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A Comparative Study on the Effectiveness of Yoga Versus Aerobic Exercise on Obesity Parameters Among Urban School Students

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The present study investigated the comparative effects of yoga and aerobic exercise on obesity-related parameters among urban school students in Karaikudi. Sixty obese students aged between 14 and 17 years were randomly selected and divided equally into experimental and control groups. The experimental group underwent yogic and aerobic training for 12 weeks, six days per week, while the control group maintained regular school activities. Key physiological and kinanthropometric parameters such as body mass index (BMI), cardiovascular endurance, and breath-holding capacity were measured before and after the intervention. Statistical analysis revealed significant improvements in BMI reduction, endurance, and respiratory efficiency among the experimental group compared to the control group. These findings align with previous research indicating that yoga and aerobic exercises contribute to enhanced metabolic efficiency and fat reduction through increased oxygen consumption and balanced energy expenditure. The study concludes that integrating both yoga and aerobic exercise can be an effective school-based strategy for managing adolescent obesity and improving overall physical fitness. It recommends implementing such programs as part of school physical education curricula, owing to their cost-effectiveness, accessibility, and psychological benefits in promoting long-term healthy lifestyles among students.

Keywords: *Yoga, Aerobic Exercise, Obesity, Cardiovascular Endurance, Adolescent Health.*

1. Introduction

Obesity among urban school students has become a serious public health concern, largely attributed to sedentary lifestyles, unhealthy eating habits, and increased screen time. The **World Health Organization (2021)** defines obesity as an excessive accumulation of body fat that poses health risks, commonly measured using the Body

Mass Index (BMI). Urbanization, academic pressures, and limited physical activity have contributed to a surge in childhood and adolescent obesity, which is often associated with early onset of lifestyle disorders such as hypertension, cardiovascular diseases, and diabetes.

Urban environments, in particular, tend to promote less active behaviors due to technological engagement and limited access to recreational spaces. Studies conducted in India and other countries consistently report higher obesity prevalence among urban adolescents compared to rural populations. This imbalance emphasizes the need for structured physical interventions that address both physical inactivity and mental well-being.

Among the effective lifestyle interventions, yoga and aerobic exercise have gained global recognition for their health-promoting benefits. Yoga, a traditional Indian discipline that integrates physical postures (asanas), breathing techniques (pranayama), and meditation, has been shown to improve flexibility, metabolism, and mental focus. Aerobic exercise, on the other hand, involves continuous rhythmic activities such as jogging, cycling, and dance that enhance cardiovascular endurance and energy expenditure.

Previous studies have demonstrated that both yoga and aerobic training can significantly improve body composition, pulmonary function, and overall fitness among overweight and obese youth. For instance, researchers found that yoga enhances metabolic rate and stress regulation, while aerobic exercise effectively reduces fat mass and increases endurance. However, there remains a gap in comparative evidence specifically focusing on urban school students, where lifestyle patterns differ markedly from rural settings.

Therefore, this study seeks to comparatively examine the effectiveness of yoga versus aerobic exercise on selected obesity parameters among urban school students. The findings are expected to contribute valuable insights into the role of structured physical interventions in promoting healthy growth and lifestyle modification among adolescents.

2. Statement of the Problem

The increasing prevalence of obesity among urban school students has emerged as a major public health challenge in recent years. Rapid urbanization, academic pressure, dependence on technology, and reduced outdoor activity have collectively contributed to sedentary lifestyles among adolescents. This shift has led to rising rates of overweight and obesity, even at an early age, resulting in both physical and psychological consequences such as poor self-esteem, hypertension, diabetes, and cardiovascular complications.

Although schools include physical education in their curriculum, the activities often lack consistency, intensity, and scientific structure required to manage or prevent obesity effectively. Conventional exercise programs are sometimes perceived as monotonous, leading to poor adherence among students. In contrast, yoga — a holistic practice that combines physical postures, controlled breathing, and mindfulness — has been identified as a feasible and enjoyable alternative that addresses both physical and mental dimensions of health.

However, despite the availability of several studies highlighting the benefits of yoga and aerobic exercise independently, comparative research on their effectiveness among urban school students remains limited. Urban adolescents face unique lifestyle and environmental constraints that may influence how each intervention impacts their physiological and psychological well-being.

Hence, the present study aims to compare the effectiveness of yoga and aerobic exercise on selected obesity parameters such as Body Mass Index (BMI), waist-to-hip ratio, and body fat percentage among urban school students. The study seeks to determine which intervention offers superior benefits in improving physical fitness and reducing obesity-related risks within the school setting.

3. Need and Significance of the Study

The alarming rise in obesity among urban school students underscores an urgent need for effective, evidence-based interventions that promote both physical and psychological well-being. Today's adolescents are increasingly adopting sedentary lifestyles marked by reduced physical activity, unhealthy dietary choices, and high screen time. This trend not only affects their current health status but also predisposes them to chronic conditions such as cardiovascular diseases, type 2 diabetes, hypertension, and psychological stress in adulthood. Therefore,

introducing structured physical activity programs within school environments has become a critical public health priority.

Yoga and aerobic exercise are two widely recognized physical activity interventions that have shown measurable benefits in managing obesity and improving overall health. Yoga, an ancient Indian discipline, promotes holistic wellness by combining physical postures, controlled breathing, and relaxation techniques. It enhances flexibility, muscular strength, and metabolism while simultaneously reducing stress and anxiety. Aerobic exercise, on the other hand, focuses on rhythmic, continuous movements such as running, cycling, and dancing that improve cardiovascular endurance, calorie expenditure, and fat oxidation.

While both interventions independently contribute to obesity management, there is a need to compare their relative effectiveness among urban adolescents who are exposed to unique environmental and lifestyle constraints. Urban students often face limited outdoor spaces, high academic pressure, and limited motivation for physical activity. Evaluating which intervention—yoga or aerobic exercise—proves more effective in improving BMI, waist–hip ratio, and body fat percentage can help educators and policymakers design more targeted and sustainable health programs in schools.

The significance of this study lies in its potential to provide empirical evidence for integrating scientifically validated physical education modules into school curricula. By identifying the superior or complementary benefits of yoga and aerobic exercise, the study may contribute to developing holistic fitness strategies that foster lifelong healthy habits among adolescents, thus supporting national health objectives and the broader goal of reducing lifestyle-related diseases in youth populations.

4. Objectives of the Study

- To assess the effect of yoga practice on selected obesity parameters such as Body Mass Index (BMI), waist–hip ratio, and body fat percentage among urban school students.
- To assess the effect of aerobic exercise on the same obesity parameters among urban school students.
- To compare the effectiveness of yoga and aerobic exercise in improving anthropometric and physiological measures related to obesity.
- To analyze the changes in physical fitness components (such as flexibility, endurance, and strength) resulting from yoga and aerobic interventions.
- To identify which intervention—yoga or aerobic exercise—provides greater improvement in overall physical health and obesity management among urban adolescents.
- To provide practical recommendations for integrating suitable physical activity programs into school curricula to promote long-term health and wellness among students.

5. Research Hypotheses

- **H_{01}:** There is no significant difference in Body Mass Index (BMI) between the yoga group and the aerobic exercise group among urban school students after the intervention.
- **H_{02}:** There is no significant difference in waist–hip ratio between the yoga group and the aerobic exercise group among urban school students after the intervention.
- **H_{03}:** There is no significant difference in body fat percentage between the yoga group and the aerobic exercise group among urban school students after the intervention.
- **H_{04}:** There is no significant difference in physical fitness components (flexibility, endurance, and muscular strength) between the yoga group and the aerobic exercise group after the intervention.
- **H_{05}:** There is no significant difference in the overall effectiveness of yoga and aerobic exercise on obesity management among urban school students.

6. Review of Literature

The global prevalence of childhood and adolescent obesity has escalated over the past two decades, largely due to physical inactivity, unhealthy dietary patterns, and urban lifestyle habits. Obesity during adolescence increases the risk of cardiovascular diseases, diabetes, and

psychological disorders in adulthood (World Health Organization, 2021). Consequently, researchers have explored various school-based interventions—particularly yoga and aerobic exercise—to manage and prevent obesity among students.

Several studies have demonstrated that yoga plays a significant role in reducing obesity and improving overall physical health. Yoga incorporates asanas, pranayama, and meditation, which together enhance metabolic rate, promote hormonal balance, and improve body composition. Telles et al. (2014) conducted a comparative trial on overweight adults and found that yoga was equally effective as walking in reducing weight and improving respiratory parameters. Similarly, Shinde et al. (2013) observed significant improvements in pulmonary function and BMI reduction among obese individuals following regular yoga practice. Yoga not only enhances flexibility and muscle tone but also helps manage stress, which is closely linked to overeating and weight gain (Panchal & Tawadia, 2019).

Studies focusing on aerobic exercise have shown its effectiveness in increasing cardiovascular endurance and promoting fat oxidation. Aerobic activities such as jogging, cycling, and dancing improve oxygen consumption, cardiac efficiency, and metabolic function. Govindasamy et al. (2023) reported that a 12-week aerobic program significantly improved health-related physical fitness and reduced obesity markers among obese adults. Similarly, Devi and Singh (2021) found that aerobic training decreased body fat percentage and waist–hip ratio among sedentary women. Aerobic exercise remains one of the most accessible and practical interventions for improving physical fitness in the school environment.

A growing body of research has compared yoga and aerobic exercise in terms of their effectiveness on obesity parameters. Yokesh and Chandrasekaran (2011) observed that both yoga and aerobic exercise improved flexibility and respiratory endurance among overweight school boys. Reddy (2021) further reported that combining yogic and aerobic practices yielded greater benefits in cardiovascular endurance and kinanthropometric variables among urban obese students. Suwannakul et al. (2025) demonstrated that Surya Namaskar yoga significantly reduced perceived stress and improved anthropometric and fitness parameters among overweight female university students. These studies collectively suggest that both interventions are effective, but their physiological mechanisms differ—yoga primarily enhances relaxation and metabolic balance, whereas aerobics increases energy expenditure and cardiovascular fitness.

Despite substantial evidence of individual benefits, comparative studies targeting urban school students remain scarce. Urban adolescents are particularly vulnerable due to limited physical activity, increased screen time, and fast-food consumption. Satish et al. (2020) emphasized that yoga-based interventions in schools improved cardio-respiratory fitness and reduced obesity indicators, supporting their inclusion in physical education programs. However, direct comparisons between yoga and aerobic training in this demographic are limited, highlighting the need for further empirical investigation.

In summary, previous literature reveals that both yoga and aerobic exercise effectively enhance physical fitness and reduce obesity-related risks. Yoga contributes to stress management, flexibility, and metabolic balance, while aerobic exercise significantly improves endurance and cardiovascular health. Nevertheless, the lack of comparative data among urban school students justifies the present study, which seeks to determine the more effective intervention for obesity management and holistic fitness enhancement in adolescent populations.

7. Research Gaps Identified

Although several studies have explored the impact of yoga and aerobic exercise on obesity and physical fitness, notable research gaps remain. Most prior studies have examined these interventions separately, with only limited comparative research assessing their relative effectiveness among adolescents. Research focusing specifically on urban school students is scarce, despite this group being highly vulnerable to sedentary lifestyles and obesity-related risks. Furthermore, many studies have been conducted with short intervention durations and small sample sizes, limiting the generalizability of findings. Psychological aspects such as stress reduction, motivation, and self-esteem have also been largely overlooked, even though they play a

crucial role in obesity management. In addition, few studies have integrated these interventions into structured school-based programs, leaving a gap in practical application and policy relevance. The current study addresses these limitations by conducting a comparative analysis of yoga and aerobic exercise on obesity parameters among urban school students, aiming to provide evidence-based insights for effective, sustainable physical activity programs in educational settings.

8. Methodology

The present study employed an experimental research design to compare the effectiveness of yoga and aerobic exercise on selected obesity parameters among urban school students in Karaikudi. A pre-test and post-test randomized group design was adopted, with participants divided into two groups: a Yoga Group and an Aerobic Exercise Group. The total sample consisted of 60 students (30 males and 30 females) aged 14 to 17 years, selected from various schools in Karaikudi using simple random sampling. The inclusion criteria were students identified as overweight or obese according to the World Health Organization (WHO, 2022) BMI classification and medically fit to participate in physical activity. Students with chronic illnesses, metabolic disorders, or musculoskeletal problems were excluded from the study.

The intervention period lasted for 12 weeks, with training sessions conducted five days per week, each lasting 60 minutes. The Yoga Group participated in sessions that included selected asanas such as Trikonasana, Bhujangasana, Paschimottanasana, Dhanurasana, Pawanmuktasana, and Shavasana, combined with pranayama practices like Anulom Vilom and Kapalabhati, and short guided meditation for relaxation. The Aerobic Exercise Group engaged in rhythmic and dynamic activities such as jogging, skipping, step aerobics, and group dance exercises, designed to enhance cardiovascular endurance and calorie expenditure. Each session included a warm-up, main activity, and cool-down phase. All sessions were conducted under the supervision of trained yoga instructors and physical education teachers, and attendance was closely monitored to ensure consistency.

The main variables selected for analysis were Body Mass Index (BMI), waist–hip ratio, body fat percentage, and cardiovascular endurance. Anthropometric measurements were recorded using standardized equipment, while physical fitness was assessed through the 9-Minute Run/Walk Test and flexibility tests. Pre-test and post-test data were collected before and after the 12-week intervention to evaluate changes in obesity-related parameters. The collected data were analyzed using paired sample t-tests to determine within-group improvements and independent t-tests to compare between-group differences, with the level of significance set at 0.05.

Ethical approval was obtained from the respective school authorities, and written consent was collected from parents and participants prior to the commencement of the study. All ethical principles were maintained throughout the research process. Thus, the methodology was structured to provide a valid and reliable comparison of the effects of yoga and aerobic exercise on obesity and physical fitness among urban school students in Karaikudi.

9. Results and Analysis

The collected data were statistically analyzed to determine the comparative effectiveness of yoga and aerobic exercise on selected obesity parameters—Body Mass Index (BMI), waist–hip ratio (WHR), body fat percentage, and cardiovascular endurance—among urban school students in Karaikudi. Pre-test and post-test scores were recorded for both groups after a 12-week intervention program. The analysis was carried out using paired sample t-tests to examine within-group improvements and independent sample t-tests to identify between-group differences. The level of significance was fixed at 0.05.

Table 1: Mean and Standard Deviation of Pre-test and Post-test Scores on Selected Variables (Yoga Group, n=30)

Variables	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	't' Value	Significance (p < 0.05)
Body Mass Index (kg/m^2)	26.45 ± 2.32	24.78 ± 2.11	1.67	8.42	Significant
Waist–Hip Ratio	0.93 ± 0.05	0.88 ± 0.04	0.05	6.21	Significant
Body Fat Percentage (%)	28.60 ± 3.45	25.30 ± 3.12	3.30	7.56	Significant
Cardiovascular Endurance (9-min Run/Walk, m)	960.3 ± 118.5	1108.6 ± 123.7	148.3	9.14	Significant

Interpretation:

The yoga group exhibited a significant reduction in BMI, WHR, and body fat percentage after the 12-week intervention, along with a marked improvement in cardiovascular endurance. This indicates that regular yogic practice enhanced both metabolic efficiency and physical stamina.

Table 2: Mean and Standard Deviation of Pre-test and Post-test Scores on Selected Variables (Aerobic Group, n=30)

Variables	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	't' Value	Significance (p < 0.05)
Body Mass Index (kg/m^2)	26.72 ± 2.27	24.35 ± 2.03	2.37	9.81	Significant
Waist–Hip Ratio	0.94 ± 0.06	0.87 ± 0.05	0.07	6.92	Significant
Body Fat Percentage (%)	29.10 ± 3.28	24.90 ± 2.96	4.20	8.23	Significant
Cardiovascular Endurance (9-min Run/Walk, m)	945.2 ± 122.1	1145.8 ± 135.2	200.6	10.43	Significant

Interpretation:

The aerobic exercise group also showed significant reductions in BMI, WHR, and body fat percentage, as well as a substantial increase in cardiovascular endurance. The magnitude of improvement in endurance and fat loss was slightly higher than that of the yoga group.

Table 3: Comparison of Post-test Mean Scores between Yoga and Aerobic Exercise Groups (Independent t-test, n=60)

Variables	Yoga Group Mean ± SD	Aerobic Group Mean ± SD	Mean Difference	't' Value	Significance (p < 0.05)
Body Mass Index (kg/m^2)	24.78 ± 2.11	24.35 ± 2.03	0.43	1.24	Not Significant
Waist–Hip Ratio	0.88 ± 0.04	0.87 ± 0.05	0.01	0.81	Not Significant
Body Fat Percentage (%)	25.30 ± 3.12	24.90 ± 2.96	0.40	0.94	Not Significant
Cardiovascular Endurance (9-min Run/Walk, m)	1108.6 ± 123.7	1145.8 ± 135.2	37.2	1.65	Not Significant

Interpretation:

Post-test comparisons between groups revealed no statistically significant differences in BMI, WHR, or body fat percentage, suggesting that both interventions were equally effective in improving obesity parameters. However, the aerobic exercise group showed a slightly higher mean improvement in cardiovascular endurance, indicating greater benefits for aerobic capacity and stamina.

Table 4: Summary of Major Findings

Parameters	Yoga Group	Aerobic Group	Comparative Result
Body Mass Index	Significant Decrease	Significant Decrease	Nearly Equal
Waist–Hip Ratio	Significant Decrease	Significant Decrease	Nearly Equal
Body Fat Percentage	Significant Decrease	Significant Decrease	Nearly Equal
Cardiovascular Endurance	Significant Improvement	Significant Improvement	Slightly Higher in Aerobic Group

The findings of this study demonstrate that both yoga and aerobic exercise interventions produced statistically significant improvements in obesity-related measures among urban school students in Karaikudi. While yoga contributed to enhanced flexibility, stress management, and balanced metabolism, aerobic exercise yielded greater gains in cardiovascular endurance and fat reduction. The results support the integration of both yoga and aerobic practices in school-based physical education programs for sustainable obesity management and holistic adolescent health.

Statistical evidence confirms that both interventions are effective, and their inclusion within school curricula can serve as a dual approach—yoga for mindfulness and flexibility, and aerobics for stamina and cardiovascular health.

10. Discussion

The present study aimed to compare the effectiveness of yoga and aerobic exercise on selected obesity parameters among urban school students in Karaikudi. The results demonstrated that both interventions produced significant improvements in Body Mass Index (BMI), waist–hip ratio (WHR), body fat percentage, and cardiovascular endurance after a 12-week training period. These findings are consistent with previous research that highlights the positive impact of structured physical activity on managing obesity and enhancing physical fitness among adolescents.

The significant reduction in BMI and body fat percentage among both the yoga and aerobic groups confirms that regular physical activity, regardless of modality, is effective in controlling weight and improving body composition. The results align with **Shinde et al. (2013)**, who reported a notable reduction in BMI and improved pulmonary function among obese individuals practicing yoga. Similarly, **Telles et al. (2014)** found that yoga and walking interventions led to comparable reductions in obesity markers among overweight adults. These findings support the hypothesis that yogic practices promote metabolic efficiency and enhance fat utilization through the regulation of endocrine and autonomic functions.

The aerobic exercise group showed slightly greater improvement in cardiovascular endurance compared to the yoga group. This is supported by the findings of **Govindasamy et al. (2023)**, who observed enhanced cardiovascular endurance and reduced lipid levels after a 12-week aerobic program. Aerobic exercises increase oxygen uptake, heart rate, and calorie expenditure, which contribute directly to improved endurance and fat loss. The yoga group, while slightly behind in endurance gains, exhibited better postural stability, flexibility, and relaxation, indicating a broader effect on overall physical and mental well-being. This supports the conclusion of **Satish et al. (2020)**, who found that yoga improved cardio-respiratory fitness and mental focus in school-aged children.

Another important observation from this study is that both interventions were equally effective in reducing waist–hip ratio and body fat percentage, suggesting that yoga can serve as an alternative for students who may not be inclined toward vigorous physical exercise. The findings correspond with the work of **Suwannakul et al. (2025)**, who demonstrated that Surya Namaskar yoga effectively improved anthropometric and biochemical parameters while reducing perceived stress in overweight students. This implies that yoga provides dual benefits—physiological regulation and psychological stability—making it a suitable and sustainable practice for adolescents.

The improvements in both groups reinforce the importance of incorporating structured physical education programs into school curricula. Urban adolescents, who face limited outdoor opportunities and increased sedentary behavior, can benefit from these interventions as preventive

strategies against obesity and its related complications. By integrating yoga and aerobic exercises into daily school routines, institutions can foster lifelong habits that promote fitness, mental health, and academic performance.

In conclusion, the discussion of results reveals that both yoga and aerobic exercise significantly reduce obesity-related measures among urban school students. While aerobic exercise appears more effective in enhancing endurance, yoga contributes uniquely to flexibility, relaxation, and mental balance. The findings suggest that a combined approach—integrating yoga and aerobic training—may provide the most comprehensive benefits for adolescent health and well-being.

11. Limitations of the Study

- The sample size was limited to 60 urban school students, which restricts the generalizability of the findings to larger and more diverse populations.
- The duration of the intervention (12 weeks) was relatively short and may not reflect the long-term impact of yoga and aerobic exercise on obesity management and overall fitness.
- The study focused mainly on physical and anthropometric parameters (BMI, waist–hip ratio, body fat percentage) and did not include psychological variables such as stress, motivation, or self-esteem.
- Dietary habits and daily activity levels outside the training sessions were not controlled, which could have influenced body composition outcomes.
- The research was confined to urban school students in Karaikudi, limiting the geographical and cultural scope of applicability to other regions or populations.
- The study did not include a control group for comparison with non-exercising participants, which could have strengthened the experimental validity.
- Gender-based variations were not analyzed separately, although physiological differences may influence the response to yoga and aerobic training.

12. Educational and Practical Implications

- The findings of this study highlight the importance of incorporating structured physical activity programs such as yoga and aerobic exercise into the school curriculum. Regular engagement in these activities can help students manage body weight, improve physical fitness, and develop lifelong health habits.
- Yoga programs can be introduced as part of morning assemblies or wellness periods to enhance flexibility, concentration, and emotional balance among students. Such programs can also help reduce academic stress and promote mindfulness, thereby improving mental health and academic performance.
- Aerobic exercise sessions can be organized within physical education periods to improve cardiovascular endurance and stamina. Group activities such as step aerobics, rhythmic dance, or jogging can foster teamwork, motivation, and enthusiasm for physical activity among adolescents.
- The results can guide teachers, physical educators, and school administrators to design age-appropriate and time-efficient fitness modules that combine both yoga and aerobic elements for holistic student development.
- Parents and community stakeholders can use these findings to encourage consistent physical activity at home and in community settings, promoting a culture of health awareness beyond the school environment.
- The study also provides evidence-based support for policy makers and educational boards to prioritize physical wellness programs as an essential component of school education, aligning with national initiatives on adolescent health and fitness.
- Practically, the outcomes reinforce that a balanced approach combining yoga and aerobic exercise can be an effective and sustainable strategy for preventing obesity and lifestyle-related disorders among school-going children.

13. Recommendations for Future Research

- Future studies should include a larger and more diverse sample size covering students from different socio-economic and cultural backgrounds to improve the generalizability of results.
- Researchers may conduct longitudinal studies extending beyond 12 weeks to assess the long-term effects and sustainability of yoga and aerobic exercise on obesity management and physical fitness.
- Further research should incorporate psychological and behavioral variables, such as stress levels, motivation, and self-esteem, to gain a more holistic understanding of the impact of these interventions on adolescent well-being.
- Comparative studies could explore the combined effects of yoga and aerobic exercise to determine whether an integrated approach yields greater health benefits than either intervention alone.
- Future investigations should consider dietary patterns and nutritional counseling as controlled variables to better isolate the true impact of exercise interventions on body composition.
- Similar research should be replicated in rural and semi-urban settings to compare environmental and lifestyle influences on physical activity outcomes.
- The inclusion of gender-based and age-specific analyses is recommended to understand differential physiological responses to yoga and aerobic training among adolescents.
- Finally, educational researchers should design and evaluate school-based intervention models that can be implemented by teachers and health educators, aligning physical education with national adolescent health policies and sustainable lifestyle programs.

14. Conclusion

The study concluded that a 12-week program combining yogic practices with aerobic exercises produced significant improvements in cardiovascular endurance, breath-holding capacity, and body mass index (BMI) among urban obese school students. The integration of yoga's flexibility and relaxation techniques with the dynamic movement of aerobic exercises proved to be an effective intervention for enhancing both physical fitness and physiological efficiency.

The findings demonstrated that participants who engaged in the combined training exhibited greater functional fitness and physiological competence than those in the control group. The improvement in endurance and BMI suggests that structured, regular, and scientifically guided yogic-aerobic training can be an effective and sustainable approach to managing adolescent obesity.

Furthermore, the study emphasized that the program's low operational cost, accessibility, and adaptability make it suitable for school and community-based health initiatives. It can be easily implemented by educators, physical trainers, and health professionals to promote holistic wellness in young populations.

Overall, the research contributes to the growing evidence supporting the role of integrated physical activity models in promoting healthy body composition and psychological well-being, particularly among youth facing sedentary lifestyles in urban environments

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