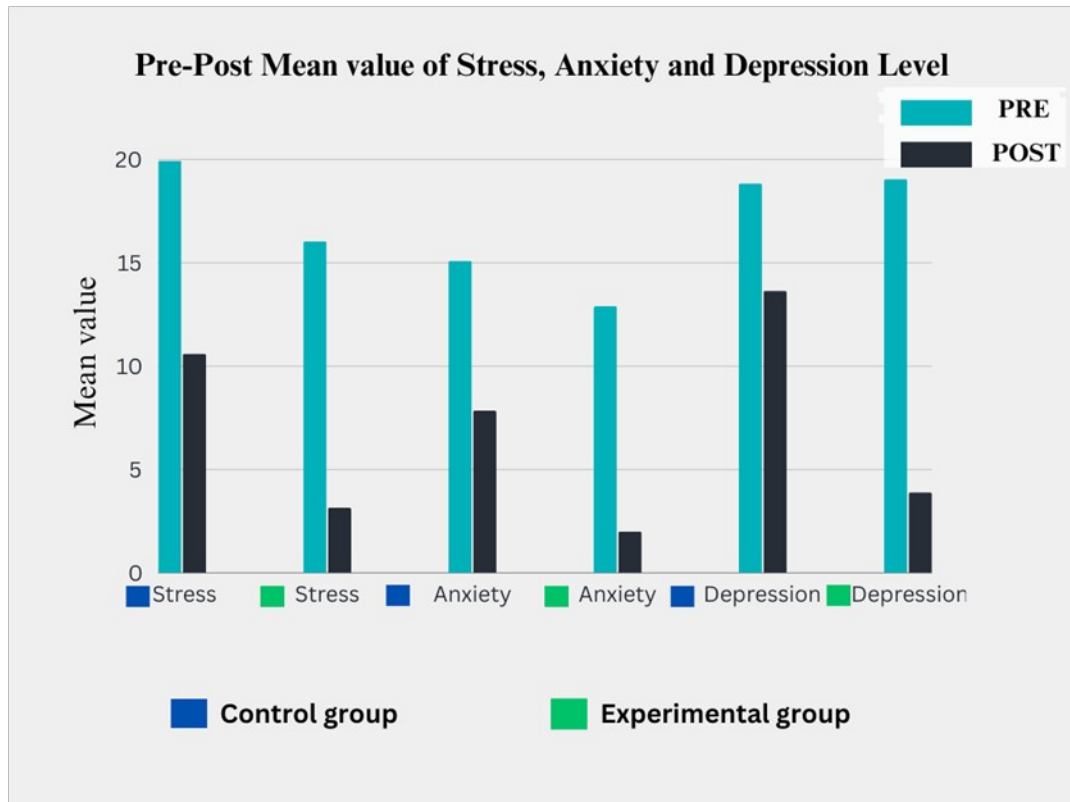


Figure 2: Pre-Post Mean Value of Stress, Anxiety and Depression Level.

Table 3. Comparative Analysis of Stress, Anxiety, and Depression Levels Before and After Intervention in control group (CG) and Experimental group (EG)

Variable	CG Pre (Mean ± SD)	CG Post (Mean ± SD)	EG Pre (Mean ± SD)	EG Post (Mean ± SD)	Mean Difference (CG & EG)	Within Group Changes (CG)	Within Group Changes (EG)	Between Group Diff (t)
Stress	19.95 ± 9.86	10.60 ± 7.39	16.05 ± 10.95	3.15 ± 3.87	9.350 & 12.900	t=7.811, p<0.001*	t=7.066, p<0.001*	5.650
Anxiety	15.10 ± 10.66	7.85 ± 7.12	12.90 ± 8.83	2.00 ± 2.40	7.250 & 10.900	t=6.032, p<0.001*	t=8.102, p<0.001*	4.923
Depression	18.85 ± 9.48	13.65 ± 7.03	19.05 ± 11.48	3.90 ± 4.32	5.200 & 15.150	t=4.236, p<0.001*	t=8.703, p<0.001*	7.474

**DISCUSSION**

This research aimed to evaluate the efficacy of an 8-week yoga program on reducing DAS in male drug addicts, including those dependent on heroin, cannabis, alcohol, and polysubstance. The observed significant decreases in DASS-21 scores among the experimental group participants validate yoga as a potent complementary therapy in addiction rehabilitation, supporting the hypothesis and aligning with previous findings (Singh & Negi, 2023; Anju *et al.*, 2015; Sharma

& Shukla, 1988; Walia *et al.*, 2021).

The results of this study align with previous investigations into the possible mechanisms by which yoga positively impacts mental health and addiction recovery. Treating SUDs is complex, requiring a multifaceted approach due to varied psychophysiological symptoms (Kuppili *et al.*, 2018). Studies show that consistent drug use adversely affects the frontal cortex of the brain, resulting in diminished cognitive capabilities (Carpenter, 2001; Crews & Boettiger, 2009; Goldstein & Volkow, 2002). Regular

yoga practice enhances mind-body awareness, fostering mental clarity and emotional balance, which are crucial for individuals with SUDs. Neuroscientific research supports that such practices improve cognitive functions like decision-making and self-control by positively affecting the frontal cortex (Gothe *et al.*, 2019; Taware *et al.*, 2017; Torres, 2024). Additionally, yoga may reduce stress and anxiety by decreasing cortisol production and promoting a shift towards parasympathetic nervous system dominance (Shobana *et al.*, 2022).

It also stimulates the release of neurotransmitters like dopamine, serotonin, oxytocin, and endorphins, which are crucial for emotional regulation and overall well-being (Yoga for Joy, 2022). Furthermore, yoga has been associated with increased levels of thalamic gamma-aminobutyric acid (GABA), a neurotransmitter that plays a crucial role in regulating anxiety and mood (Streeter *et al.*, 2010). It could help mitigate stress by lowering cortisol levels in the hypothalamus, which in turn may ease symptoms of depression (Thirthalli *et al.*, 2013).

**Comparison with Previous Literature** – The results of this study align with existing literature that highlights the positive impact of yoga on psychological health and addiction recovery. Systematic reviews and controlled trials have shown that yoga interventions can significantly improve substance use disorders (SUDs), as well as conditions like DAS, enhancing overall quality of life (Singh & Negi, 2023; Anju *et al.*, 2015; Walia *et al.*, 2021). These findings emphasize role of yoga in improving life quality, emotional growth, and recovery among individuals with drug addiction, further supporting the incorporation of yoga into addiction rehabilitation (Sharma & Shukla, 1988).

**Implications for Future Research** - This study confirms the short-term benefits of yoga in treating addiction, further research is necessary to explore its long-term effects and confirm these findings across broader populations. In future, various types of research designs and yoga interventions can yield more accurate and good results. also, research should aim to replicate these results in broader populations and explore the long-term benefits of yoga in sustaining recovery and

preventing relapse. This could potentially reshape standard rehabilitation protocols and provide a more comprehensive, effective treatment model for addiction (Kuppili *et al.*, 2018).

## CONCLUSION

This study effectively illustrates the benefits of an eight-week yoga program in decreasing levels of Depression, Anxiety, and Stress among male drug addicts in rehabilitation. The empirical evidence shows that participants who regularly practiced yoga experienced significant enhancements in their psychological well-being compared to those who did not engage in yoga activities. These results support the inclusion of yoga as a complementary therapy in drug rehabilitation programs, providing a holistic method to address both physical and mental health challenges during recovery.

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## CONFLICTS OF INTEREST

The authors declare that they have no potential conflicts of interest.

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