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Impact Of High-Intensity Interval Training on Specific Physical Factors Among College Men Ball Badminton Players

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ABSTRACT

Examining how high-intensity interval training affected particular physical characteristics in collegiate men's ball badminton players was the goal of this study. Thirty individuals, ages 18 to 24, were selected at random from SRM Institute of Technology, Kattankulathur, in order to accomplish this purpose. A control group and an experimental group, each with 15 participants, were subsequently randomized to these chosen individuals. The control group did not participate in any experimental activities, whereas the experimental group trained using high-intensity intervals. This study concentrated on two aspects of physical fitness: muscle strength and agility. Both pre-tests and post-tests were part of the genuine random group design used in the research. Each of the 30 participants was split equally between the control group and the experimental group, which included the interval training at high intensity group. Pre-tests were given to all 30 subjects before to the six-week study period in order to evaluate the chosen physical factors. Post-tests were administered after the experimental period, and the results were carefully documented. A preset significance level of 0.05 confidence was used for the statistical analysis. The study's findings showed that individuals in the interval training with high intensity group significantly improved their muscle strength and agility.

Keywords: *Muscle strength, ball badminton players, agility.*

1. INTRODUCTION

Ball badminton

Ball badminton, a sport that amalgamates elements of badminton, tennis, and volleyball, stands as a testament to human creativity in sports. Originating in India, this captivating game has gradually spread its wings globally, captivating enthusiasts with its unique blend of agility, strategy, and skill. Despite its relatively modest beginnings, ball badminton has evolved into a sport of significant cultural and sporting importance, resonating with diverse communities around the world. In this comprehensive exploration, we delve deep into the history, rules, techniques, and cultural significance of ball badminton, aiming to provide a comprehensive understanding of this dynamic and engaging sport. As we embark on this journey, it's essential to acknowledge the rich tapestry of history woven into the fabric of ball badminton. While precise historical records are scarce, the roots of the game can be traced back to ancient India, where it was played as a recreational activity in villages and towns. Over time, ball badminton began to gain traction, particularly in the southern regions of India, where it became an integral part of local culture and festivities. The game's simplicity and accessibility appealed to people of all ages and backgrounds, fostering a sense of community and camaraderie.

However, it wasn't until the late 19th century that ball badminton started to take shape as a formalized sport. Credit for its modernization is often attributed to stalwarts like Nagaraja Mudaliar and Veeraswamy. These pioneers worked tirelessly to codify the rules, standardize equipment, and promote the sport's competitive aspect. Their efforts laid the groundwork for the organized leagues and tournaments that would propel ball badminton into the mainstream.

One of the defining features of ball badminton is its adaptability and inclusivity. Unlike its counterpart, traditional badminton, which requires specialized equipment and facilities, ball badminton, can be played in a variety of settings, from sandy beaches to grassy fields. This versatility has contributed to its widespread appeal, attracting players from diverse backgrounds and regions. Whether played competitively or casually, ball badminton fosters a sense of unity and shared passion among its participants.

Central to the allure of ball badminton is its dynamic and fast-paced gameplay. The objective is simple: maneuver the ball across the net and prevent the opposing team from returning it. However, achieving this goal requires a combination of skill, strategy, and athleticism. Players must master a range of techniques, from powerful smashes to delicate drops, all while anticipating their opponent's moves and adjusting their tactics accordingly. The result is a thrilling spectacle that keeps spectators on the edge of their seats.

As we delve deeper into the intricacies of ball badminton, it becomes apparent that the sport is more than just a pastime; it is a reflection of the human spirit. It embodies the values of teamwork, perseverance, and fair play, instilling lessons that extend far beyond the confines of the court. Whether played in the streets of Chennai or the parks of London, ball badminton serves as a reminder of our shared humanity and the power of sport to unite us (John Smith 2024).

In recent years, High-Intensity Interval Training (HIIT) has been advocated as the preferred exercise method when time is limited. In football (soccer), both aerobic and anaerobic metabolism is crucial. Given the prolonged nature of the game, aerobic capacity is essential, while anaerobic power plays a vital role in short bursts of running with and without the ball, kicking, heading, and throwing. Endurance athlete training typically emphasizes long-duration, low- or moderate-intensity exercise during the base or preparation phase, with short-duration, high-intensity efforts as the competitive phase approaches. It has been demonstrated that High-Intensity Training (HIT) produces faster results than traditional training methods. High Resistance Interval Training has also shown significant benefits for elite athletes.

2. LITERATURE REVIEW

Eswari et al. [9] designed Impact Of High-Intensity Interval Training On Specific Physical Factors Among College Male Football Players. Examining how high-intensity interval training affected particular physical characteristics in male collegiate football players was the goal of this study. This study concentrated on two aspects of physical fitness: muscle strength and agility. Both pre-tests and post-tests were part of the genuine random group design used in the research. Pre-tests were given to all 30 subjects before to the six-week study period in order to evaluate the chosen physical factors. The study's findings showed that individuals in the high-intensity interval training group significantly improved their muscle strength and agility.

Liu et al. [10] introduced The effect of eight-week sprint interval training on aerobic performance of elite badminton players.

The purpose of this study was to examine the physiological effects of sprint interval training (SIT) on the aerobic capacity of professional badminton players as well as possible oxygen uptake, transport, and recovery processes during the process. Over the course of eight weeks, the CON group engaged in two Fartlek runs and one standard multi-ball training, while the SIT group trained three times a week, including two power bike sessions and one multi-ball session. The study's evidence-based conclusions suggest that SIT could be a good addition to badminton players' training regimens as a time-efficient training option.

Du et al. [11] proposed The effect of physical exercise of different intensities on the mental health of college students. To inquire into how varied levels of physical activity have an impact college students' psychological and physical health. The healthy body remains in place. Four distinct groups were included in the experiment, each of which were given an eight-week break between working out and exercising twice a week. Exercise and moderate intensity can help college students' mental health, which is something that is deserving of attention.

Zhao et al. [12] introduced Effect of integrative neuromuscular training for injury prevention and sports performance of female badminton players. According to the study's hypothesis, female badminton players' asymmetry and athletic performance might be enhanced by integrated neuromuscular training. 38 participants were split into a high-risk group (HG) and a low-risk group (LG), with 22 and 16 individuals in each group, respectively, based on the pretest results from functional movement screening. In addition to improving performance through physical preparation, INT can lower the chance of injury. Deficits and connections between INT and injury can be further found using screening instruments like the FMS. Athletes may be able to compete internationally for longer because to this.

3. METHODOLOGY

Several preliminaries and subsequent tests were included in the researcher's randomized design. The group performing the experiment and the control group, each consisting of 15 players, were randomly selected from among 30 men's ball badminton players (N=30). A pre-test was given to all 30 ball badminton players before any training begin in order to assess a few physical fitness factors, including muscle strength and agility. After a component of the test group participated in a six-week high-intensity interval training initiatives, the whereas the control unit had no involvement in any training exercises. Post-tests were administered to examine the exact same dependent variables at the end during the six-week training period. To determine whether any statistically significant changes occurred, the dependent t-test was used to statistically analyze the data gathered from these tests. Notably, an accuracy rate of 96% was guaranteed for all analyses by setting a significance level of 0.05.

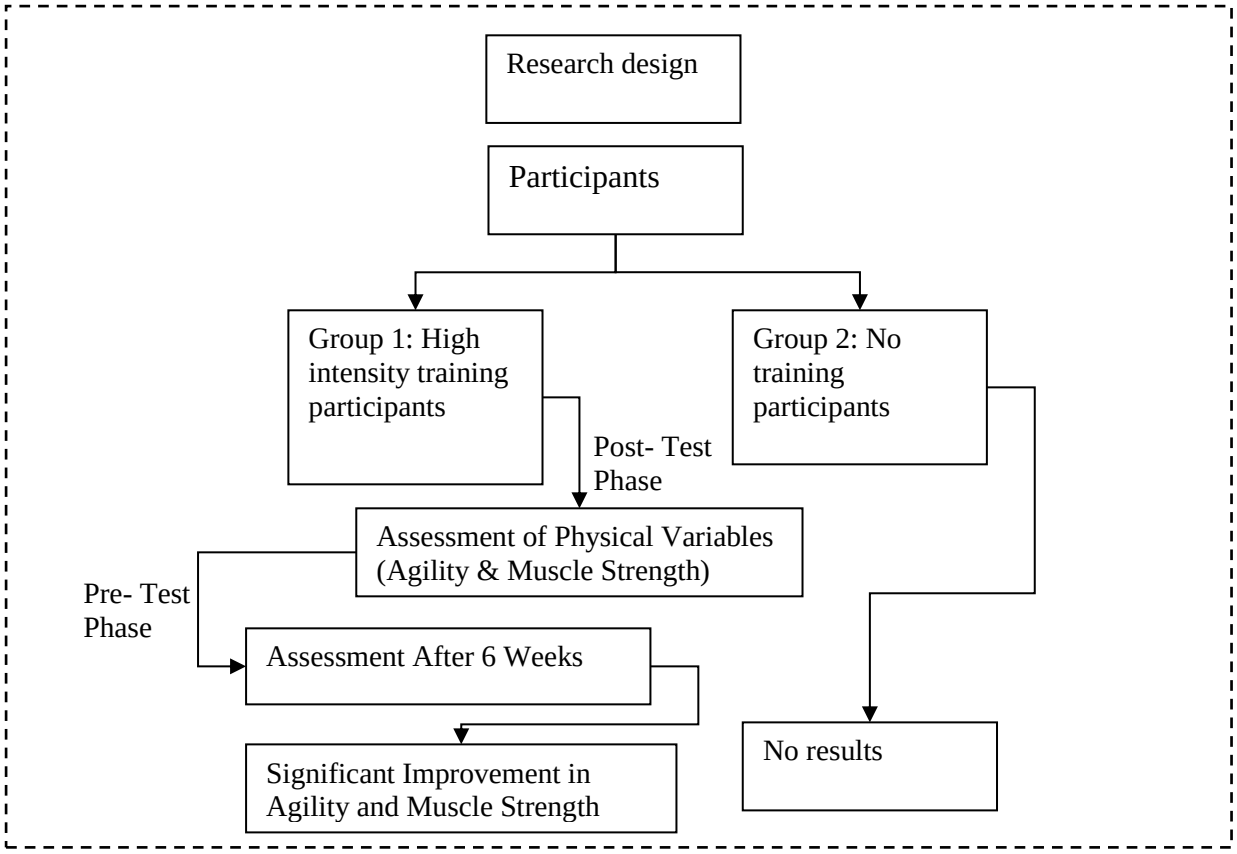

Figure 1. Architectural diagram of proposed system

The study design evaluating the effects of high-intensity interval training on the muscular strength and agility of thirty college men is depicted in the architecture diagram. Participants were split into two groups at random: the experimental group, which trained for six weeks, and the control group, which did nothing. The physical characteristics of both groups were assessed using pre- and post-tests. The experimental group's agility and muscle strength significantly improved, according to the data in figure 1.

Throughout the trial, the CON group followed the aerobic training routine that was typical for these badminton players, which included one fortnightly multi-ball feeding session and two Fartlek Exercise training practices. In the meantime, three times a week, the SIT group engaged in sprint interval training, which included one multi-ball training session tailored to SIT and two power bike training sessions using a Monark 894E activity bike (Monark Exercise AB, Vansbro, Sweden), which has a high reliability of weight loading for anaerobically testing or training.

Cycling is a closed-chain exercise that is relatively easier enable cyclists to master the right approach and achieve the intended training effect from the perspective of injury prevention. Additionally, it can be used practically for training on indoor badminton courts in inclement weather or throughout the winter. On the basis of earlier research, the training intervention was created and adjusted. In order to prevent the analytical results from being compromised, the accuracy of the assignment, the logic and rationality of the variables, the accuracy of the entry, and the timeless error repair are guaranteed once the access is finished.

4. RESULT

The influence of varying exercise intensities on college students' self-rating scale scores. According to the findings, both the male and female SIT groups' maximum and average heart rates throughout training were noticeably greater than those of the CON groups. Furthermore, the former's effective training period was substantially less than the latter's. During the 8-week training period, the Male-SIT group's indicate weekly operational time for training (time spent within the 55–100% HRmax zone) and TRIMP in the 83–100% HRmax intensity range were considerably greater than those of the Male-CON group, while the power source Male-CON category's all periodically effective training time and TRIMP were significantly lower than the Male-SIT group's ($p < 0.05$).

Test I: Pre and Post Tests on high intensity interval training

Category	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	17.66	3.16	0.18	4.76*
	Post test	17.62	3.20		
Control group	**Pre test**	17.15	3.46	0.19	1.81
	Post test	17.14	3.22		

**Important level 0.25 level degree of strength(2.04, 1 and 18)*

The 'r' ratio between the means of pre-test and post-test agility scores for collegiate ball badminton players is calculated as shown in Table I. Before and after training, the experimental group's mean agility scores were 17.66 and 17.62, respectively, whereas the control group's means were 17.15 and 17.14. At a 0.05 level of confidence, the calculated "t" ratio of 4.76 exceeded the critical table value of 2.04, demonstrating statistical significance for 14 participants and 1 degree of freedom. This finding strongly implies that the experimental group's agility increased greatly as a result of high-intensity interval training. At a 0.05 level of confidence, however, the computed "r" ratio of 2.81 was statistically non-significant for only one degree of strength and 13 participants because it was below the critical table value of 2.14. This result unequivocally shows that after the procedure, the control organization's mobility did not significantly improve.

The control and research groups' the beginning mean flexibility scores are displayed in the bar illustration.

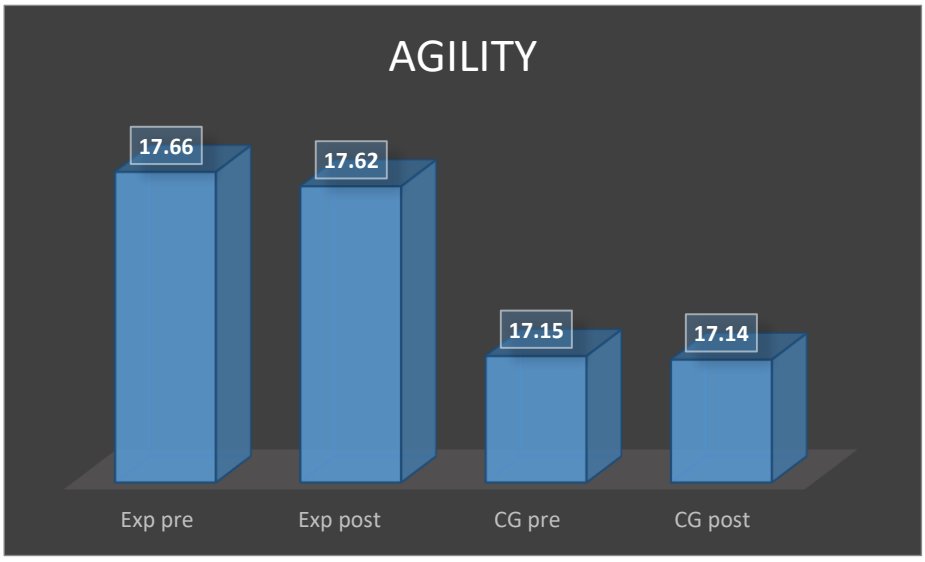

Figure 2. Bar diagram

The agility performance measures before and after the designated intervention or changes are contrasted in Figure 2.

Test II: Mean and Dependant 'T' – ratio for the Pre and Post Tests on high intensity interval training group and control Group on muscle strength

Group	Test	Mean	Standard deviation	Standard error mean	t- ratio
Experimental group	**Pre test**	52.01	0.03	0.45	2.28*
	Post test	53.60	0.04		
Control group	**Pre test**	49.67	0.04	0.06	1.44
	Post test	50.01	0.04		

**Importance level 1.25 level degree of Strength(3.24, 6 and 17)*

The calculation of the 'r' ratio, which compares the median of before and after test strength of muscles ratings among collegiate ball badminton players, is described in Table II. In contrast to the control group, which had means of 49.67 and 50.01 for the same tests, the treatment group's mean values were 52.01 before training and 53.60 after. At a 0.25 level of confidence, the computed 'r' ratio of 2.88 was meaningful for one level of freedom and 14 participants, surpassing the crucial table value of 2.14. This result clearly indicates that in-and-outs with high intensity intervals had a considerable positive impact on the experimental group's muscle strength. On the other hand, the calculated 'r' ratio of 1.59 was deemed not important for a single degree of freedom and 16all fourteen participants at a 0.25 level of confidence because it was below the critical table value of 2.14. This outcome makes it abundantly evident that the control group's knee speed did not significantly increase after the intervention.

The pretest medians for the research as well as control groups' muscle strength are displayed in the bar diagram.

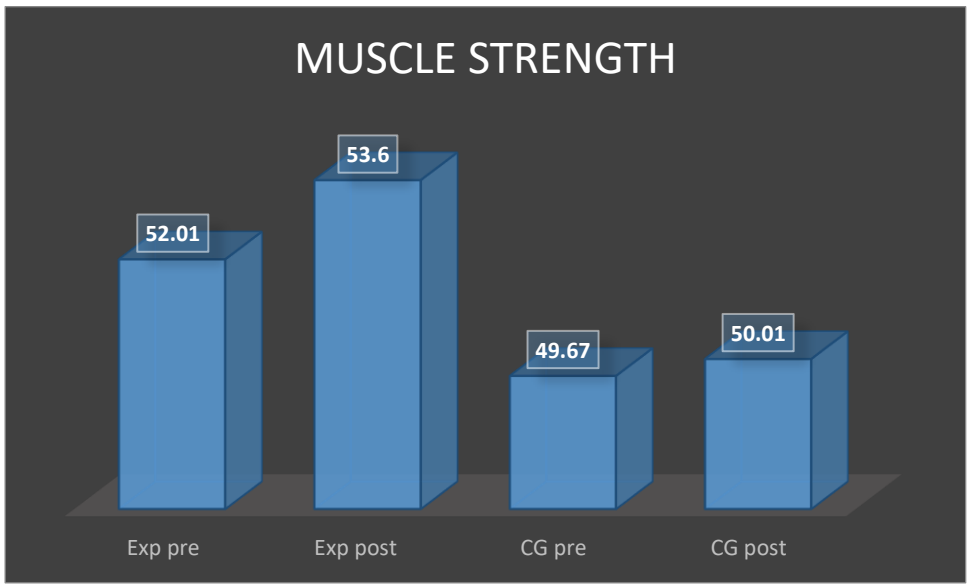

Figure 3. Bar diagram

The muscle strength performance measures before and after the designated intervention or changes are contrasted in Figure 3.

5. DISCUSSION

The results of the study show that the experimental group, which consisted of people receiving game-high intensity interval training, considerably enhanced the chosen variables—muscle strength and agility. The control group is contrasted with this improvement. According to the study, the improvements made by the game-high intensity interval training group are also noticeably better than those made by the control group. In conclusion, the study's results underscore the positive impact of high-intensity interval training on agility and muscle strength, emphasizing its effectiveness in enhancing ball badminton performance

6. CONCLUSIONS

The data analysis yielded the following findings:

1. College-level ball badminton players in the experimental cohort, who underwent a high-intensity interval exercising course, showed a noticeably noticeable boost in physical fitness characteristics, especially muscle strength and agility.

2. Conversely, among higher education ball badminton players, the command group demonstrated very little increase in athletic metrics including muscle strength and agility.

REFERENCES

[1] Saravanan R., & Pushpa, P. M. (2022). The effect of high intensity interval training with specific drill training on performance variables and skill performance of elite volleyball players International Journal of Yogic, Human Movement and Sports Sciences 2022; 7(1): 234-237

[2] Billy Sperlich et al., (2011) Effects of 5 weeks high-intensity interval training vs. volume training in 14-year-old soccer players. Journal of Strength and Conditioning Research: May 2011 - Volume 25 - Issue 5 - p 1271-1278 doi: 10.1519/JSC.0b013e3181d67c38.,

[3] Mila Vukadinovic Jurisic et al., (2021) Effects of small-sided games and high- intensity interval training on physical performance in young female handball players. DOI: https://doi.org/10.5114/biolsport.2021.99327, Biol Sport. 2021; 38(3):359–366.Online publish date: 2020/10/23 3/2021 vol. 38 EISSN: 2083- 1862 ISSN: 0860-021X, Biology of Sport.

[4] Kilit et al., (2019) conducted study Effects of High-Intensity Interval Training vs. On-Court Tennis Training in Young Tennis Players. Journal of Strength and Conditioning Research: January 2019 - Volume 33 - Issue 1 - p 188-196doi: 10.1519/JSC.0000000000002766.

[5] Iacono Antonio Dello et al., (2015) conducted a study on high-intensity intermittent training (HIIT) and small-sided games (SSGs) training on fitness variables of elite handball players. Journal of Strength and Conditioning Research: March 2015 - Volume 29 - Issue 3 - p 835-843doi: 10.1519/JSC.0000000000000686.

[6] Saravanan, N. (2016). Effect of specific drill training programme on playing ability among volleyball players. Journal of physical education. Fitness and sports, 5(04), 1-4.

[7] Ye, B., Zhu, H., Yang, Z., He, Z., Liu, G., Pan, H., & Guo, H. (2024). Construction and Analysis of the Physical Fitness Evaluation Index System for Elite Male Singles Badminton Players: Based on Delphi and AHP Methods. Life, 14(8), 944.

[8] Golshaei, B. (2020). Effects of stimulus speed, exercise intensity, and experience level on coincidence anticipation timing in badminton players.

[9] Eswari, M. S., & Shanmugavalli, T. (2024). Impact Of High-Intensity Interval Training On Specific Physical Factors Among College Male Football Players. Library Progress International, 44(3), 14145-14149.

[10] Liu, H., Leng, B., Li, Q., Liu, Y., Bao, D., & Cui, Y. (2021). The effect of eight-week sprint interval training on aerobic performance of elite badminton players. International Journal of Environmental Research and Public Health, 18(2), 638.

[11] Du, R., Zhang, F., & Chang, M. (2022). The effect of physical exercise of different intensities on the mental health of college students. Revista de Psicología del Deporte (Journal of Sport Psychology), 31(4), 1-9.

[12] Zhao, W., Wang, C., Bi, Y., & Chen, L. (2021). Effect of integrative neuromuscular training for injury prevention and sports performance of female badminton players. BioMed research *international*, *2021*(1), 5555853.