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Effectiveness of Yoga and Exercise-Based Interventions in Reducing Anorexia Nervosa among Obese Adults

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ABSTRACT: Obesity is a major global health concern affecting people across all age groups. Previous research indicates that anorexia nervosa, a form of eating disorder, is frequently observed among overweight and obese individuals, particularly during adolescence and early adulthood. Therefore, the present survey-cum-experimental study was undertaken to examine the effectiveness of yoga and exercise interventions in reducing the tendency toward anorexia nervosa among adults. Based on the survey findings, 100 participants exhibiting symptoms of anorexia nervosa were selected and randomly assigned to four groups: Yoga, Exercise, Yoga plus Exercise Training, and Control, with 25 participants in each group. The results of ANCOVA, followed by Scheffé's post-hoc test, revealed that the Yoga plus Exercise Training group showed a significantly greater reduction in anorexia nervosa levels ($CD = 0.55$, $p < 0.01$) compared with the other intervention groups. Although the combined Yoga plus Exercise Training programme proved more effective than Yoga alone, both interventions demonstrated significant benefits in reducing anorexia nervosa levels.

KEYWORDS: Yoga, physical exercise, obesity, anorexia nervosa

I. INTRODUCTION

Eating disorders are recognized as serious mental health conditions that commonly emerge during adolescence and young adulthood. Over the past several decades, the prevalence of eating disorders has increased considerably, and they continue to represent a significant public health concern. According to the International Classification of Diseases (ICD-10), eating disorders include conditions such as anorexia nervosa (AN), bulimia nervosa, and other atypical eating disorders. Among these, anorexia nervosa is influenced by a combination of genetic, psychological, and socio-cultural factors. Young individuals are often particularly vulnerable to body-image disturbances associated with eating disorders, which can negatively affect their physical and psychological well-being.

Existing literature highlights several evidence-based approaches for treating eating disorders. Cognitive Behavioural Therapy (CBT) is widely regarded as an effective intervention for conditions such as bulimia nervosa and binge-eating disorder. However, the availability of effective

treatment strategies for anorexia nervosa, particularly among adults, remains limited. Current research suggests that family-based therapy may provide some benefits for adolescents with anorexia nervosa, but further high-quality investigations are required to establish more effective therapeutic approaches (Voderholzer et al., 2012).

Physical exercise has also been explored as a potential strategy for improving eating-related behaviors and body-image concerns associated with anorexia nervosa. Nevertheless, exercise alone may not adequately address the behavioral and psychological components of the disorder. In recent years, yoga has gained recognition as a holistic behavioral intervention that promotes self-awareness, emotional regulation, and healthy lifestyle practices. Therefore, combining yoga with structured exercise training may offer a more comprehensive approach to managing anorexia nervosa and

improving eating behaviors. Considering these potential benefits, the present study was undertaken to examine the effectiveness of yoga and exercise training interventions on anorexia nervosa among obese adults.

II. METHOD

This study employed a survey-cum-experimental research design to investigate the effectiveness of yoga and exercise training interventions on anorexia nervosa among obese adults. Initially, a survey was conducted to identify individuals exhibiting symptoms and tendencies of anorexia nervosa within the selected population. The survey phase enabled the researcher to screen participants and select suitable subjects for the experimental investigation. Following the survey, an experimental study was carried out in which the selected participants were randomly assigned to different intervention groups, namely Yoga, Exercise, Yoga plus Exercise Training, and a Control group. The experimental phase involved the administration of structured training programmes over a specified period, followed by pre-test and post-test assessments to evaluate changes in anorexia nervosa levels. This combined research approach provided comprehensive information by integrating the descriptive findings of the survey with the cause-and-effect analysis of the experimental investigation, thereby enabling a more accurate assessment of the impact of yoga and exercise interventions on anorexia nervosa among obese adults.

III. METHODOLOGY

The present study adopted an experimental research design to examine the effects of yoga and exercise training interventions on anorexia nervosa among female participants. A total of 100 female subjects aged between 21 and 25 years who exhibited symptoms of anorexia nervosa were selected for the study. All participants were medically fit and voluntarily agreed to participate throughout the experimental period.

The selected subjects were randomly divided into four equal groups of 25 participants each:

- Group A: Yoga Training (n = 25)
- Group B: Exercise Training (n = 25)
- Group C: Yoga plus Exercise Training (n = 25)
- Group D: Control Group (n = 25)

Only those participants who regularly attended the intervention programme and completed the study were included in the final analysis. Subjects with any acute medical condition were excluded from participation.

The study was conducted in three phases. During the baseline assessment, all participants completed the Anorexia Nervosa Questionnaire to determine their initial anorexia nervosa levels. Following this, the intervention phase was carried out for eight weeks, during which Groups A, B, and C participated in their respective training programmes for 30 minutes daily, excluding Sundays and holidays. The Yoga plus Exercise group performed yoga and exercise sessions on alternate days, while the Control group continued their normal routine activities without any specific intervention.

At the end of the eight-week programme, a post-test assessment was conducted using the same questionnaire to evaluate changes in anorexia nervosa levels. Descriptive statistics (Mean and Standard Deviation) were used to summarize the data, while Analysis of Covariance (ANCOVA) followed by Scheffé's post-hoc test was employed to determine the significance of differences among the groups.

IV. FINDINGS

The results revealed that all intervention groups showed improvement in reducing anorexia nervosa levels. However, the Yoga plus Exercise Training group demonstrated the greatest improvement, followed by the Yoga group, while the Exercise group showed comparatively smaller improvements. The Control group exhibited the least change. The findings suggest that a combination of yoga and exercise is more effective than either intervention alone in reducing anorexia nervosa symptoms among female participants.

V. CONCLUSION

The study concluded that both **Yoga Training** and **Yoga plus Exercise Training** are effective interventions for reducing anorexia nervosa among female subjects, with the combined programme producing the most significant benefits.

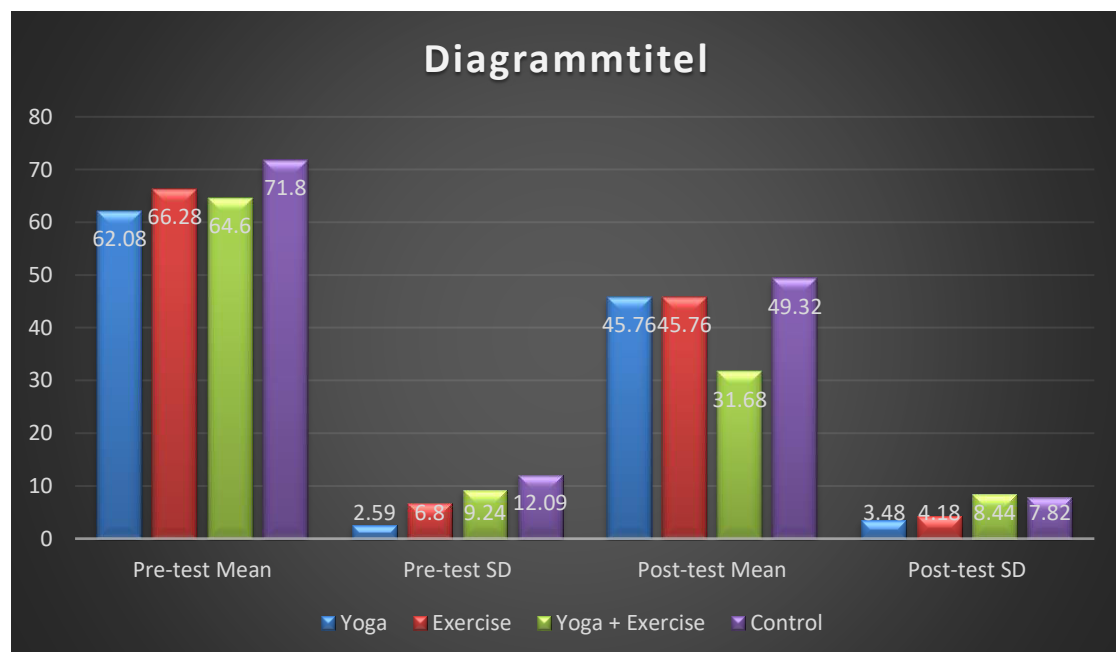
Table no. 1

Group	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD
Yoga	62.08	2.59	45.76	3.48
Exercise	66.28	6.80	45.76	4.18
Yoga + Exercise	64.60	9.24	31.68	8.44
Control	71.80	12.09	49.32	7.82

Interpretation

The table presents the mean and standard deviation (SD) scores of anorexia nervosa for the Yoga, Exercise, Yoga plus Exercise, and Control groups during the pre-test and post-test assessments. The Yoga group recorded a pre-test mean of 62.08 ± 2.59 , which decreased to 45.76 ± 3.48 in the post-test. The Exercise group showed a reduction from 66.28 ± 6.80 to 45.76 ± 4.18 . The Yoga plus Exercise group demonstrated the greatest improvement, with the mean score decreasing from 64.60 ± 9.24 to 31.68 ± 8.44 . The Control group showed comparatively less improvement, with the mean score decreasing from 71.80 ± 12.09 to 49.32 ± 7.82 . The findings indicate that the post-test mean scores were lower than the pre-test mean scores in all groups, suggesting an improvement in anorexia nervosa levels following the intervention. Among all groups, the Yoga plus Exercise group exhibited the lowest post-test mean score (31.68 ± 8.44), indicating the most substantial improvement.

Graph no.1



Graph No. 1: Graphical representation of Mean and SD of yoga, exercise, yoga + exercise and control group

Table 2 Result of ANCOVA among the Training Intervention Groups in Anorexia Nervosa

Source of Variation	Type III Sum of Squares	df	MS	F
Yoga (A)	884.69	3	294.896	22.24**
Exercise (B)	364.86	3	121.620	15.42*
Yoga plus Exercise (C)	897.12	3	299.048	26.94**
Control (D)	325.03	3	108.345	7.23
Intercept	22611.84	80	282.648	14.78*
Error	123891.44	6479	19.122	

* $p < 0.05$, ** $p < 0.01$ **Analysis of ANCOVA**

The results of ANCOVA revealed significant differences among the intervention groups with respect to anorexia nervosa scores. The Yoga Training group demonstrated a statistically significant improvement in anorexia nervosa levels ($F = 22.24$, $p < 0.01$), indicating that regular yoga practice effectively reduced the symptoms of anorexia nervosa among the participants. Similarly, the Exercise Training group also showed significant improvement ($F = 15.42$, $p < 0.05$), suggesting that physical exercise contributed positively to reducing anorexia nervosa tendencies.

The highest F-value was observed in the Yoga plus Exercise Training group ($F = 26.94$, $p < 0.01$), indicating that the combined intervention produced the most substantial improvement in anorexia nervosa levels. In contrast, the Control group did not show a statistically significant improvement ($F = 7.23$), highlighting the importance of structured intervention programmes.

Furthermore, the significant interaction effect ($F = 14.78$, $p < 0.05$) suggests that the effectiveness of the interventions differed across groups. Therefore, it can be inferred that while both yoga and exercise independently contributed to reducing anorexia nervosa symptoms, the combined Yoga plus Exercise Training programme was the most effective intervention among the four groups. These findings justified the use of post-hoc analysis to identify specific group differences and establish the superiority of the combined intervention.

VI. CONCLUSION

The present study concluded that yoga, exercise, and combined yoga plus exercise training interventions were effective in reducing anorexia nervosa levels among female participants. However, the combined Yoga plus Exercise Training programme produced the greatest improvement, followed by Yoga Training alone. The ANCOVA results demonstrated significant differences among the intervention groups, indicating that structured physical and yogic practices positively influenced anorexia nervosa symptoms. The findings suggest that integrating yoga with exercise provides a more comprehensive and effective approach for managing anorexia nervosa among young adult females. Therefore, the combined intervention may be recommended as a beneficial strategy for improving eating behaviours and psychological well-being in individuals experiencing anorexia nervosa.

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