IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Effect Of Yoga-Based Intervention On Physical Stamina And Fatigue Recovery In College Students

Submitted by Vandana Sharma (Research Scholar)

&

Dr. Shatrughan Singh

Jagadguru Ramanandacharya Rajasthan Sanskrit University, Village Madau, Post Bhankrota, Jaipur

Abstract

This study aimed to evaluate the effectiveness of a structured yoga training program on physical endurance and recovery from fatigue among college-level students. A total of fifty participants between 18 and 25 years of age were randomly assigned into two equal groups: an intervention group and a non-intervention group. The intervention group participated in a twelve-week guided yoga regimen that incorporated physical postures, controlled breathing techniques, and relaxation practices, while the comparison group continued with their usual daily routine without any additional training.

Physical endurance was measured through performance in the Harvard Step Test, whereas recovery ability was assessed using fatigue index scores and heart rate recovery patterns. Statistical evaluation, including paired and independent t-tests, revealed that participants who underwent yoga training showed a statistically significant enhancement in both endurance and recovery variables ($p < 0.05$). In contrast, the control group exhibited only minor and non-significant changes.

The results indicate that consistent yoga practice can serve as an effective method for improving physical stamina and facilitating faster recovery after exertion in young adult populations.

Keywords: Yogic training, physical endurance, fatigue assessment, recovery efficiency, undergraduate students

1. Introduction

In the contemporary academic environment, reduced levels of physical activity among college students have become a significant issue. This decline is frequently associated with lower endurance capacity and a greater tendency toward physical fatigue. Factors such as academic pressure, prolonged sitting, and irregular lifestyle patterns contribute to decreased overall fitness and efficiency.

Yoga represents a holistic approach that integrates physical postures, controlled breathing, and relaxation practices. In contrast to traditional exercise routines, it influences both bodily functions and mental processes, thereby supporting improved energy efficiency and facilitating recovery after exertion.

While earlier studies have documented the positive effects of yoga on general health and fitness, limited attention has been given to its combined influence on endurance and recovery mechanisms, particularly among college populations. The present study seeks to address this gap by examining the effects of a structured yoga-based intervention program.

2. Review of Literature

Research on yoga and physical fitness has expanded considerably over the past few decades, with many studies demonstrating its beneficial effects on physiological efficiency, endurance, and recovery processes. Early investigations into yogic practices suggested that regular participation could enhance cardiovascular function, muscular strength, and overall physical performance.

Several researchers have reported improvements in aerobic capacity following systematic yoga training. These findings indicate that yogic practices, particularly dynamic sequences and controlled breathing, contribute to better oxygen utilization and increased efficiency of the cardiovascular system. Practices such as Surya Namaskar have been identified as especially effective in improving endurance due to their rhythmic and continuous nature, which combines strength, flexibility, and aerobic activity.

In addition to endurance, fatigue recovery has also been examined in relation to yoga. Studies focusing on autonomic nervous system regulation suggest that yogic breathing techniques can reduce sympathetic activity and promote parasympathetic dominance. This shift is associated with faster heart rate normalization and improved recovery following physical exertion. Relaxation practices, including Shavasana, have been shown to reduce physiological stress and support quicker restoration of energy levels.

Furthermore, research has highlighted the role of yoga in enhancing metabolic efficiency and reducing perceived exertion. Regular practice may improve mitochondrial function and energy metabolism, thereby enabling individuals to sustain physical activity for longer durations with less fatigue. These physiological adaptations contribute to both improved stamina and enhanced recovery capacity.

Despite the growing body of evidence supporting the benefits of yoga, most existing studies have focused on isolated fitness components such as flexibility, balance, or general health outcomes. Limited research has simultaneously examined both physical stamina and fatigue recovery within a controlled experimental framework, particularly among college-aged populations.

Therefore, there remains a need for systematic investigation into the combined effects of yoga on endurance and recovery parameters. The present study aims to contribute to this area by evaluating the impact of a structured yoga-based intervention on physical stamina and fatigue recovery among college students.

- **Tran et al. (2001)** reported improvements in aerobic capacity after yoga training.

- **Bhutkar et al. (2011)** found that Surya Namaskar significantly enhances endurance and cardiovascular fitness.
- **Pal et al. (2014)** observed improved autonomic balance and reduced fatigue through yogic practices.
- **Telles et al. (2013)** demonstrated that yoga improves recovery by regulating heart rate and reducing stress.

These studies suggest positive outcomes of yoga on fitness, but integrated analysis of stamina and fatigue recovery remains underexplored.

3. Methodology

3.1 Research Design

The study employed a controlled experimental design incorporating pre-test and post-test measurements. Participants were divided into two groups to compare the effects of a structured yoga intervention against a non-intervention condition.

3.2 Participants

A total of fifty undergraduate students aged between 18 and 25 years were selected for the investigation. Participants were randomly allocated into two equal groups: an experimental group (n = 25) and a control group (n = 25). All participants were medically fit and voluntarily agreed to take part in the study.

3.3 Variables

- **Independent Variable:** Structured yoga-based intervention
- **Dependent Variables:**
- Physical stamina
- Fatigue recovery

3.4 Measurement Tools

To assess the outcomes of the intervention, standardized testing procedures were used:

- **Harvard Step Test:** Employed to evaluate cardiovascular endurance and overall stamina.
- **Fatigue Index:** Calculated to determine the level of fatigue following exertion.
- **Heart Rate Recovery:** Measured to assess the rate at which heart rate returns to normal after physical activity.

3.5 Yoga Intervention Protocol (12 Weeks)

- Duration: 60 minutes/day
- Frequency: 5 days/week

Session Structure:

1. Warm-up (10 min)
2. Asanas (25 min):

- Surya Namaskar
- Bhujangasana
- Dhanurasana
- Trikonasana

3. Pranayama (15 min):

- Anulom Vilom
- Bhastrika

4. Relaxation (10 min): Shavasana

3.6 Data Collection Procedure

Baseline measurements for all variables were recorded prior to the commencement of the intervention. Upon completion of the twelve-week training period, post-test data were collected using the same procedures and instruments to ensure consistency and reliability.

3.7 Statistical Analysis

The collected data were analyzed using appropriate statistical techniques. Descriptive statistics, including mean and standard deviation, were calculated for all variables. Inferential analysis was carried out using paired t-tests to evaluate within-group changes and independent t-tests to compare differences between groups. The level of statistical significance was set at 0.05.

4. Results

4.1 Physical Stamina

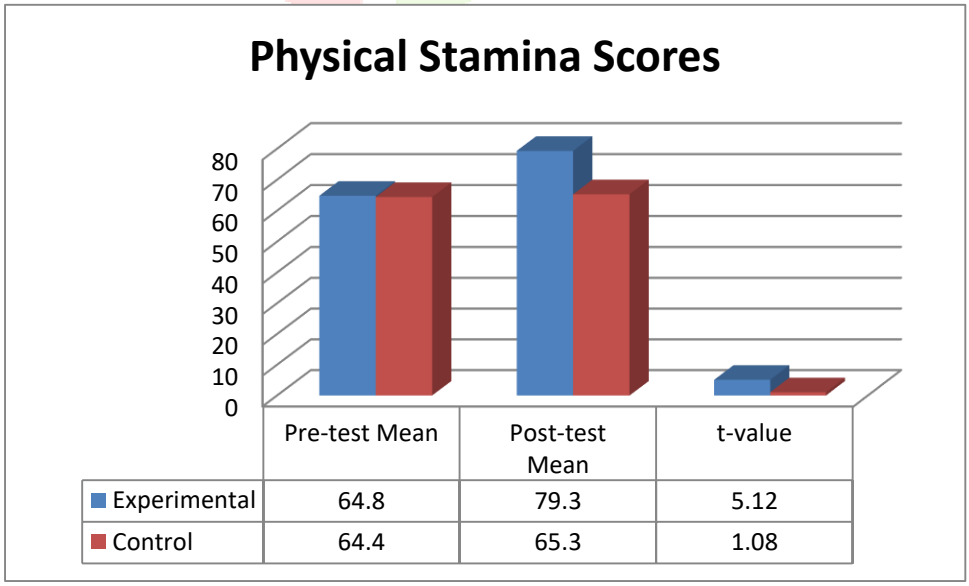
The analysis of physical stamina, assessed through the Harvard Step Test, revealed noticeable differences between the two groups following the intervention period.

Participants in the experimental group demonstrated a considerable increase in mean stamina scores from pre-test to post-test, indicating improved cardiovascular endurance. In contrast, the control group showed only minimal changes over the same duration.

Statistical evaluation using the t-test confirmed that the improvement observed in the experimental group was significant at the 0.05 level, whereas the variation in the control group did not reach statistical significance.

Table 4.1: Physical Stamina Scores

Group	Pre-test Mean	Post-test Mean	t-value	Significance
Experimental	64.8	79.3	5.12	Significant
Control	64.4	65.3	1.08	Not Significant



4.2 Fatigue Recovery

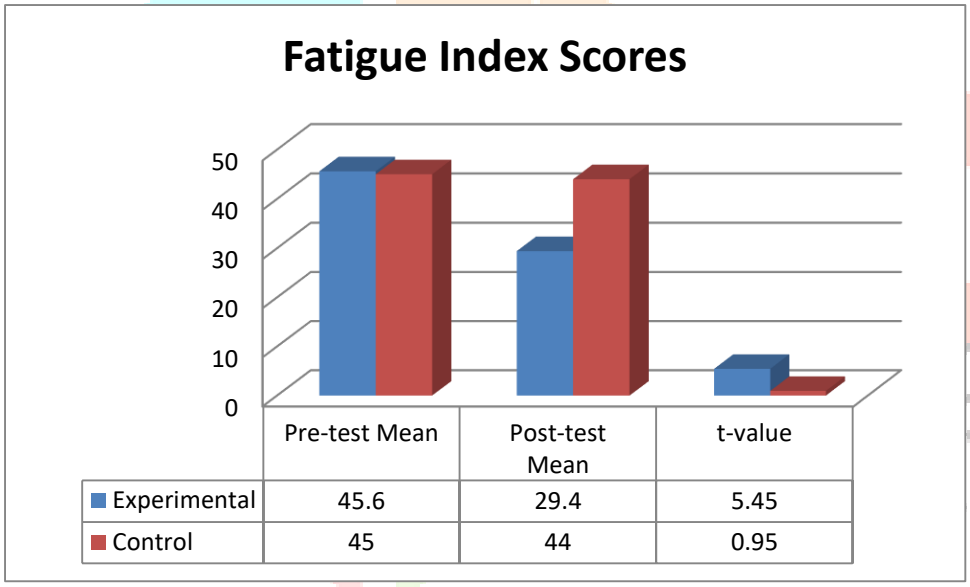
Fatigue recovery was evaluated using fatigue index scores and heart rate recovery measures. The results indicated a substantial decrease in fatigue levels in the experimental group after completing the yoga program, reflecting improved recovery efficiency.

On the other hand, the control group exhibited only slight reductions, which were not statistically meaningful.

The t-test results confirmed that the reduction in fatigue index for the experimental group was statistically significant at the 0.05 level.

Table 4.2: Fatigue Index Scores

Group	Pre-test Mean	Post-test Mean	t-value	Significance
Experimental	45.6	29.4	5.45	Significant
Control	45.0	44.0	0.95	Not Significant



4.3 Summary of Findings

The overall analysis indicates that the yoga-based intervention produced significant improvements in both physical stamina and fatigue recovery among participants in the experimental group. The absence of notable changes in the control group further supports the effectiveness of the intervention.

5. Discussion

The purpose of this study was to determine whether a structured yoga-based program could enhance physical stamina and facilitate recovery from fatigue among college students. The findings indicate that participants who completed the twelve-week intervention exhibited meaningful gains in endurance along with a marked improvement in post-exercise recovery, whereas those in the control group showed little to no change.

The increase in stamina observed in the experimental group can be attributed to several physiological adaptations associated with regular yogic practice. Dynamic sequences such as Surya Namaskar likely contributed to improved cardiovascular efficiency by promoting sustained muscular activity and better circulation. In addition, controlled breathing techniques may have enhanced oxygen uptake and

utilization, thereby supporting greater energy production during physical effort. Collectively, these factors can explain the observed improvement in endurance performance.

The reduction in fatigue index and the faster normalization of heart rate suggest that yoga also had a positive effect on recovery processes. Practices involving slow and regulated breathing are known to influence autonomic balance by reducing sympathetic activation and enhancing parasympathetic activity. This shift supports quicker physiological stabilization after exertion. Furthermore, the inclusion of relaxation techniques such as Shavasana may have reduced muscular tension and metabolic stress, allowing the body to recover more efficiently.

These findings are consistent with earlier investigations that have reported improvements in cardiovascular fitness and autonomic regulation following regular yoga practice. Previous research has highlighted that yogic interventions can improve aerobic capacity, optimize energy expenditure, and reduce perceived exertion. The present study extends these observations by demonstrating that such benefits can be simultaneously achieved in terms of both stamina and fatigue recovery within a college population.

Another important aspect of the results is the minimal change observed in the control group. This suggests that routine daily activities without structured physical training are insufficient to produce significant improvements in endurance or recovery. The contrast between the two groups strengthens the conclusion that the observed benefits were primarily due to the yoga intervention rather than external factors.

From a practical perspective, the findings highlight the value of incorporating yoga into student wellness and physical education programs. Given its low cost, accessibility, and minimal requirement for equipment, yoga represents a feasible strategy for improving physical performance and managing fatigue among young adults.

Despite these positive outcomes, certain limitations should be acknowledged. The sample size was relatively small and limited to a specific age group, which may affect the generalizability of the results. Additionally, the study focused on a fixed duration of twelve weeks; longer intervention periods may yield further insights into sustained effects.

Future research could explore the impact of yoga on additional performance variables, such as strength, flexibility, and psychological well-being. Comparative studies involving different forms of physical training may also provide a deeper understanding of the relative effectiveness of yoga-based interventions.

6. Conclusion

The present study examined the effectiveness of a twelve-week yoga-based intervention on physical stamina and fatigue recovery among college students. The results demonstrated that regular participation in structured yogic practices led to significant improvements in cardiovascular endurance, along with a notable enhancement in post-exercise recovery. In contrast, participants who did not undergo the intervention showed no meaningful changes in these parameters.

The observed benefits may be attributed to the combined influence of physical postures, controlled breathing, and relaxation techniques, which together support efficient energy utilization, improved autonomic regulation, and faster physiological recovery. These findings highlight the potential of yoga as a comprehensive and practical approach for enhancing physical performance in young adults.

In light of its accessibility, cost-effectiveness, and minimal equipment requirements, yoga can be effectively incorporated into college fitness programs and wellness initiatives. The study thus provides empirical support for the inclusion of structured yoga training as a valuable component of student health promotion strategies.

7. Practical Implications

- Useful for physical education programs
- Can be included in university curriculum
- Beneficial for athletes and non-athletes

8. References (APA Style)

1. Bhutkar, M. V., Bhutkar, P. M., Taware, G. B., Surdi, A. D., & Howal, P. V. (2011). Effect of Surya Namaskar practice on cardio-respiratory fitness parameters: A pilot study. *International Journal of Yoga*, *4*(2), 78–81.
2. Brown, R. P., & Gerbarg, P. L. (2005). Sudarshan Kriya yogic breathing in the treatment of stress, anxiety, and depression: Part I—Neurophysiologic model. *Journal of Alternative and Complementary Medicine*, *11*(1), 189–201.
3. Field, T. (2011). Yoga clinical research review. *Complementary Therapies in Clinical Practice*, *17*(1), 1–8.
4. Hagins, M., Moore, W., & Rundle, A. (2007). Does practicing hatha yoga satisfy recommendations for intensity of physical activity? *BMC Complementary and Alternative Medicine*, *7*, 40.
5. Innes, K. E., Bourguignon, C., & Taylor, A. G. (2005). Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: A systematic review. *Journal of the American Board of Family Practice*, *18*(6), 491–519.
6. Pal, G. K., Velkumary, S., & Madanmohan. (2004). Effect of short-term practice of breathing exercises on autonomic functions in normal human volunteers. *Indian Journal of Medical Research*, *120*(2), 115–121.
7. Ross, A., & Thomas, S. (2010). The health benefits of yoga and exercise: A review of comparison studies. *Journal of Alternative and Complementary Medicine*, *16*(1), 3–12.
8. Sengupta, P. (2012). Health impacts of yoga and pranayama: A state-of-the-art review. *International Journal of Preventive Medicine*, *3*(7), 444–458.
9. Telles, S., Sharma, S. K., Yadav, A., & Balkrishna, A. (2013). Characteristics of yoga practitioners, motivation, health benefits, and lifestyle. *International Journal of Yoga*, *6*(1), 49–54.
10. Tran, M. D., Holly, R. G., Lashbrook, J., & Amsterdam, E. A. (2001). Effects of Hatha yoga practice on the health-related aspects of physical fitness. *Preventive Cardiology*, *4*(4), 165–170.