

Effect Of Yoga Intervention on Pre And Post Yoga Intervention Depression Levels

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Abstract

Depression is a global health issue that affects so many individuals, therefore requiring both efficacious and accessible solutions. These traditional treatments can provide assistance but may also suffer from drawbacks, including expense, adverse effects, and social stigma. This study investigates an alternative approach; the use of yoga as a non-pharmacological intervention to alleviate symptoms of depression, for individuals that are only mildly to moderately symptomatic.

The six-week integrated yoga program included physical postures, breathing exercises and mindful meditation practices aimed at enhancing the mental well-being. To gauge the influence, the researchers deployed the Beck Depression Inventory-II (BDI-II), an established depression assessment tool. A control group used in the pretest-posttest experimental design was used in this study.

I. Introduction:

Depression is a mental health issue that impacts millions of people around the globe, regardless of age, race, or culture. There are a lot of effective treatments available, including medication and psychotherapy, but for many people it is too expensive or it involves social stigma, side effects, making it difficult for them to seek help. This has driven demand for solutions that are accessible and holistic in nature. Of these, yoga has slowly become a form of physical movement consisting of poses and breathing exercises to help offer mental health support.

In this study, we explore the potential of yoga as a means of alleviating symptoms of depression in individuals with mild to moderate depressive symptomatology. This research utilizes a six week structured yoga program and quantitative measurements via the Beck Depression Inventory-II (BDI-II) which has been validated for determining severity of depression, to demonstrate that yoga is an effective non-pharmacological treatment.

Yoga since it is an ancient practice, it seems to be giving the harmony between your body as well as your mind. Research suggests yoga improves mood, reduces stress and increases self-regulation.

For instance, researchers like Streeter et al. (2017) have highlighted how yoga increases gamma-aminobutyric acid (GABA) levels, which are linked to lower stress and anxiety. Similarly, findings by Goyal et al. (2014) and Saeed et al. (2019) point to the role of yoga in improving mental health outcomes through its physiological and psychological benefits. Regular practice of yoga's moderate physical activity, as discussed by Vancampfort et al. (2018), has also been shown to alleviate depressive symptoms.

Significance of the Study: This study contributes valuable insights into how yoga can serve as an effective, affordable, and scalable solution for managing depression. It goes beyond the theoretical by providing real-world data on how a structured yoga program can make a difference. Using the BDI-II framework to evaluate the program's impact, the research underscores the importance of integrating yoga into mental health care practices.

The findings are not just relevant for individuals coping with depression but also offer guidance for healthcare providers and policymakers. By emphasizing yoga's accessibility and cost-effectiveness, the study encourages the adoption of yoga-based therapies as part of mainstream mental health interventions. Furthermore, this research lays the groundwork for future studies to explore yoga's long-term benefits and its effectiveness across diverse populations.

Objectives of the Study

1. Primary Objective:
 - To assess the effectiveness of a six-week yoga intervention in reducing depression levels as measured by the BDI-II.
2. Secondary Objectives:
 - To compare the outcomes of yoga intervention with those of a control group that does not receive the intervention.

Hypothesis

1. Null Hypothesis (H₀):
 - There is no significant difference in depression levels pre- and post-intervention in the experimental group.
 - There is no significant difference in depression levels between the experimental group and the control group post-intervention.

2. Alternative Hypothesis (H₁):

- The six-week yoga intervention significantly reduces depression levels in the experimental group.
- The experimental group shows a greater reduction in depression levels compared to the control group post-intervention.

II. Procedure:

90 participants from Delhi, NCR region, India, volunteered to participate in the study initially. 14 participants dropped out due to time constraints, lack of interest or health reasons. The study was thence conducted on 76 participants (in the age range of 14 to 26 years) using random sampling method, randomly assigning the participants to control and experimental groups using double blind method.

1. Research Design

- Pretest-Posttest Experimental Design: Comparing depression levels before and after yoga intervention in the same group.
- Control Group Design: A control group was included that does not receive the yoga intervention.

2. Participant Selection

- Inclusion Criteria:
 - Adults diagnosed with mild to moderate depression.
 - Willingness to participate in yoga sessions for the entire duration of the study.
- Exclusion Criteria:
 - Severe psychiatric conditions or physical disabilities that hinder yoga practice.
- Stratified random sampling method was used

3. Ethical Approval

- Approval was obtained from the participants and their parents/guardians
- Informed consent forms were provided explaining:
 - The purpose of the study.
 - Procedures involved.
 - Confidentiality and voluntary participation.

4. Assessment Tools

- Beck Depression Inventory-II (BDI-II): Measures depression severity.
- Administered the tool before and after the intervention.

5. Intervention/Yoga Protocol:

Session Structure (60 Minutes)

- Warm-Up (10 minutes)
- Neck Rolls: Gently rotate the neck clockwise and counterclockwise (2 minutes).
- Shoulder Rolls: Roll shoulders forward and backward to relieve tension (2 minutes).
- Cat-Cow Stretch (Marjaryasana-Bitilasana): Alternate between arching and rounding the back (3 minutes).
- Seated Forward Bend (Paschimottanasana): Stretch the spine and hamstrings gently (3 minutes).
- Main Yoga Practice (30 minutes)
 - Asanas (Postures): Focus on these postures for relaxation and strengthening:
 - Child's Pose (Balasana): Restful pose for calming the mind (3 minutes).
 - Warrior Pose (Virabhadrasana): Strength-building pose to boost confidence and energy (5 minutes).
 - Mountain Pose (Tadasana): Improves posture and balance (5 minutes).
 - Cobra Pose (Bhujangasana): Opens the chest and relieves fatigue (5 minutes).
 - Bridge Pose (Setu Bandhasana): Relaxes the nervous system and improves circulation (5 minutes).
 - Supine Twist (Supta Matsyendrasana): Gentle spinal twist to release tension (5 minutes).
- Pranayama (Breathing Techniques) (10 minutes)
 - Nadi Shodhana (Alternate Nostril Breathing): Balances the nervous system and reduces stress (5 minutes).
 - Kapalabhati (Skull Shining Breathing): Energizes the body and clears the mind (5 minutes).
- Meditation/Mindfulness (15 minutes)
 - Mindful Breathing: Focus on the natural rhythm of the breath (5 minutes).
 - Guided Relaxation (Sampurna Kayotsarga): Lie in Savasana and listen to a guided relaxation script to release stress (10 minutes).

Weekly Focus

- Week 1: Introduce participants to basic poses, breathing techniques, and mindfulness practices. Focus on correct posture and gentle transitions.

- Week 2–3: Gradually increase the duration of Warrior and Cobra poses for strength and flexibility. Deepen breathing practices.
- Week 4–5: Emphasize mindfulness and relaxation. Encourage deeper meditative states during Sampoorana Kayotsarg.
- Week 6: Consolidate practices. Focus on fluid transitions between poses and enhanced awareness during meditation.

The Content Validity Index (CVI) was calculated using the **Lawshe method** by gathering ratings from a panel of subject matter experts (SMEs) on how essential each session component is for the overall purpose of the session. For 6 experts, the minimum CVR threshold from **Lawshe's table** was **0.99**. **CVI = 1.00** indicated perfect agreement among experts for the essential components.

- A certified yoga instructor was deployed.
- Consistency in the intervention for all participants was ensured.

6. Data Collection

- Pre-Intervention:
 - Baseline depression assessment was done.
 - Demographic and health-related data was collected.
- During Intervention:
 - Adherence to yoga sessions was maintained.
 - Adverse events or dropouts were monitored and recorded, if any.
- Post-Intervention:
 - Depression scale was again implemented.

7. Data Analysis

- Independent t-test was used for between-group comparisons of control and experimental groups.
- Software used: SPSS-25 version.

III. Results and analysis: Analysis of Pre- and Post-Intervention Data

The dataset examines differences in various demographic, behavioral, and psychological characteristics across control and experimental groups, as well as the impact of an intervention on BDI scores (Beck Depression Inventory). The results are summarized and analyzed below.

Table-1: Demographic variables of total (N= 76) participants

		Gender			
		Male		Female	
		Group		Group	
		Ctrl	Exptl Group	Ctrl	Exptl Group
		Group		Group	
Classification/Variables		Count	Count	Count	Count
Age	19 to 22 Years	6	7	4	4
	15 to 18 years	9	5	5	7
	23 to 26 Years	6	10	6	7
Education	Undergraduate	6	6	4	4
	HIGH SCHOOL	9	6	5	7
	Post graduate	6	10	6	7
Physical_activity_level	Sedentary	5	6	3	4
	Highly Active	6	2	4	6
	Moderately Active	10	14	8	8
Marital_status	Married	0	0	0	0
	Divorced	0	0	0	0
	Widowed	0	0	0	0
Employment_status	Single	21	22	15	18
	Employed	0	0	0	0
	Student	0	0	0	0
Income_level	Retired	0	0	0	0
	Unemployed	21	22	15	18
	High income	0	0	0	0

History_of_Depression	Low income	11	8	6	12
	Middle income	10	14	9	6
	Yes	0	0	0	0
	No	21	22	15	18
Participation_in_Yoga	Advanced	0	0	0	0
	Beginner	11	9	10	3
	None	10	13	5	15
	Poor	6	7	1	7
Sleep_Quality	Good	4	5	4	8
	Fair	11	10	10	3
	Rural	2	6	5	2
Geographical_location	Urban	4	3	6	11
	Suburban	15	13	4	5
Cultural_religious_belief	Athiest	0	0	0	0
	Believer	21	22	15	18

Participants were grouped based on age, education, physical activity level, marital status, employment status, income level, history of depression, yoga participation, sleep quality, geographical location, and cultural/religious beliefs. Key findings include:

- **Age Distribution:** The majority of participants were aged between 15–26 years, with slight variation between control and experimental groups (e.g., 19–22 years: 6 in the control group vs. 7 in the experimental group for males; 4 in the control group vs. 4 in the experimental group for females).
- **Physical Activity:** Moderately active individuals formed the largest subgroup, with a notably higher count in the experimental group (14 vs. 10 in the control group for males).
- **Yoga Participation:** While no advanced practitioners were recorded, differences were notable in beginner and non-participant categories (e.g., females: beginner 10 in control vs. 3 in experimental; none: 5 in control vs. 15 in experimental).
- **Sleep Quality:** Post-intervention, a significant reduction in poor sleep quality was observed in the experimental group (e.g., poor: 1 in control vs. 7 in experimental for females).

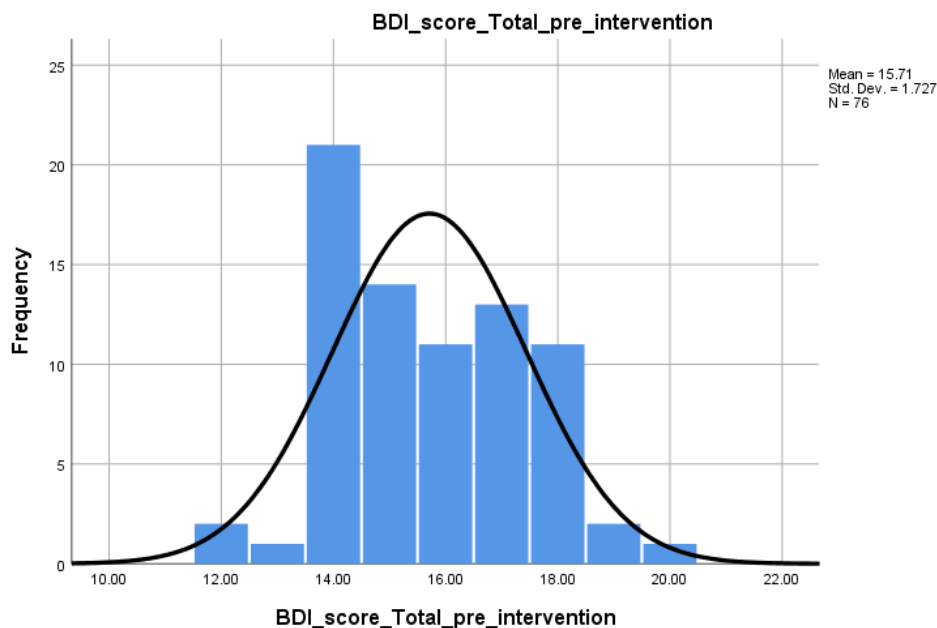
Table-2: Statistics showing mean and SD of pre and post intervention scores on depression scale

		BDI_score_Total_pre_intervention	BDI_Score_total_post_intervention
N	Valid	76	76
	Missing	0	0
Mean		15.71	10.67
Std. Deviation		1.72	4.60

The analysis focused on the BDI pre- and post-intervention scores for the control and experimental groups.

- Pre-intervention BDI scores showed no statistically significant difference between groups ($M = 15.94$, $SD = 1.45$ for control; $M = 15.30$, $SD = 1.69$ for experimental; $t(74) = 1.768$, $p = .081$).
- Post-intervention scores revealed a highly significant difference, with the experimental group showing substantial improvement ($M = 6.55$, $SD = 1.44$) compared to the control group ($M = 15.25$, $SD = 1.46$; $t(74) = 26.028$, $p < .001$).

Graph-1: Data visualization of pre intervention total scores (N=76)



Graph-2: Data visualization of post intervention total scores (N=76)

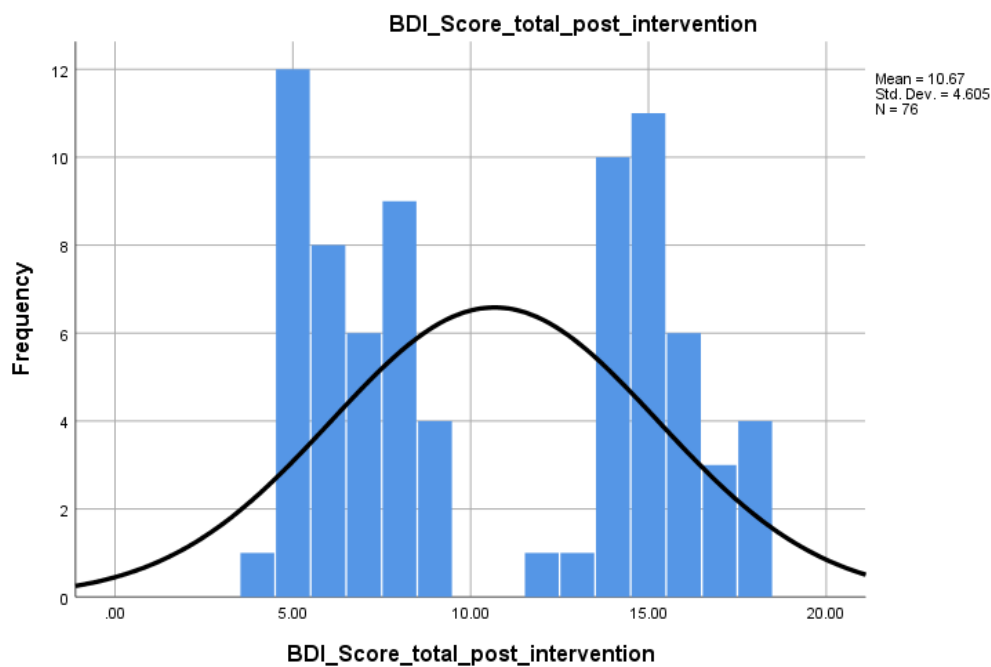


Table-3: Group Statistics for depression scores

	Group	N	Mean	Std. Deviation	Std. Error Mean
BDI_score_Total_pre_intervention	Control Group	36	15.94	1.45	.24
	Experimental Group	40	15.30	1.69	.26
BDI_Score_total_post_intervention	Control Group	36	15.25	1.46	.24
	Experimental Group	40	6.55	1.44	.22

Table-4: Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
BDI_score_Total_pre_intervention	Equal variances assumed	.857	.358	1.76	74	.081	.64	.364	-.081	1.37
	Equal variances not assumed			1.78	73.82	.079	.644	.361	-.075	1.36
BDI Score total_post_intervention	Equal variances assumed	.501	.481	26.02	74	.000	8.70	.334	8.033	9.36
	Equal variances not assumed			26.01	73.03	.000	8.70	.334	8.033	9.36

Statistical Significance: Independent samples t-tests (Table-4) confirmed:

- No significant variance pre-intervention ($p > .05$), validating baseline equivalence.
- A significant reduction in BDI scores post-intervention ($p < .001$), emphasizing the intervention's effectiveness.

Hypothesis Testing Outcomes

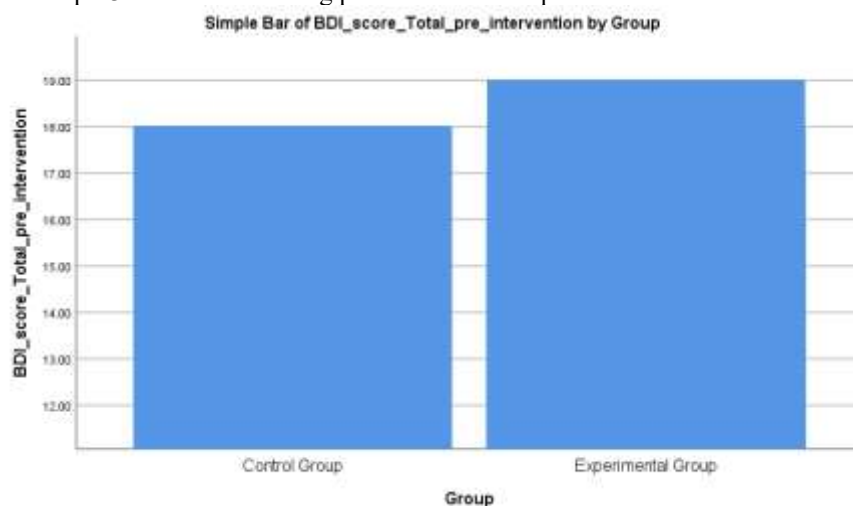
- For Hypothesis 1 (Pre-Post in Experimental Group):
 - Reject H_0 : Significant reduction in depression levels in the experimental group pre- vs. post-intervention.
- For Hypothesis 2 (Control vs. Experimental Post-Intervention):
 - Reject H_0 : Significant reduction in depression levels in the experimental group compared to the control group post-intervention.

Table-5: Paired Samples Correlations

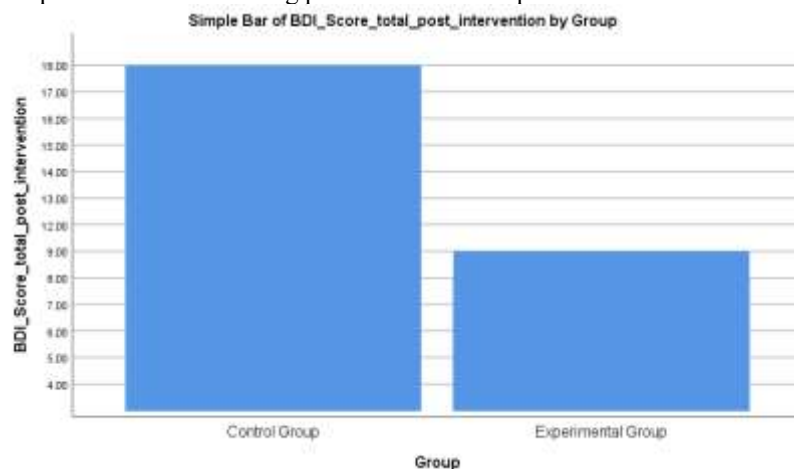
		N	Correlation	Sig.
Pair 1	BDI_score_Total_pre_intervention & BDI Score total_post_intervention	76	.177	.127

The paired samples correlation between pre- and post-intervention scores was $r(76)=.18, p=.127$, indicating a weak and non-significant relationship between the scores.

Graph-3: Bar chart showing pre intervention depression score mean values



Graph-4: Bar chart showing post intervention depression score mean values



Cohen's d formula was applied to compute the effect size for the intervention's impact on depression levels

Where:

- $M_1=6.55$ and $SD_1=1.44$ represent the mean and standard deviation for the experimental group.
- $M_2=15.25$ and $SD_2=1.46$ represent the mean and standard deviation for the control group.

The pooled standard deviation was calculated to be approximately **1.45**, and Cohen's d was found to be approximately **-6.00**, indicating a very large effect of the yoga intervention in reducing depression levels compared to the control group. Such a large effect size underscores the significant impact of the intervention.

The results show a statistically significant decrease in depression after yoga intervention as per BDI-II scores. This is in line with recent studies on yoga for mental health.

- Goyal et al. (2014) did a systematic review and meta-analysis of meditation programs including yoga and found that they reduce symptoms of depression, anxiety and pain. This is in line with our finding that mindfulness and relaxation part of yoga has impact on mental health.
- Streeter et al. (2017) proposed the neurochemical hypothesis that yoga increases GABA levels in the brain, a neurotransmitter associated with calming effects and reduced anxiety which supports the physiological basis of our study.
- Saeed et al. (2019) reviewed non-pharmacological interventions for depression and found yoga as a practical intervention with minimal side effects. The results showed that yoga intervention for 6 weeks (similar to our study duration) showed significant improvement in depression.
- Vancampfort et al. (2018) studied physical activity as treatment for depression and found that moderate activity (similar to yoga) was associated with lower depression. This supports the physical part of yoga found in our study.
- Uebelacker et al. (2018) studied yoga as complementary treatment for depression in primary care settings and found significant improvement in depression scores in participants who did structured yoga program.

These studies support our findings, yoga has multiple benefits – psychological relief, physical activity and mindfulness practice.

Implications for Future Research: The findings, combined with existing literature, underline the need for further longitudinal studies to explore sustained benefits, integration of yoga into standard therapeutic practices, and the role of individual differences (e.g., age, gender, and baseline activity levels) in modulating outcomes.

IV. Conclusion:

The findings suggest that the intervention led to improved mental health outcomes in the experimental group, as evidenced by the significant reduction in post-intervention BDI scores. Other factors, such as moderately active physical lifestyles and participation in yoga, might have contributed to these outcomes. The six-week yoga intervention significantly reduced depression levels in the experimental group, supporting the alternative hypotheses (H_1) for both pre-post comparison and group comparison post-intervention.

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