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Impact of the Indian Knowledge System–Based Lagori Game on Cardio Respiratory Endurance of School Girls

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Abstract

The purpose of this investigation was to determine the impact of the Indian Knowledge System (IKS)-based Lagori game on the cardio respiratory endurance of school girls. To conduct the present study, thirty (N = 30) school girls from the Alagappa Physical Fitness Academy (APFA) Programme, Karaikudi, Tamil Nadu, India, were selected randomly as subjects. Their ages ranged from 12 to 14 years. The selected subjects were divided into two groups of fifteen each (n = 15). Group I served as the Indian Knowledge System-based Lagori game training group, while Group II served as the control group and did not receive any training. The Indian Knowledge System-based Lagori game training was considered the independent (manipulative) variable, while cardio respiratory endurance was considered the dependent variable. Cardio respiratory endurance was assessed using the cardio respiratory endurance tested by 9 minutes run or walk test and performance was recorded in meters. The training programme was conducted for six weeks, with training sessions held five days per week. Data were collected before the commencement of the training programme (pre-test) and after the completion of the six-week training period (post-test). The collected pre-test and post-test data were analysed using the paired sample t-test to determine the significance of improvement resulting from the training programme. The findings revealed that six weeks of Indian Knowledge System-based Lagori game training significantly improved the cardio respiratory endurance of school girls compared to the control group that did not undergo training.

Keywords: Indian Knowledge System (IKS), Lagori Game, Cardiorespiratory Endurance, School Girls, Experimental Study.

INTRODUCTION

Ancient Indian sports have been an integral part of the Indian Knowledge System (IKS), contributing to the physical, mental, moral, and social development of individuals. Traditional sports were rooted in a holistic philosophy that combined physical fitness with mental discipline, ethical values, and community participation. Practices such as Kalaripayattu, Malla-yuddha, archery, and Chaturanga were used to develop strength, self-discipline, strategic thinking, and resilience. These activities were supported by Yoga and Ayurveda, which enhanced physical health, flexibility, concentration, recovery, and overall well-being. Community-based games such as Kabaddi, Kho-Kho, Gilli-Danda, and Lagori promoted teamwork, agility, cooperation, and cultural continuity. However, during British colonial rule, many indigenous sports were marginalized in favor of Western games (Dutt, 2021). In recent years, traditional sports have experienced a revival through initiatives such as the Pro Kabaddi League (2014), the Ultimate Kho-Kho League (2022), and the Kho-Kho World Cup (2025), reflecting growing recognition of indigenous games (Sportstar, 2025). Among these, Lagori, also known as Pitthu or Seven Stones, is a traditional outdoor team game that requires agility, speed, coordination, endurance, and quick decision-making. The Indian Knowledge System–based Lagori game represents a structured and culturally grounded physical activity intervention that integrates indigenous movement patterns, cooperative play, and holistic development. Scientific implementation of Lagori training can improve health-related fitness components

such as cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition, while also enhancing social skills, emotional regulation, and cultural awareness among school girls.

METHODOLOGY

The present study was conducted using a well-structured methodology, which included the population domain, sampling technique, group allocation, research design, variables involved, testing procedures, training guidelines, and statistical tools used for analysis. The population comprised school students, from which a sample of 30 school girls aged 12 to 14 years was selected using a simple random sampling technique. The study adopted a pre-test and post-test random group experimental design. The independent variable was the Indian Knowledge System–based Lagori game, while cardio respiratory endurance served as the dependent variable. Cardio respiratory endurance, the criterion variable, was assessed using the Sit-and-Reach Test, and performance was recorded in centimetres. The collected data were analysed using the paired-samples t-test to determine the differences between pre-test and post-test scores. The level of significance was set at 0.05.

TRAINING APPROCH

- **Training Period: 6 weeks.**
- **Total Innings/Sets:** A standard competitive match consists of 3 sets (often referred to as sets or innings).
- **Duration per Set:** Each set lasts for 3 minutes.
- **Breaks:** A 30-second break is allowed between each set.
- **Total Match Time:** Approximately 10–12 minutes, including breaks.
- **Player Count:** While 12 players may be on a team roster, only 6 players are on the field per set.

Weeks	Duration of each game	Set	Rest in between set	Total duration of a training session
Weeks 1 and 2	3minutes	3	30 Seconds	60 minutes
Weeks 3 and 4	3 minutes	3	30 Seconds	60 minutes
Weeks 5 and 6	3 minutes	3	30 Seconds	60 minutes

The training programme was conducted five days per week, with the intensity determined according to the individual ability of each participant. Each training session began with a 10-minute warm-up period to prepare the body for physical activity and reduce the risk of injury. This was followed by the main training activity, and the session concluded with a 10-minute cool-down period to promote recovery and relaxation. The total duration of each training session was 60 minutes.

RESULT

Table 1: Analysis of Paired Sample 'T' Test on Cardio Respiratory Endurance of Experimental and Control Group of School Girls (Scores in meter)

Groups	Pre test		Post Test		Mean Difference	df	Obtained 't'-Test value	Statistical p Value
	Mean	SD	Mean	SD				
Exp	1188.8	36.38	1277.9	47.02	89.13	14	6.83*	0.00
CG	1183.7	35.74	1182.4	36.31	1.26	14	1.99	0.06

The table value required for 14 degrees of freedom at the 0.05 level of significance is **2.14.*

RESULTS OF CARDIO RESPIRATORY ENDURANCE

The pre-test and post-test mean and standard deviation on cardio respiratory endurance of Experimental Group was 1188.8±36.38 and 1277.9±47.02 and Control Group was 1183.7±35.74 and 1182.4±36.31 respectively. The collected data were analysed with paired sample t test, and the obtained t ratio for Indian Knowledge System based lagori game Group (IKS-BLG) and Control Group (CG) were 6.83 and 1.99 respectively. This is higher than the required table value of 2.14 with the level of confidence of 0.05. Hence, it is significant. The results concluded that, the eight weeks of scheduled Indian Knowledge System based lagori game have altered cardio respiratory endurance of school girls. For control group (CG), the obtained t ratio was 1.99. This is lower than the required table value of 2.14 with the level of confidence of 0.05. Hence, it is insignificant. This result indicated that the control group did not alter on cardio respiratory endurance of school girls. The pre-test and post-test mean values on cardio respiratory endurance of experimental and control group were graphically represented in figure-1.

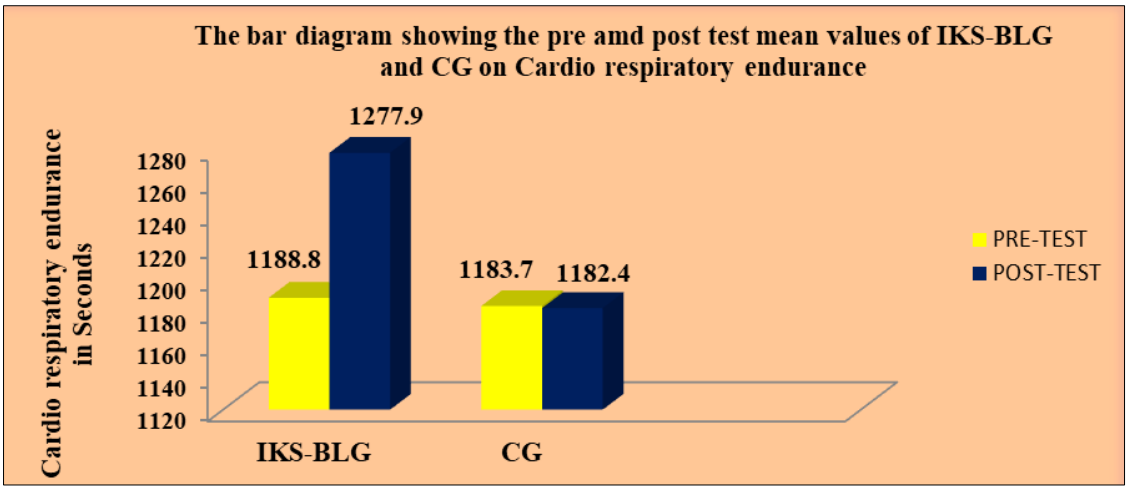

Figure 1:

DISCUSSION AND FINDINGS

Described that Kabaddi players exhibited high aerobic capacity (VO_2 max) and anaerobic capacity (plasma lactate values), indicating their strong fitness for competitive performance. However, since success in competition depends on multiple factors not always measurable in a laboratory, the study emphasizes the need for further research in India to assess the physical and physiological characteristics of Kabaddi players and compare them with international standards. Amit Kumar (2025), his study concluded that Bhāratīya Khel is an integral part of India's cultural heritage, contributing to physical fitness, intellectual development, and social cohesion. The revival of these traditional games underscores the importance of preserving indigenous knowledge systems and ensuring their relevance among younger generations. Games such as Kabaddi, Kho-Kho, and Pachisi reflect cultural identity and continuity. The study further emphasizes that educational initiatives and institutional support, along with international collaboration, are essential for their promotion and global recognition. Kumar, A., & Prasad, A. (2025), they highlighted that Chikki Kabaddi exemplifies India's rich cultural heritage and offers significant psychological and physiological benefits, particularly for adolescents and youth. The game combines physical exertion, strategic thinking, and teamwork, reflecting the principles of the Indian Knowledge System and supporting holistic development. Despite its benefits, modernization and digital entertainment have led to a decline in the prevalence of such traditional games. The study emphasizes the need to preserve and promote folk games through educational programs, community events, and school curricula, while integrating them with modern lifestyle practices to maintain cultural heritage and engage younger generations. Guggari, M & Singh B. (2024), their examined the effects of interval training on performance related fitness variables of Kabaddi players under different surface conditions. The study concluded that interval training significantly enhances both aerobic capacity (such as VO_2 max and anaerobic threshold) and anaerobic attributes including speed, strength, and agility. It also improves muscular strength, endurance, reaction time, and decision-making ability, which are crucial for Kabaddi performance. Furthermore, the study highlighted that surface conditions (e.g., mats, turf, and grass) play a vital role in influencing performance outcomes and injury risk, emphasizing the need for careful selection of training environments. Kumar, M. N, (2024), his findings of the present study indicate that the experimental group showed a significant improvement in cardiovascular endurance when compared to the control group of school-level kho-kho players ($p \leq 0.05$). Notably, participants who underwent a combination of proprioceptive and yoga training exhibited greater enhancement than those in other groups, suggesting that the integrated training approach may be particularly effective in improving cardiovascular performance. These results highlight the potential benefits of combining proprioceptive exercises with yoga practices in athletic conditioning programs. Tripathi, H., Pandey, P., & Choudhary, R. (2024), their findings emphasize the importance of sport-specific conditioning programs that focus on agility, cardiovascular endurance, and explosive power. Such targeted training approaches provide valuable insights for coaches and sports scientists to refine methodologies, enhance athletic performance, and support effective talent identification. Ghosh, S. S., Biswas, R., & Saha, T (2020), their results and discussion of the present study, it can be concluded that long-term participation in Kho-Kho significantly enhances muscular endurance, cardiovascular endurance, and flexibility. Therefore, Kho-Kho can be effectively adopted both as a training method and a recreational activity for children to improve fitness and performance simultaneously. Furthermore, the study highlights its potential application for advanced athletes, serving as an alternative training approach to develop fitness while providing relief from monotonous training routines. Sultana, M. N., & Kumar, P. P. S. P. (2020), they determined that, within the limitations and delimitations of the study, skill-related training significantly improved cardiovascular endurance and positively enhanced the vital capacity of Kabaddi players. The training

programme implemented was found to be effective and beneficial in improving the overall physiological performance of the players. Gandhi, G., Sharma, R., & Kaur, G. (2019), their results of the present study suggest that the players exhibited elevated levels of genetic damage and oxidative stress, which may be attributed to intense physical activity in the absence of other significant exposure factors, as the remaining attributes were comparable across the study groups. This indicates that strenuous and prolonged exercise may contribute to increased oxidative burden. Consequently, these players may be at a heightened risk of developing conditions such as cancer, other chronic diseases, and early onset of age-related changes. Therefore, it is important to create awareness among athletes regarding the potential health risks associated with regular intensive physical exercise and to emphasize the need for appropriate preventive and recovery strategies. Bhaskara, D. R., & Murthy, D. K. (2016), they reported that various physical fitness components, including cant (r = 0.83), raiding ability (r= 0.63), reaction ability (r = 0.55), hand touch reach (r = 0.54), and toe touch reach (r = 0.56), are significantly correlated with Kabaddi skill performance. The analysis indicates a strong relationship between these fitness attributes and the players' performance, highlighting the importance of targeted physical conditioning for enhancing Kabaddi skills. Urvashi Tiwari et.al. (2025) they examined that the effects of two modes of circuit training on the flexibility of school boys. The findings revealed that both circuit training methods significantly improved flexibility levels among the participants. Regular participation in structured circuit training enhanced joint mobility and muscle elasticity. The study suggests that circuit training is an effective approach for developing flexibility in school-aged boys. Therefore, physical education teachers may incorporate different circuit training methods to improve students' flexibility and overall fitness. D. Maniazhagu (2020) he studied that the effects of concurrent strength and endurance training on the flexibility of junior athletes. Thirty athletes participated in a nine-week training program and were divided into two experimental groups and one control group. The findings revealed that both training methods significantly improved flexibility compared to the control group. However, no significant difference was observed between performing strength training before endurance training and after endurance training. The study concluded that concurrent strength and endurance training is effective for enhancing flexibility in junior athletes. K. Sudha and D. Maniazhagu (2019) they examined the effects of circuit training (CT) activities on the flexibility of school girls. The findings showed that participation in circuit training significantly improved flexibility compared to the control group. Among the training variations, circuit training combined with resistance band exercises produced the greatest improvement in flexibility. The study highlights that structured circuit training programs are effective for enhancing joint range of motion and overall physical fitness in school girls. Urvashi Tiwari and D. Maniazhagu (2025) their study scrutinized the impact of the Indian Knowledge System-based Lagori game on selected health-related fitness components of school girls. The findings indicated significant improvement in flexibility, agility, and muscular endurance after regular participation in the Lagori game. The traditional game-based intervention was found to be an enjoyable and effective method for enhancing physical fitness. Students in the experimental group showed better progress compared to the control group. The study concludes that indigenous games can be effectively integrated into school physical education programs to improve overall fitness levels.

CONCLUSION

1. The IKS-based Lagori game produced a significant improvement on cardio respiratory endurance among school girls.
2. The IKS-based Lagori game showed greater improvement on cardio respiratory endurance compared to the control group.
3. The control group did not show any significant improvement.

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