



# Effects of Exercise Therapy and Yoga Therapy on Stress among Obese College Students

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**Abstract:** Obesity is a critical global health issue, rising sharply due to modern lifestyle changes. Obesity is a growing global health concern that significantly impacts individuals' physical and psychological well-being, particularly among college students who often face heightened stress, anxiety, and low self-esteem. These challenges are further exacerbated by academic pressures and lifestyle changes during the transition to college. Holistic interventions such as exercise therapy and yoga therapy have shown promise in reducing stress and improving mental health. Exercise therapy lowers cortisol levels and boosts endorphins, while yoga therapy promotes relaxation and emotional stability. However, limited research has explored the comparative effectiveness of these interventions in managing stress among obese college students. This study aimed to evaluate and compare the impact of exercise therapy and yoga therapy on psychological stress among obese male college students. A total of 150 participants, aged 18–21, were purposively selected from St. Benedict's Group of Institutions and St. Anthony's Institution in Bangalore. They were randomly assigned to three groups: Exercise Therapy, Yoga Therapy, and a Control Group, with 50 participants in each. The intervention lasted for 16 weeks, conducted six days a week in the morning for one hour per session. Data were collected using standardized questionnaires administered before and after the intervention and analyzed using mixed two-way repeated measures ANOVA. The results revealed a significant reduction in stress levels across both intervention groups, while no notable changes were observed in the Control Group. Both exercise and yoga therapies demonstrated substantial improvements, with variations in their degree of effectiveness. This study highlights the potential of these interventions as effective tools for managing stress and improving mental health outcomes in obese college students.

Key words: Exercise, Yoga, Therapy, Stress, Obese.

## 1. INTRODUCTION

Obesity is a global health concern that significantly affects not only physical health but also psychological well-being. Among college students, obesity is often associated with increased stress, anxiety, and low self-esteem, all of which can hinder academic performance and overall quality of life (Hruby & Hu, 2015). The transition to college life, coupled with unhealthy lifestyle habits, often intensifies these issues, highlighting the importance of addressing both the physical and psychological dimensions of obesity.

Holistic interventions such as exercise therapy and yoga therapy have gained recognition for their effectiveness in improving mental health. Exercise therapy has been found to reduce stress, anxiety, and depression by enhancing endorphin levels and improving self-perception (Carek et al., 2011). Similarly, yoga therapy integrates physical postures, breathing techniques, and meditation to promote mental clarity, emotional stability, and relaxation, making it particularly beneficial for managing stress and anxiety (Ross & Thomas, 2010). These approaches not only target physical health but also support mental well-being, making them suitable for individuals dealing with obesity-related stress.

Chronic stress is a widespread issue among college students, particularly those who are obese, as it compounds both psychological and physical health challenges (American Psychological Association, 2020). Obesity often leads to heightened psychological stress due to factors such as societal stigma, health complications, and limited physical activity (Hruby & Hu, 2015). Managing stress is critical for obese students, as prolonged stress can hinder weight management and overall well-being (Kivimäki & Steptoe, 2018).

Both exercise therapy and yoga therapy are well-documented methods for reducing stress. Exercise therapy alleviates stress by lowering cortisol levels, enhancing mood, and increasing endorphin release (Penedo & Dahn, 2005). In contrast, yoga therapy emphasizes mindfulness and relaxation through physical postures, breathing exercises, and meditation, leading to improved emotional regulation and stress reduction (Field, 2016). Despite their proven benefits, research comparing the effectiveness of these interventions in managing stress among obese college students remains limited.

This study aims to evaluate and compare the impact of exercise therapy and yoga therapy on psychological stress among obese college students. By investigating these approaches, the study seeks to provide insights into their potential for reducing stress and supporting mental well-being. The findings can contribute to the development of tailored intervention programs for this vulnerable population, addressing both their physical and psychological needs.

## 2. Objectives and Hypothesis

### Objective of the study

The primary objective of this study is to evaluate and compare the effectiveness of exercise therapy and yoga therapy in reducing stress among obese college students. The specific aims of the study are:

1. To assess the impact of exercise therapy on stress levels and its associated effects on overall health outcomes in obese college students.
2. To explore the effectiveness of yoga therapy in alleviating stress and its potential benefits for both physical health and mental well-being.
3. To compare the relative effectiveness of exercise therapy and yoga therapy in managing stress and promoting healthier lifestyle practices among obese college students.

### Hypothesis of the Study

**The following are hypothesis of the present study:**

1. There is significant effects of exercise therapy on reducing stress among obese male college students.

2. There is significant effects of yoga therapy on alleviating stress among obese male college students.
3. There is a significant difference in the effectiveness of stress reduction between the exercise therapy and yoga therapy groups.

### 3. Methodology

This study employed an experimental intervention design to evaluate the effects of exercise therapy and yoga therapy on stress and BMI among obese male college students, given the high prevalence of obesity within this population. A total of 150 participants, aged 18–21 years, were recruited from St. Benedict’s Group of Institutions in Anchepalya and St. Anthony’s Institution in Kengeri, Bangalore, Karnataka. Eligibility criteria included the absence of participation in any structured exercise programs outside of physical education classes or the interventions provided. Students with orthopaedic impairments, injuries, prosthetic or orthotic equipment usage, or a history of orthopaedic surgeries were excluded from the study. Participants were randomly assigned into three groups of 50: the Exercise Therapy Group, which engaged in structured physical training; the Yoga Therapy Group, which practiced asanas, pranayama, and relaxation techniques; and the Control Group, which did not receive any intervention. The intervention spanned 16 weeks, with one-hour sessions conducted six days a week in the mornings. Standardized questionnaires were administered before and after the intervention to collect data. The data were analyzed using mixed two-way repeated measures ANOVA to assess the statistical significance of differences in stress levels changes among the groups. Descriptive statistics were also utilized to summarize the data. IBM SPSS (version 26) was used for statistical analysis.

### 4. Results and Interpretation

This section presents an overview of the findings from the analysis of stress scores across various time points, treatment groups, and their interactions. The results are detailed using descriptive statistics, inferential analyses, and graphical representations to evaluate the effectiveness of the interventions.

The table are present the results along with interpretation

**Table: 4.1 Descriptive Statistics of Stress Score at each Time Periods**

Time	n	Minimum	Maximum	Mean	Std. Error of mean	Std. Deviation
Pre-test	150	7	27	15.42	0.381	4.662
Post-test	150	3	27	12.09	0.391	4.792

**Interpretation:** The table 4.1 displays the descriptive statistics of the stress scores over different time periods. The pre-test means stress score is 15.42 with a standard deviation (SD) of 4.662. The mean score after the

training (post) is 12.09, while the SD is 4.792. Further the minimum and maximum scores for pre- test are 7 and 27 and post- test are 3 and 27 respectively. Additionally, the standard error of mean is 0.381 and 0.391 respectively.

**Table: 4.2 Descriptive Statistics of the Stress Scores of the Subjects in each Treatment Groups Tested at Different Time Periods**

Groups	Time	n	Minimum	Maximum	Mean	Std. Error of mean	Std. Deviation
Control	Pre-test	50	7	27	15.42	0.676	4.954
	Post-test	50	5	27	15.62	0.674	3.665
Exercise therapy	Pre-test	50	8	24	15.30	0.701	4.954
	Post-test	50	4	17	10.80	0.518	3.665
Yoga therapy	Pre-test	50	9	27	15.54	0.612	4.325
	Post-test	50	3	22	9.84	0.532	3.76

**Interpretation:** The above table 4.2 presents the summary statistics of stress with respect to pre- and post-test results for the control and experimental groups. The table provides the following:

- **Control group:** The mean and standard deviation of pre-test data of stress in the control group is 15.42 and 4.954 respectively with standard error of mean is 0.676. The mean and standard deviation values after the interventions (Post) is 15.62 and 3.665 respectively with standard error of mean is 0.674.
- **Exercise Therapy:** The mean and standard deviation of pre-test data of stress in the exercise therapy is 15.30 and 4.954 respectively with Std. error of mean is 0.701. Further the mean and standard deviation values after the interventions (Post) is 10.80 and 3.665 respectively with standard error of mean is 0.518.
- **Yoga Therapy:** The mean and standard deviation of pre-test data of stress in the yoga therapy is 15.54 and 4.325 respectively with Std. error of mean is 0.612. Further the mean and standard deviation values after the interventions (Post) is 9.84 and 3.76 respectively with standard error of mean is 0.532.

**Table: 4.3 Wilks' Lambda (Multivariate Analysis) for within the Time Scores**

Effects	Values	Hypothesis df	Error df	F	p-value
Time	0.189	1	147	629.820	< 0.05
Time X Groups	0.286	2	147	183.719	< 0.05

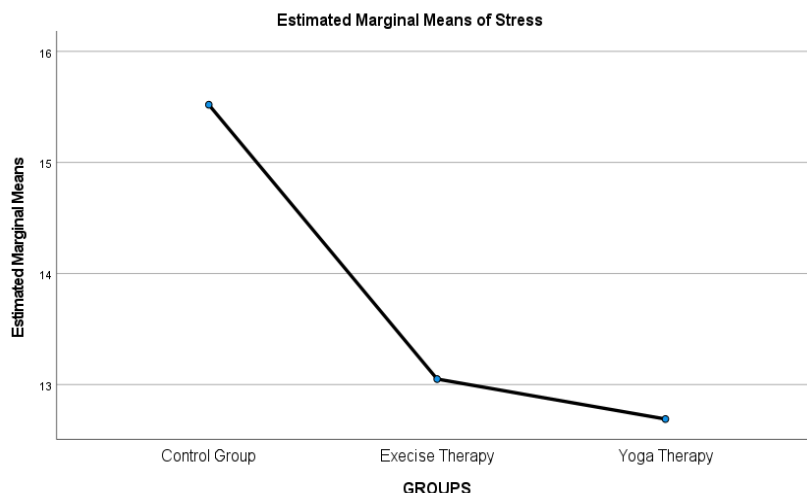
**Conclusion:** The main effects of time is found to be statistically significant (Wilk's Lambda = 0.189, (F (1,147) = 629.820),  $p < 0.05$ ). This effects, however, is qualified by a significant time X group interaction (Wilk's Lambda = 0.286, (F (2,147) = 183.719),  $p < 0.05$ ).

**Table: 4.4 F-Table for Testing Significance of Treatments (Between Subjects) Effects**

Source	Type III sum of squares	df	Mean score	F	p-value
Groups	474.647	2	237.323	6.337	< 0.05
Error	5505.100	147	37.450		

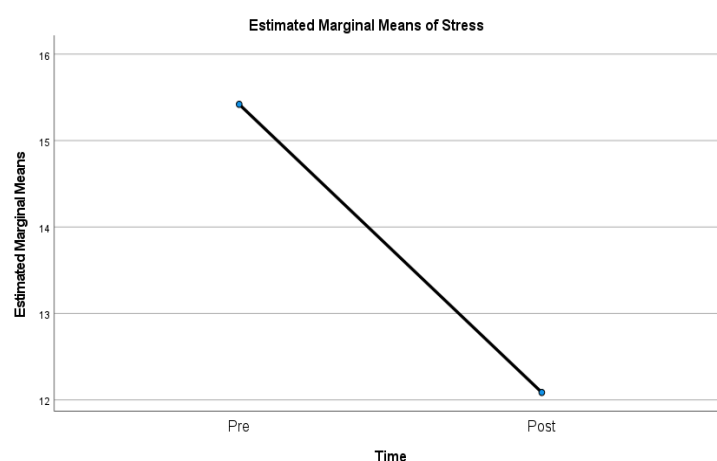
**Conclusion:** The main effects of treatment groups on the average stress score across time is found to be statistically significant ( $F(2,147) = 6.337$ ),  $p < 0.05$ ).

**Figure-4.1 Marginal Means (Stress) Plot of Treatments**



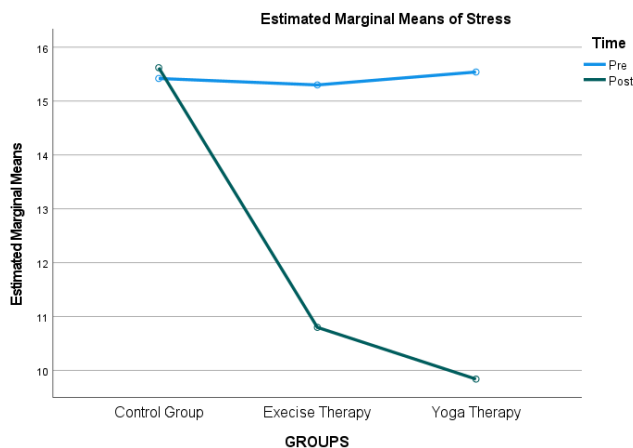
**Interpretation:** The means plot shown in the figure 4.1. depicts that the yoga therapy treatment group fared better than the other groups in terms of effectiveness, followed by exercise therapy, while the control group stands last in terms of relevance.

**Figure- 4.2 Marginal Means (Stress) Plot of Time**



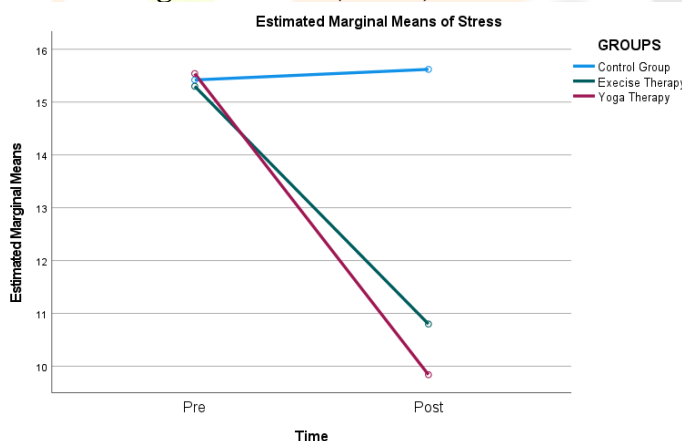
**Interpretation:** This marginal means plot indicates that across groups, the mean level of stress exhibited a decreasing trend over the two measurement occasions from pre to post, which is a clear indication of decrease in the stress due to the training.

**Figure- 4.3 Marginal Means of (Stress) Across Groups and Time**



**Interpretation:** This marginal means plot demonstrates that impact of three interventions across groups and time. The Control Group shows minimal change in stress levels, indicating no significant effect. Exercise Therapy results in a moderate reduction in stress, while Yoga Therapy demonstrates the most substantial decrease, with the lowest stress levels observed after the intervention. In summary, both Exercise and Yoga Therapy effectively reduce stress, with Yoga Therapy proving to be the most impactful.

**Figure: 4.4 Marginal Means (Stress) Plot of Treatment X Time**



**Interpretation:** Since the plots (lines) are overlapped it indicates an interaction between treatments and time. However, this marginal mean plot also indicates that among the experimental groups, the stress scores is reduced due to the treatments. There is a reduction in the post-test when compared with pre-test score in the two experimental groups.

**Table: 4.5 Multivariate Testing Significance of Time (Within-Subjects) Effects in each Treatment Category**

Groups	Value of Wilks' Lambda	Hypothesis df	Error df	F	p-value
Control	0.995	1	147	0.756	> 0.05
Exercise Therapy	0.278	1	147	382.616	< 0.05
Yoga Therapy	0.193	1	147	613.886	< 0.05

**Conclusion:** The following conclusions can be drawn from the above table 4.5

- **Control Group:** The effects of time in the control group is found to be statistically insignificant (Wilks' Lambda value is 0.995, (F (1,147) = 0.756) and  $p > 0.05$ ).
- **Exercise Therapy:** There is a significant difference between pre and post among the exercise therapy group (Wilks' Lambda value of 0.278, (F (1,147) = 382.616) and  $p < 0.05$ ). This clearly indicates that the exercise therapy is effective on stress.
- **Yoga Therapy:** In this group it shows a significant difference (Wilks' Lambda value 0.193, (F (1,147) = 613.886) and  $p < 0.05$ ) in stress between pre and post, which is an indication of effectiveness of yoga therapy on stress.

**Table: 4.6 Pairwise Comparison of Stress Score between Treatments with respect to Pre and Post-Test**

Time	(I) GROUPS	(J) GROUPS	Mean Difference (I-J)	Std. Error of Mean	p-value
Pre-test	Control	Exercise Therapy	0.120	0.939	> 0.05
	Control	Yoga Therapy	-0.120	0.939	> 0.05
	Exercise Therapy	Yoga Therapy	-0.240	0.939	> 0.05
Post-test	Control	Exercise Therapy	4.820	0.819	< 0.05
	Control	Yoga Therapy	5.780	0.819	< 0.05
	Exercise Therapy	Yoga Therapy	0.960	0.819	> 0.05

**Conclusion:** The pairwise comparisons on the average stress score (average over time) is presented in the above table 4.6

- **Pre- test:** At initial time period (pre) the stress is found to be statistically insignificant ( $p > 0.05$ ) between as pairwise of different treatments.
- **Post- test:** After the treatment (post) period it is found that these exist a statistically insignificant difference in the stress between as pairwise of different treatments group (ET and YT) ( $p > 0.05$ ).

**Table: 4.7 Percentage of Relative Changes in Experimental Groups**

	Post-Exercise Therapy	Post-Yoga Therapy
Pre- Exercise therapy	29.41%	-
Pre- Yoga therapy	-	36.67%

**Interpretation:** Table 4.7 shows that obese college students in the exercise therapy, yoga therapy reduces their stress by 29.41% and 36.67%, respectively. The yoga therapy group demonstrated the highest reduction in stress compared to the exercise therapy group.

## 5. Discussion of Findings

This study underscores the effectiveness of exercise therapy and yoga therapy in reducing stress among obese male college students, with yoga therapy proving to be the more impactful intervention. Participants in the Exercise Therapy Group experienced a reduction in stress levels from a mean score of 15.30 (pre-test) to 10.80 (post-test), while the Yoga Therapy Group showed a more pronounced decrease, from 15.54 to 9.84. These findings are consistent with previous research indicating that physical activity reduces stress through mechanisms such as lowering cortisol levels and enhancing endorphin release (Penedo & Dahn, 2005). Additionally, yoga therapy's ability to combine physical movements, breathing exercises, and mindfulness aligns with studies highlighting its effectiveness in reducing psychological stress and improving relaxation (Ross & Thomas, 2010; Field, 2016). Research by Streeter et al. (2012) further suggests that yoga enhances gamma-aminobutyric acid (GABA) activity in the brain, contributing to its calming effects.

Unlike the experimental groups, the Control Group did not exhibit significant changes in stress levels, emphasizing the necessity of structured interventions for managing stress. The analysis revealed a significant interaction between time and treatment effects, demonstrating the importance of consistent and sustained participation in these therapies for meaningful stress reduction. Overall, the findings provide robust evidence for integrating yoga therapy, alongside exercise therapy, into stress management programs targeting obese college students to promote mental well-being and reduce stress effectively.

## Recommendation

To improve stress management among obese college students, it is essential for institutions to incorporate yoga therapy and exercise therapy into their wellness initiatives. Yoga sessions emphasizing mindfulness, relaxation, and physical postures, alongside structured exercise routines, can effectively enhance both mental and physical health. Awareness programs and tailored intervention strategies can help engage students and address individual needs. Regular evaluation and ongoing research can refine these programs, while institutional policies should ensure these interventions become an integral part of health and fitness initiatives. Such steps will foster a supportive environment that promotes overall well-being and academic achievement.

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