



P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.38
IJPESH 2024; 11(2): 158-162
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www.kheljournal.com
Received: 02-01-2024
Accepted: 05-02-2024

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Exploring the impact of diverse aerobic and Indian aerobic exercise regimens on key physical and physiological parameters in adolescent boys

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Abstract

The intention of this study was to exploring the impact of diverse aerobic and Indian aerobic exercise regimens on key physical and physiological parameters in adolescent boys. Seventy Five individuals from Railway Higher Secondary School Palakkad aged between 12 to 14 years, were selected for the study. They were divided into three equal groups (n = 25): Group I underwent aerobic training, Group II practiced Indian aerobic training, and Group III served as the control group without any specific training. The training regimen lasted three days a week for six weeks. The selected physical parameters such as speed, muscular strength, flexibility, cardio respiratory endurance and physiological parameters such as resting pulse rate and breath holding time were tested before and after the training period.

Analysis of covariance (ANCOVA) was employed to determine any significant differences among the experimental groups and the control group regarding the selected variables. Additionally, the Scheffe's test was utilized as a post-hoc test due to the involvement of three groups in the study. The findings indicated that both aerobic training and Indian aerobic training positively influenced the criterion variables of speed, muscular strength, flexibility, cardio respiratory endurance, resting pulse rate and breath holding time among adolescent boys compared to the control group. However, no significant difference was observed between the training groups themselves.

Keywords: Aerobic training, Indian aerobic training, speed, muscular strength, flexibility, cardio respiratory endurance, resting pulse rate, breath holding time and adolescent boys

Introduction

Physical activity is fundamental for the holistic development of adolescents, particularly in shaping their physical and physiological well-being. Among the various forms of exercise, aerobic exercises hold significant importance due to their ability to enhance cardiovascular health, endurance, and overall fitness levels. In recent years, there has been a growing interest in exploring the effects of culturally specific aerobic exercise programs, such as Indian aerobic exercises, on the health outcomes of individuals.

This study aims to delve into the impact of both traditional aerobic exercise and Indian aerobic exercise regimens on selected physical and physiological variables among adolescent boys. Adolescence is a critical period marked by rapid physical growth, hormonal changes, and the establishment of lifestyle habits that can profoundly influence long-term health outcomes. Therefore, understanding the effects of different exercise modalities during this developmental stage is crucial for promoting optimal health and well-being.

While conventional aerobic exercises like jogging, cycling, and swimming have been extensively studied and proven beneficial for cardiovascular health and fitness, the efficacy of culturally specific exercise programs, such as those rooted in Indian traditions, remains relatively understudied. Indian aerobic exercises often incorporate elements of yoga, dance, and martial arts, offering a unique blend of physical activity with potential cultural relevance and acceptance.

By comparing the effects of varied aerobic and Indian aerobic exercise programs, this research aims to provide valuable insights into their differential impacts on physical fitness and other key physiological parameters in adolescent boys. Understanding how different exercise modalities influence these variables can inform the development of more tailored and

culturally relevant exercise interventions for promoting health and fitness among adolescents, particularly within diverse cultural contexts.

Moreover, elucidating the potential benefits of Indian Aerobics, also known as Lezium, encompasses a distinctive form of rhythmic movement-based exercise originating from India. Lezium aerobics integrates a fusion of rhythmic steps, coordinated arm movements, and controlled body motions, creating a dynamic and engaging workout experience.

Central to Lezium aerobics are its varied step sequences, which involve a combination of forward, backward, sideways, and diagonal movements. These steps are often choreographed to music or beats, enhancing the rhythmic aspect of the exercise routine. Additionally, Lezium incorporates arm movements that complement the footwork, adding an element of coordination and full-body engagement. These arm movements may include swinging, lifting, or twisting motions, further intensifying the workout and targeting upper body strength and flexibility.

Methods

This research exploring the impact of diverse aerobic and Indian aerobic exercise regimens on key physical and physiological parameters in adolescent boys. Seventy individuals from Railway Higher Secondary School Palakkad aged between 12 to 14 years. Seventy subjects were randomly allocated into three groups, each comprising twenty five participants. Group I (n = 25) engaged in aerobic training,

Group II (n = 25) practiced Indian aerobic training, and Group III (n = 25) served as the control group.

The training regimen spanned six weeks, with sessions conducted three days per week during evening hours (4.30 pm to 6 pm). The selected physical parameters such as speed was measured in seconds by 50 mts dash, muscular strength was measured in counts by modified sit ups, flexibility was measured in centimeters by sit and reach test, cardio respiratory endurance was measured in seconds by one mile run and walk and physiological parameters such as resting pulse rate was assessed in beats/minute by radial artery with the help of fingertip and breath holding time was assessed in seconds. Prior to commencing the experiment, all subjects in the aerobic and Indian aerobic training and control groups underwent a pre-test one day before training initiation. Data on selected physical and physiological parameters were collected during this pre-test.

After the six-week training period, a post-test was administered one day following the conclusion of the training to evaluate any alterations in the criterion variables. Analysis of covariance (ANCOVA) was employed to ascertain notable variances among the experimental and control groups regarding each criterion variable, with a confidence level of 0.05 deemed suitable. Due to the participation of three groups, the Scheffe's test was employed as a post-hoc examination.

Results

Table I: Analysis of covariance on selected physical parameters of aerobic and Indian aerobic training and control groups

| Variables Name | Mean | Aerobic Training Group (ATG) | Indian Aerobic Training Group (IATG) | Control Group (CG) | 'F' Ratio |
|------------------------------|-----------|------------------------------|--------------------------------------|--------------------|-----------|
| Speed | Pre-test | 9.51 | 9.79 | 10.10 | 2.96 |
| | Post-test | 8.96 | 9.46 | 9.78 | 6.49* |
| | Adj. Post | 9.19 | 9.46 | 9.53 | 4.61* |
| Muscular Strength | Pre-test | 15.45 | 13 | 10.95 | 2.78 |
| | Post-test | 34.15 | 28.45 | 23.20 | 7.14* |
| | Adj. Post | 32.36 | 28.55 | 24.88 | 8.55* |
| Flexibility | Pre-test | 24.84 | 22.20 | 18.55 | 2.58 |
| | Post-test | 29.12 | 27.85 | 20.70 | 10.09* |
| | Adj. Post | 27.45 | 27.66 | 22.55 | 6.41* |
| Cardio Respiratory Endurance | Pre-test | 4.97 | 5.22 | 6.27 | 1.19 |
| | Post-test | 4.49 | 4.73 | 6.26 | 39.73* |
| | Adj. Post | 4.92 | 4.85 | 5.60 | 13.05* |

*Significant at 0.05 level of confidence

Table 1 displays the results indicating that the pre-test mean 'F' ratio for speed in the aerobic and Indian aerobic training and control groups was 2.96, which was found to be insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental groups and the control group was 6.49 and 4.61, respectively, showing significance at the 0.05 level of confidence.

Similarly for muscular strength, the pre-test mean 'F' ratio for the aerobic and Indian aerobic training and control groups was 2.78, which was insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental groups and the control group was 7.14 and 8.55, respectively, showing significance at the 0.05 level of confidence.

For flexibility, the pre-test mean 'F' ratio for the aerobic and

Indian aerobic training and control groups was 2.58, which was insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental groups and the control group was 10.09 and 6.41, respectively, showing significance at the 0.05 level of confidence.

Finally, Cardio Respiratory Endurance, the pre-test mean 'F' ratio for the aerobic and Indian aerobic training and control groups was 1.19, which was insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental groups and the control group was 39.73 and 13.05, respectively, showing significance at the 0.05 level of confidence. To determine which paired means exhibited significant differences among the groups, the Scheffe's test was employed

Table 2: Scheffe’s Post Hoc Test for the Difference between the Adjusted Post-Test Mean of Speed, Muscular Strength, Flexibility, Cardio Respiratory Endurance

| Adjusted Post-test Mean Difference on Speed | | | | |
|--|--------------------------------------|--------------------|-----------------|------|
| Aerobic Training Group (ATG) | Indian Aerobic Training Group (IATG) | Control Group (CG) | Mean Difference | CI |
| 9.19 | | 9.53 | 0.34* | 0.06 |
| 9.19 | 9.46 | | 0.27* | |
| | 9.46 | 9.53 | 0.07* | |
| Adjusted Post-test Mean Difference on Muscular Strength | | | | |
| 32.36 | | 24.88 | 7.48* | 0.17 |
| 32.36 | 28.55 | | 3.81* | |
| | 28.55 | 24.88 | 3.67* | |
| Adjusted Post-test Mean Difference on Flexibility | | | | |
| 27.45 | | 22.55 | 4.90* | 0.15 |
| 27.45 | 27.66 | | 0.21* | |
| | 27.66 | 22.55 | 5.11* | |
| Adjusted Post-test Mean Difference on Cardio Respiratory Endurance | | | | |
| 4.92 | | 5.60 | 0.68* | 0.03 |
| 4.92 | 4.85 | | 0.07* | |
| | 4.85 | 5.60 | 0.75* | |

*Significant at 0.05 level of confidence

Table 2 indicates the results of the Scheffe’s Test for the difference between adjusted post-test mean values on speed. The comparison between the aerobic training group and control groups yielded a difference of (0.34), aerobic training group and Indian aerobic training group (0.27) and while the Indian aerobic training group versus the control group exhibited a difference of (0.07). These differences were found to be significant at the 0.05 level of confidence.

Moreover, significant differences were observed in muscular strength between the aerobic training group and control groups yielded a difference of (7.48), aerobic training group and Indian aerobic training group (3.81) and while the Indian aerobic training group versus the control group exhibited a difference of (3.61). Flexibility between the aerobic training group and control groups yielded a difference of (4.90),

aerobic training group and Indian aerobic training group (0.21) and while the Indian aerobic training group versus the control group exhibited a difference of (5.11).

Additionally, significant differences were found in cardio respiratory endurance between the aerobic training group and control groups yielded a difference of (0.68), aerobic training group and Indian aerobic training group (0.07) and while the Indian aerobic training group versus the control group exhibited a difference of (0.75), all significant at the 0.05 level of confidence following the respective training programs.

Furthermore, the study's results indicated no significant difference between the training groups on the selected criterion variables.

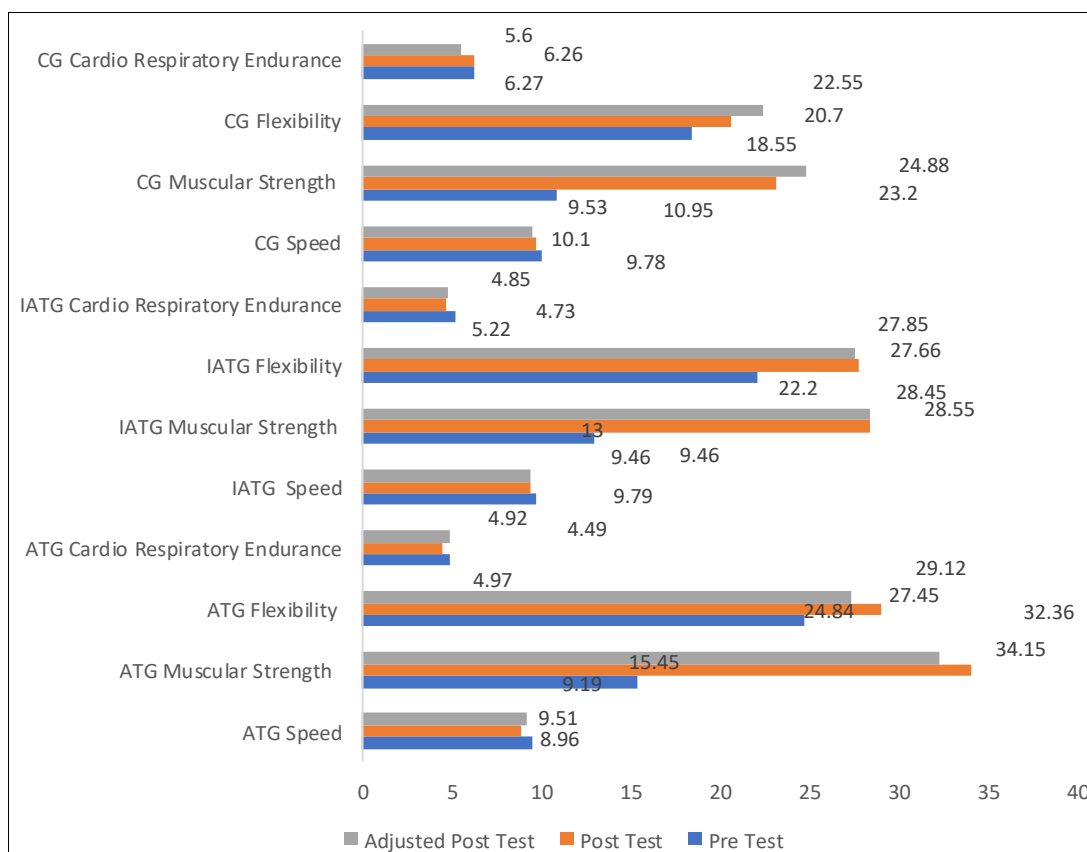


Fig 1: The study's results indicated no significant difference between the training groups on the selected criterion variables

Table 3: Analysis of Covariance on Selected Physiological Variables of Aerobic and Indian Aerobic Training and Control Groups

| Variable Name | Mean | Aerobic Training Group (ATG) | Indian Aerobic Training Group (IATG) | Control Group (CG) | 'F' Ratio |
|---------------------|-----------|------------------------------|--------------------------------------|--------------------|-----------|
| Resting Pulse Rate | Pre-test | 61.70 | 64.30 | 64.25 | 0.30 |
| | Post-test | 61.80 | 62.55 | 62.45 | 3.30* |
| | Adj. Post | 63.37 | 61.73 | 61.68 | 6.64* |
| Breath Holding Time | Pre-test | 18.15 | 17.68 | 16.90 | 0.21 |
| | Post-test | 23.51 | 22.45 | 17.20 | 3.51* |
| | Adj. Post | 23.01 | 22.36 | 17.78 | 4.32* |

*Significant at 0.05 level of confidence.

Table 3 displays the results indicating that the pre-test mean 'F' ratio for Resting Pulse Rate in the aerobic and Indian aerobic training and control groups was 0.30, which was found to be insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental groups and the control group was 3.30 and 6.64, respectively, showing significance at the 0.05 level of confidence.

Similarly for breath holding time, the pre-test mean 'F' ratio

for the aerobic and Indian aerobic training and control groups was 0.21, which was insignificant at the 0.05 level of confidence. However, the post-test and adjusted post-test mean 'F' ratio value for the experimental group and the control group was 3.51 and 4.32, respectively, showing significance at the 0.05 level of confidence. To determine which paired means exhibited significant differences among the groups, the Scheffe's test was employed.

Table 4: Scheffe's Post Hoc Test for the Difference between the Adjusted Post-Test Mean of Resting Pulse Rate and Breath Holding Time

| Adjusted Post-test Mean Difference on Resting Pulse Rate | | | | |
|---|--------------------------------------|--------------------|-----------------|------|
| Aerobic Training Group (ATG) | Indian Aerobic Training Group (IATG) | Control Group (CG) | Mean Difference | CI |
| 63.37 | | 61.68 | 1.69* | 0.03 |
| 63.37 | 61.73 | | 1.64* | |
| | 61.73 | 61.68 | 0.05* | |
| Adjusted Post-test Mean Difference on Breath Holding Time | | | | |
| 23.01 | | 17.78 | 5.23* | 0.19 |
| 23.01 | 22.36 | | 0.65* | |
| | 22.36 | 17.78 | 4.58* | |

*Significant at 0.05 level of confidence

Table 4 indicates the results of the Scheffe's Test for the difference between adjusted post-test mean values on resting pulse rate. The comparison between the aerobic training group and control groups yielded a difference of (1.69), aerobic training group and Indian aerobic training group (1.64) and while the Indian aerobic training group versus the control group exhibited a difference of (0.05). These differences were found to be significant at the 0.05 level of confidence.

Moreover, significant differences were observed in breath

holding time between the aerobic training group and control groups yielded a difference of (5.23), aerobic training group and Indian aerobic training group (0.65) and while the Indian aerobic training group versus the control group exhibited a difference of (4.58), all significant at the 0.05 level of confidence following the respective training programs. Furthermore, the study's results indicated no significant difference between the training groups on the selected criterion variables.

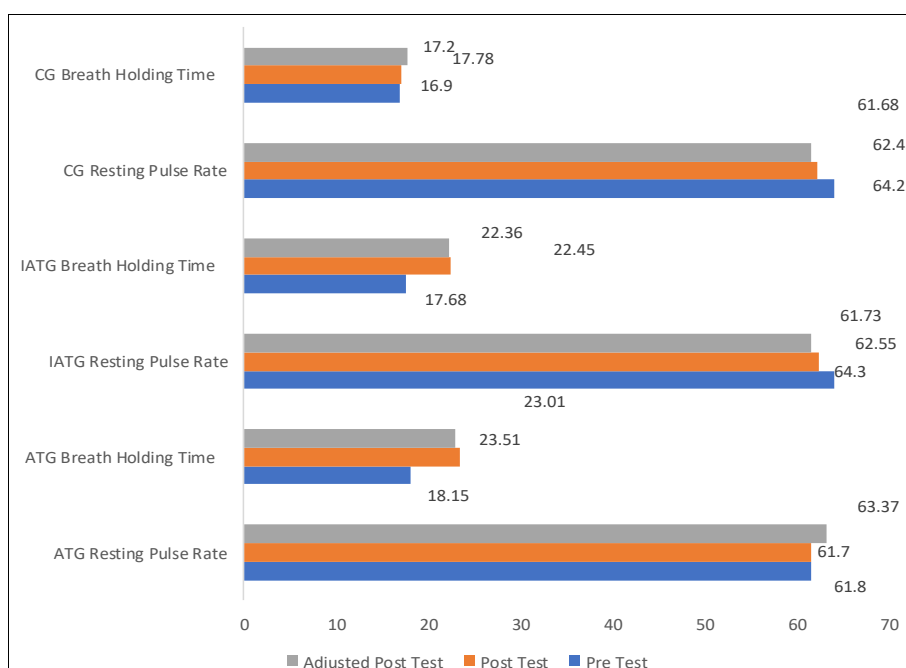


Fig 2: The study's results indicated no significant difference between the training groups on the selected criterion variables

Discussion on Findings

In this study, the Analysis of Covariance (ANCOVA) of PHYSICAL and physiological variables was carried in two different experimental groups with the inclusion of aerobic and Indian aerobic training programme. The same analysis was carried out in control group without inclusion of training programme. From these analyses, it was found that the results obtained from experimental groups had significant improvement on the physical and physiological variables when compared with control group. This was due to influence of aerobic and Indian aerobic training programme with in the analysis of experimental groups. It was interesting to note that the result of physical and physiological variables such as speed, muscular strength, cardio respiratory endurance, breath holding time concluded that the aerobic group was better than and Indian aerobic training group and control group. Finally resting pulse rate and flexibility concluded that the Indian aerobic group was better than and aerobic training group and control group. This in turns helps to develop to the adolescent boys. The findings of the study had close relationship with the results of the previous study conducted by (Balamuralikrishnan & Yoga., 2018)^[1], (Almeida & Araujo., 2003)^[2] and (Montero *et al.*, 2015)^[4].

Conclusion

Drawing upon the study's findings and considering its essential limitations, it becomes evident that the integration of aerobic and Indian aerobic training has a noticeable positive influence on improving physical and physiological variables among adolescent boys. Furthermore, significant progress was observed within the selected variables of the aerobic and Indian aerobic training group, evident after a six weeks period of specialized training. This solidifies the notion that this training regimen is effective in enhancing both speed, muscular strength, flexibility, cardio respiratory endurance, resting pulse rate, breath holding time.

1. It can be inferred that the personalized implementation of aerobic training demonstrated statistically significant and positive effects throughout the intervention period, contributing to the improvement of physical and physiological variables among adolescent boys.
2. It can be conditional that the improved application of Indian aerobic training demonstrated statistically significant and positive effects throughout the intervention period, contributing to the improvement of physical and physiological variables among adolescent boys.
3. It is apparent that the individualized interventions applied by the control group, while showing a positive trend, did not yield statistically significant results within the given timeframe. This applies to physical and physiological variables among adolescent boys.
4. Upon comparison, the comparative outcomes lead to the conclusion that the physical and physiological variables such as speed, muscular strength, cardio respiratory endurance, breath holding time concluded that the aerobic group was better than and Indian aerobic training group and control group. Finally resting pulse rate and flexibility concluded that the Indian aerobic group was better than and aerobic training group and control group. This in turns helps to develop to the adolescent boys.

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