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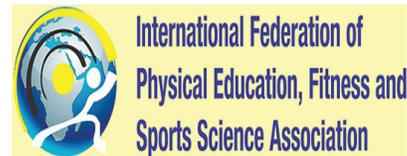
# Asian Journal of Physical Education and Computer Science in Sports

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## Research Article

# Effect of conditional small-sided game on speed endurance of football players

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### ABSTRACT

Football is an intermittent sport that requires different physiological components. Acclimatize to the demand of the competitions needs training modifications to tolerate extreme pressure during the competition. The objective of this study was to find out the effect of small-sided games (SSGs) training on speed endurance. To achieve the purpose thirty ( $N = 30$ ), soccer players were selected from Jaffna, Sri Lanka, and their age were ranged between 18 and 24 years. The subjects were divided at random into two groups of 15 each, Group I underwent SSGs training ( $[n = 15]$ , 50–60 min/day/3 days/week over the period of 8 weeks), and Group II acted as control group ( $n = 15$ ). Speed endurance was assessed by 150 m dash test. Data were collected on speed endurance before and after the training period and were subjected to statistical treatment using analysis of “t” ratio for independent group. In all the cases, 0.05 level of confidence was fixed to test the significance. Hence, several physical demand characteristics are affected by the moment of SSGs application, while others respond to the recovery regime during SSGs, thus providing indications to the coaches to prescribe this training by manipulating the context. Within the limitations set for this study, it was concluded that the experimental group was significantly improved speed endurance than the control.

**Keywords:** Small sided games, Physical components, Speed endurance

### INTRODUCTION

Football is an unpredictable game for players what will happen and as well as the spectators at during and after the match result. Football players need different physiological components for playing high demand of football. Physiological qualities at the highest intensity for skill execution with a high standard of technical ability, as well as a tactical understanding of the game, are requested to soccer. International soccer players distance covering up to 12 km per match at 75% of  $VO_2$  max. Its game is distinguished by 1200 movements and erratic changes in activity involving within the 5s, among the 30–40 sprints, above than 700 turns, and 30–40 tackles and jumps. All these efforts are imposed on the players, which intensifies the physical strain and they contribute to making football highly physiologically demanding. Energy requirements must be understood and suggest that the estimated that as much as 98% of all energy requirements in football come from aerobic

sources, and only 2% from anaerobic sources during a 90-min soccer game (Hill-Haas, Coutts, Rowsell & Dawson 2011).

Small-sided games have been considered as a practicable alternative to conventional endurance training to enhance endurance performance in youth soccer players (Moran, J 2019). Small-sided games are a successful training modality for developing aerobic and anaerobic fitness as well as technical and tactical skills for soccer players, while keeping high motivation. Training intensity in small-sided games can be changed by modifying several factors such as the number of players, the pitch dimension, the specific rules adopted, and also providing encouragement and support from coaches. Larger pitch dimensions lead to increased physical demands and as well high energy requirements, while playing in smaller pitch dimensions seems to be associated with a greater number of frequency actions. Technical skills (Ali, 2001), playing tactics (Reilly, 1994), and endurance capacity (Bangsbo., J, Mohr M., 2008) are known to have major influences on match performance. In addition, if running drills without the ball are used to improve endurance capacities, players will need extra practice time to improve their technical skills (Helgerud.,

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**Table 1: Small-sided games training protocol for speed endurance**

Number of players	Repetition time	Repetitions	Rest and recovery	Pitch size
4 versus 4+2 GK	120s	2	360s	20×40 m
5 versus 5	180s	2	240s	20×40 m
7 versus 7	300s	2	300s	½ pitch size
8 versus 8	360s	2	360s	½ pitch size

2001). Based on these general arguments, small-sided games have recently been adopted to simultaneously improve players' physical fitness, tactical thinking, and the specific dynamics of the game. However, the aim of this study was to find out how players get benefited from this training and the amount of training load necessary to improve speed endurance. Hence, the objective of the study was to find out the effect of small-sided games on speed endurance of football players.

### Experimental Protocol

The SSGs were organized four types of SSGs were randomly applied during the team's regular training period. Participated in the study, including two goalkeepers and eighteen outfield players. One four-a-side games, one five-a-side games, one 7-a-sides games, and one eight-a-side games. First 2 weeks, no additional instructions were given with respect to game playing except coach motivations. Second 2 weeks, coach has asked to the players should cover of maximum distance in the time of repetition. Third 2 weeks, instructions were given, game playing with distance and long lopping passes. Fourth 2 weeks, instructions were given, game playing with distance and long lopping passes, each player has to give the supporting play, high pressure of talking, and maintain the possessions.

Operationalization and data analysis small-sided games were used to reduce the number of players because of the complexity. In addition, small-sided games are also used for tactical training and development goal attempts had to be performed after seven or less passes after recovery of possession because in regular competitive playing.

### METHODOLOGY

To achieve the purpose thirty ( $N = 30$ ), soccer players were selected from Jaffna, Sri Lanka, and their age were ranged between 18 and 24 years. The subjects were divided at random in to two groups of 15 each, Group I underwent small-sided games training ([SSGT]  $n = 15$ , 50–60 min/day/3 days/week over the period of 8 weeks) and Group II acted as control. Speed endurance was assessed using 150-m speed endurance test (<https://www.brianmac.co.uk/end150.htm2018>) Data were collected on speed endurance before and after the training period and were subjected to statistical treatment using analysis independent "t" test, 0.05 level of confidence was fixed to test the significance.

### RESULTS

The results presented in Table 2 showed that the pre-test and post-test mean value of control group lower speed endurance mean 25.0667 and 25.0000, respectively. The obtained' value of 1.058 was less than the required' value of 2, 28. Hence, it was not significant improvement and also it was not reached required "t" value of 2, 28 in speed endurance of control group of football players.

The results presented in Table 3 showed that the pre-test and post-test mean value of experimental group speed endurance mean 24.8000 and 23.9333, respectively. After 8 weeks SSGT mean difference of 0.8667. The obtained "t" value of 3.552 was greater than the required "t" value of 2.28. Hence, it was proved that there was significant improvement in speed endurance of football players due to SSGs training.

### DISCUSSION

During the last two decades, several studies have investigated the physiological and performance responses associated with different SSG formats. The majority of these studies have focused on manipulation of the pitch size, number of players, motivation of the coach, defensive organization, use of goalkeepers, and use of selected rule changes (Hill-Haas *et al.*, 2011). It is possible that the overall effect of training with small-sided games is greater for football-specific performance. This idea is supported by the work of Hill-Haas *et al.*

In the present study, small-sided games improve speed endurance and these modality training most influence on soccer game, and this type of training may contribute to enhance the ability to manage high-level game pressure. These trainings mainly target on the development of the speed endurance systems. To improve the speed endurance, a consequence the manipulation of running speeds practices should be important in small-sided games.

Furthermore, various studies have reported SSGT elicited similar changes in endurance performance in soccer players. The present study used SSG as soccer training methods to improve speed endurance of participants. The study reveals that there was a significant difference on speed endurance between the SSG group and control group, due to the effect of 8 weeks of

**Table 2: Descriptive statistics and obtained “t” result table shows value on speed endurance of control group football players**

	N	Mean	Standard deviation	Standard error mean	F
Post	15	25.0000	0.65465	0.16903	1.058
Pre	15	25.0667	0.70373	0.18170	

\*Significant at 0.05 level of confidence. with df (2, 28) is 1.701

**Table 3: Descriptive statistics and obtained “t” result table shows value on speed endurance of experimental group football players due to SSGs**

	N	Mean	Standard deviation	Standard error mean	F
Post	15	23.9333	0.96115	0.24817	3.552
Pre	15	24.8000	0.67612	0.17457	

\*Significant at 0.05 level of confidence. With df (2, 28) is 1.701

SSG. However, there were the significant differences are there in the control groups on speed endurance due to the previous fitness status of the soccer players.

## CONCLUSIONS

It is concluded that SSG as a tool to train multiple aspects such as technical, tactical, and physiological components. Pitch-size changes the technical and physiological aspect of the game and the actions performed during the SSG. Amount of players on similar pitch-size increases the technical tactical and physiological aspect in the demand of competition as well. The lower the amount of players the increase the amount of dribbling, shots, tackles, and touches for each player. However, this argument requires further scientific evidence. Football players do not always have the time to perform anaerobic

high-intensity training sessions twice per week, especially during the competitive period. All of the mentioned studies, including our own, have demonstrated that the SSGT methods have potential to improve players’ endurance capacities. Hence, it was concluded that high-intensity aerobic training is essential to improve cardiorespiratory endurance as well as ability to tolerate higher game pressure.

## RECOMMENDATION

Small-sided games may support to the players to improve players speed endurance, others physiological aspects, ability to tolerate different positional demand, and reduce monotonous.

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## Research Article

# Yoga on sport science – A bibliometric analysis

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### ABSTRACT

**Background:** In this modern world, yoga become the popular activity across the world. This bibliometric analysis aimed to provide a systematic review analysis in the field of Sports Science on yoga research publication. **Objectives:** In this bibliometric analysis, it is used to find the information about the yoga-related research publication done in the sports science. **Methods:** Web of science database used to gather the data regarding yoga in the sports science field. Using the various keyword related to the terms of “Yoga”. Based on the inclusion and exclusion criteria the data were finalized and expert in the plain text file format. The export document analysis in the R studio (Biblioshiny) software. **Results:** From this bibliometric analysis, we come to know very few studies only conducted in the field of sports science to improve the sports performance and fitness abilities.

**Key words:** Bibliometric analysis, R Studio, Sports Science, Yoga

## INTRODUCTION

Yoga is an ancient practice of Indians. It started out as a spiritual practice but is now widely used to encourage both physical and mental well-being (Muthappan, Ilangovan, Subramanian, Durairajan, and Elumalai, 2020). There are many various styles of yoga performed, each with its own unique characteristics and combinations of the fundamental elements of postures (asanas), breathing exercises (pranayama), and relaxation or meditation (Bussing, Hedtstuck, Khalsa, Ostermann, and Heusser, 2012; Park, Riley, Bedesin, and Stewart, 2016). Yoga has been proven to be an effective treatment for a variety of health issues, including bone problems (Haaz, and Bartlett, 2011), diabetes (Innes and Vincent, 2007), asthma (Posadzki and Ernst, 2011), pain or back pain (Posadzki, Ernst, Terry, and Lee, 2011; Wieland, Skoetz, Pilkington, Vempati, D’Adamo, and Berman, 2017), depression (Uebelacker, Epstein-Lubow, Gaudiano, Tremont, Battle, and Miller, 2010), and rehabilitation (Telles, Kozasa, Bernardi, and Cohen, 2013).

Research is a significant part of the development of the academic or educational institute. An institute’s research output is a measure of the quality of education offered and its commitment to research (Pfeffer, 2015). There are several ways to measure the quantity and quality of the research output of an institution. A bibliometric method is a tool used to assess the academic institutions’ quantitative output in scientific research (Muthappan, Ilangovan, Subramanian, Durairajan, and Elumalai, 2020). This present study planned to find the number of scientific publications in the field of yoga at web of science database.

### Objectives

The primary objective of this study to estimate the yoga-related research articles published in the Web of Science database. In particular, this study emphasizes on the following objectives: (i) To describe growth of research publication; (ii) to identify the leading countries doing research in yoga, and (iii) to identify the top 10 journals publishing yoga research papers in the web of science database.

## METHODS

### Database

Web of Science is an online platform containing databases of bibliographic information and information analysis resources

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that allow the evaluation and analysis of research performance, especially in the field of social sciences. In addition, it presents a series of analysis tools that allow specific and concrete searches to be carried out (Lopez Belmonte, Moreno-Guerrero, Lopez Nunez, and Pozo Sanchez, 2019; Moreno-Guerrero, Gomez-Garcia, Lopez-Belmonte, and Rodriguez-Jimenez, 2020). The Mesh terms are also one of the key features of Web of Science to explore and retrieve the scientific article. Hence, we have taken this database to retrieve the Yoga-related published scientific articles.

### Keywords

In this scientific analysis, we have used advance search in web of Science, and used “MeSH” term “yoga” and used the following yoga-related keywords: “Yoga”, “Asana”, “Pranayama”, “Yogasana”, “Yogic exercise”, and “Breathing Asana”. We have not restricted the timeline or country-specific for the search, so all the articles were included in this bibliometric analysis.

### Data Extraction and Analysis

Using the above-mentioned Mesh term, we found 6528 research documents in 185 filed of subjects from the web of science data base. The first exclusion criteria fixed to only one filed of subject as Sports Science, other than the field of research works not consider. In these 368 documents found from the 6528 articles. The second exclusion criteria are fixed based on the document types with respect of article only. Finally, we retrieved 144 articles and export the data in the plain text file format. The extracted data were cleaned, analyzed, and presented as frequency and proportion R Studio (biblioshiny) was used to analyze the data.

### Bibliometric Indicators

The retrieved documents from web of Science database were analyzed and we used the following bibliometric indicators:

Number of articles published over the years, top 10 countries leading in the research production and the top 10 journal, which published more number of scientific publication in the field of yoga papers in sports science.

### Ethics

Since this analysis was based on previously published research, no ethics approval was required.

## RESULTS

We retrieved 144 article type documents in sports science research articles using the mentioned mesh terms. The study finds that the first research article related to yoga in the field of sports science was published in 1989. Between 1990 and 1994, 1996, 1999, 2001, and 2009, it was found that there is no scientific research publication in the field of sports science in yoga. It was observed that there was gradual increase in article published on 1995, 1998, 2003, 2005, 2009, and 2016, respectively, as shown in Figure 1. This indicates the substantial growth of the field of Yoga globally. There was a steep increase in the number of publications from 2016 onward and the maximum number of articles (18) published was in 2020.

In sports science field, the USA country has produced more research compared with other countries with 59 (40.95%) yoga-related articles, similarly, Australia publish 14 (9.72%) of scientific research publication in the particular field of study; however, India has published 4 (2.78%) doing research in yoga in the field of Sports Science as shown in Figure 2.

Table 1 shows that the Journal of sports medicine and physical fitness publish no. of research publication 9 (6.25%) in yoga. ACSMS health and fitness journal, and Archives of physical

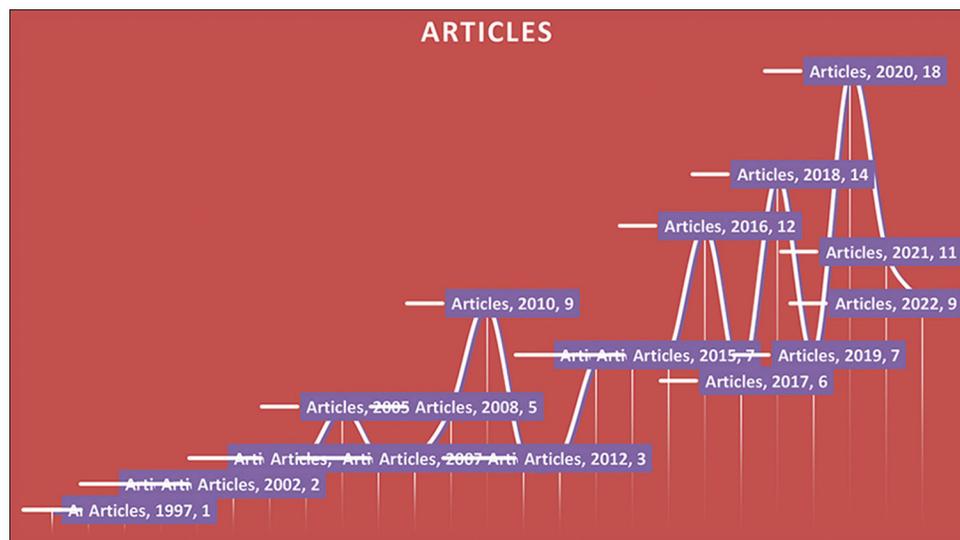
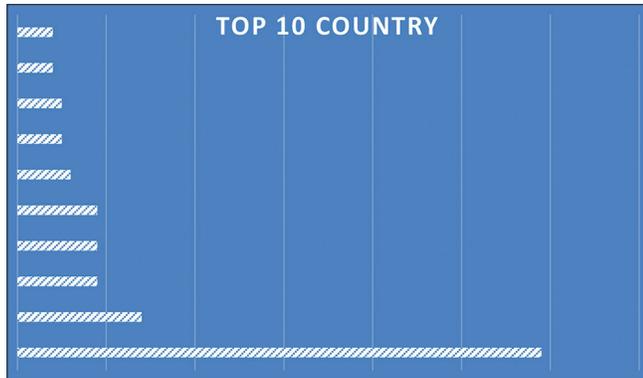


Figure 1: Year-wise publication list



**Figure 2:** Top 10 country publishing research articles

**Table 1: Top 10 sources of journals publishing the yoga research in sports science**

Rank	Sources	Articles	Percentage
1	Journal of Sports Medicine and Physical Fitness	9	6.25
2	ACSMS Health and Fitness Journal	7	4.86
3	Archives of Physical Medicine and Rehabilitation	7	4.86
4	American Journal of Physical Medicine and Rehabilitation	6	4.17
5	Journal of Aging and Physical Activity	6	4.17
6	Journal of Strength and Conditioning Research	6	4.17
7	Psychology of Sport and Exercise	6	4.17
8	Journal of Science and Medicine in Sport	5	3.47
9	Medicine and Science in Sports and Exercise	5	3.47
10	BMC Sports Science Medicine and Rehabilitation	4	2.78

medicine and rehabilitation had 7 (4.86%) in sports science field.

## DISCUSSION AND CONCLUSION

The findings from the bibliometric analysis of yoga research in sports science provide valuable insights into the growth and distribution of publications in this field. The analysis reveals interesting trends in the number of articles published over the years, the leading countries contributing to research, and the top journals publishing in this area.

The analysis shows that the field of yoga in sports science had a slow start, with the first research article being published in

1989. Notably, there were several gaps in research publications between 1990 and 2009, indicating a lack of significant interest in this topic during those periods. However, from 2016 onward, there was a remarkable surge in research output, and 2020 saw the highest number of articles published. This exponential growth in recent years suggests that yoga has gained prominence as a subject of interest in sports science research.

The analysis identifies the USA as the leading country in producing yoga-related research in sports science. The USA contributed 40.95% of the total articles retrieved, indicating its significant involvement and leadership in this field. Australia follows with 9.72% of the publications, signifying its active engagement in yoga research in sports science. India, although having a rich yoga tradition, appears to have a relatively lower contribution (2.78%) to the research in this specific field. This finding may suggest a potential area for growth and collaboration in future research endeavors between countries.

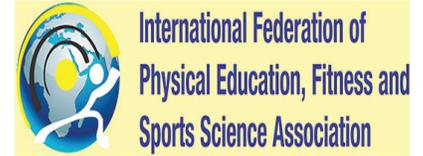
The analysis lists the top journals that have published research articles on yoga in sports science. The Journal of Sports Medicine and Physical Fitness emerges as the leading journal, publishing 6.25% of the total articles retrieved. ACSMS Health and Fitness Journal and Archives of Physical Medicine and Rehabilitation are closely following with 4.86% each. These journals are highly influential in the field of sports science and play a crucial role in disseminating yoga-related research.

Overall, this bibliometric analysis sheds light on the current state of research in yoga and sports science, providing researchers and stakeholders with valuable information to understand the trends and dynamics in this evolving field. It also offers a foundation for future research and collaboration opportunities to advance knowledge and promote the integration of yoga in sports science practices and interventions.

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## Research Article

# Effect of structured physical activity on motor proficiency in children with moderate intellectual disability

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### ABSTRACT

This research study aimed at probing the effect of structured physical activity on the selected motor proficiency variables of children with moderate intellectual disability (ID). The study followed a pre-test post-test experimental design with a randomly selected experimental group ( $n = 15$ ) and control group ( $n = 15$ ) of children from the Central Institute of Mental Retardation Trivandrum. As per the results based on the post-test data analysis, the experimental group exhibited an improved motor proficiency than the control group, following the 8-week structured physical activity program.

**Keywords:** Intellectual disability, Mental retardation, Motor proficiency

### INTRODUCTION

Intellectual disability (ID) is one of the most common and challenging developmental disorders with an onset during the developmental period of an individual. Individuals with ID must be prepared to the best of their potential for being independent in this competing world. The term ID was introduced by replacing the earlier term mental retardation, following a federal statute in the United States. The American Association on Mental Retardation defines ID as "significantly sub-average general intellectual functioning accompanied by significant limitations in adaptive functioning in at least two of the following skill areas: Communication, self-care, social skills, self-direction, academic skills, work, leisure, health, and safety. These limitations manifest themselves before 18 years of age" (Walker and Johnson, 2006).

According to DSM-V, ID (intellectual developmental disorder) includes both intellectual and adaptive functioning deficits in conceptual, social, and practical domains. ID can be of varying severity, that is, mild, moderate, severe, and profound. The subjects ( $n = 30$ ) used for this study represent the moderate severity

group of ID within the age group of 13–18 years. DSM-V clarifies the following three diagnosis criteria, which should be met for ID;

1. Deficits in intellectual functions, such as reasoning, problem-solving, planning, abstract thinking, judgment, academic learning, and learning from experience, confirmed by both clinical assessment and individualized and standardized intelligence testing.
2. Deficits in adaptive functioning that result in failure to meet developmental and sociocultural standards for personal independence and social responsibility. Without on-going support, the adaptive deficits limit functioning in one or more activities of daily life, such as communication, social participation, and independent living, across multiple environments, such as home, school, work, and community.
3. Onset of intellectual and adaptive deficits during the developmental period.

ID has got an approximate 1% of prevalence rate among the overall general population; the rate may vary based on the age. Prevalence for severe ID is approximately six per 1000 (Zvolensky *et al.*, 2019). As per the NSSO Survey 2002 on disability across various sub-population of India, 50% of the intellectual disabilities were caused by serious illness or head injury in the childhood. The study also reported that 85% of the intellectually disabled persons experience a delay in development of combination of sitting, walking, and talking. According to the

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census report on major states of India; J&K, Orissa, Kerala, Tamil Nadu, and HP were having more percentage of disabled in total population. The most common cooccurring mental and neurodevelopmental disorders are attention-deficit/hyperactivity disorder; depressive and bipolar disorders; anxiety disorders; autism spectrum disorder; stereotypic movement disorder (with or without self-injurious behavior); impulse-control disorders; and major neurocognitive disorder (Zvolensky *et al.*, 2019).

Stimulants are being used for treating most of the ID and its cooccurring disorders, which may have some serious side effects in many of the children suffering from ID. Poor motor quality or motor performance is one of the most common coexisting disorders for children with ID. Motor proficiency is the ability to perform complex neuromuscular activities that produce movement. Many researchers suggest that motor proficiency and cognitive learning ability are having a significant relationship (Abdelkarim *et al.*, 2017). Thus the study was designed for investigating the efficacy of 8 weeks physical training program on children with moderate ID, which has got the least or no side effects.

## METHODOLOGY

The findings of the study were obtained by following a pre-test-post-test true experimental design. Participants of the study were selected based on the predetermined inclusion criteria,  $n = 30$  subjects were selected for the study within the age group of 13–18 years with moderate severity of ID from Central Institute of Mental Retardation Trivandrum. Eight motor proficiency variables were selected for the study through a literature survey for evaluation, including: running speed and agility, balance, bilateral coordination, strength, upper limb coordination, response speed, visual motor control, upper limb speed, and dexterity. To isolate the effects of physical training on the variables, the subjects were grouped as control group ( $n = 15$ ) and experimental group ( $n = 15$ ) randomly.

Short form of Bruininks Osteretsky Test for Motor Proficiency was used to evaluate the motor development of the children. It is the most commonly used diagnostic test by adaptive physical education to measure the abilities of those children with ID. Instrumental reliability, subject reliability, and tester reliability

**Table 1: ANCOVA for post-treatment data on motor proficiency variables Group-1**

Variables	Sub-variables	Source	Type I sum of squares	Df	Mean Square	F	Sig.	Partial eta square
Running Speed and Agility	-	Pre-RSA	216.68	1	216.68	166.55	0.000	0.86
		Group	12.78	1	12.78	9.83	0.004	0.26
		Error	35.12	27	1.30			
		Corrected Total	264.59	29				
Balance	Standing balance	Pre-SB	208.23	1	208.23	203.09	0.000	0.88
		Group	41.45	1	41.45	40.43	0.000	0.6
		Error	27.68	27	1.025			
		Corrected Total	277.36	29				
	Walking balance	Pre-WB	97.38	1	97.38	182.39	0.000	0.87
		Group	25.56	1	25.56	47.88	0.000	0.63
		Error	14.41	27	0.53			
		Corrected Total	137.36	29				
Bilateral coordination	Tapping alternate feet	Pre-TF	1.014	1	1.014	8.387	0.000	0.23
		Group	2.386	1	32.386	19.729	0.000	0.42
		Error	3.266	27	0.121			
		Corrected Total	6.667	29				
	Jump and clap	Pre-JC	14.229	1	14.229	40.913	0.000	0.60
		Group	9.348	1	9.348	26.880	0.000	0.49
		Error	9.390	27	0.348			
		Corrected Total	32.967	29				
Strength	Standing broad jump	Pre-SBJ	56616.545	1	56616.545	1064.729	0.000	0.97
		Group	619.607	1	619.607	11.652	0.002	0.30
		Error	1435.714	27	0.628			
		Corrected Total	58671.867	29				

**Table 2: ANCOVA for post-treatment data on motor proficiency variables Group-2**

Variables	Sub-variables	Source	Type I sum of squares	Df	Mean Square	F	Sig.	Partial eta square
Upper limb coordination	Catching a tossed ball	Pre-CTB	47.697	1	47.697	54.079	0.000	0.66
		Group	33.956	1	33.956	38.499	0.000	0.58
		Error	23.814	27	0.882			
		Corrected Total	105.467	29				
	Throwing at target	Pre-TAT	35.433	1	35.433	56.422	0.000	0.67
		Group	26.410	1	26.410	42.055	0.000	0.60
		Error	16.956	27	0.628			
		Corrected Total	78.8	29				
Response Speed	-	Pre-RS	1770.571	1	1770.571	168.984	0.000	0.86
		Group	149.998	1	149.998	14.316	0.001	0.34
		Error	282.898	27	10.478			
		Corrected Total	2203.467	29				
Visual motor control	Drawing line	Pre-DL	1.429	1	1.429	9.884	0.004	0.26
		Group	0.533	1	0.533	3.688	0.065	0.12
		Error	3.904	27	0.145			
		Corrected Total	5.867	29				
	Copying circle	Pre-CC	2.363	1	2.363	18.608	0.000	0.40
		Group	0.510	1	0.510	4.014	0.055	0.129
		Error	3.428	27	0.127			
		Corrected Total	6.300	29				
	Copying overlapping	Pre-COL	4.821	1	4.821	49.825	0.000	0.64
		Group	0.066	1	0.066	0.680	0.417	0.02
		Error	2.613	27	0.097			
		Corrected Total	7.500	29				
Upper limb speed and dexterity	Sorting shape cards	Pre-SSC	75.524	1	75.524	61.670	0.000	0.695
		Group	107.711	1	107.711	87.953	0.000	0.765
		Error	33.065	27	1.225			
		Corrected Total	216.300	29				
	Making dots in circles	Pre-MDC	643.924	1	643.924	291.035	0.000	0.915
		Group	230.204	1	230.204	104.045	0.000	0.794
		Error	59.738	27	2.213			
		Corrected Total	933.867	29				

were established using product moment correlation. Pre-test data and post-test data pertaining to all the variables were collected from the subjects ( $n = 30$ ) and the data analyses were done using descriptive as well as inferential statistical techniques.

## ANALYSIS

The findings of the study are illustrated in the following tables;

Table 1 clarifies ANCOVA results of Group-1 motor proficiency variables such as running speed and agility,

balance, bilateral coordination, and strength. According to the data, all the variables had a significant effect followed by the physical activity protocol, since the significance or  $P$  is  $< 0.05$ . The partial eta square or the effect size ranged between small and medium based on Cohen's classification, that is, small ( $d = 0.2$ ), medium ( $d = 0.5$ ), and large ( $d > 0.8$ ). Sub-variables such as standing balance and walking balance exhibited the highest effect size when compared.

Table 2 illustrates the ANCOVA report of Group-2 motor proficiency variables such as upper limb coordination, response

speed, visual motor control, upper limb speed, and dexterity. Among which upper limb coordination, response speed, upper limb speed, and dexterity showed a significant improvement while visual motor control was not significant as the *P* value was greater than the selected level of significance (0.05). According to Cohen's classification of effect size many of the variables had medium to large partial eta square scores, among which upper limb speed and dexterity exhibited the maximum range (>70).

## DISCUSSION

This study was designed to find out the effect of physical training on children with moderate ID. And as a result of 8-week training intervention, the experimental group exhibited improvements in running speed and agility. It is implicit that speed could have improved due to an improvement in strength, neuromuscular coordination, and flexibility. Emphasis on posture and repeated activities meant to develop a kinaesthetic sense and concentration resulted in improving balance of the experimental group. A significant improvement was exhibited by the experimental group on findings associated with variables such as upper limb coordination and upper limb dexterity. Activities such as throwing, catching, and rolling the ball might have improved the motor unit stimulation and coordination. An improvement in strength was also noticed in the post-test result analysis. It might be due to the improved nervous recruitment, proper muscle involvement through right movement pattern

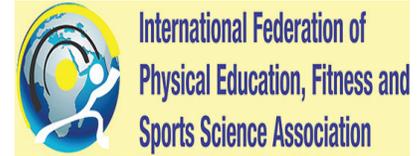
and concentric contraction of muscles. Response speed or the ability to respond quickly was not having a significant improvement, probably due to the restricted duration and intensity of training.

## CONCLUSION

Regular physical activity or quality adaptive physical education can help the children with ID to optimize their functional skills and cognitive abilities. It was also noticed that the regular physical activity improved the social qualities, patience, and obedience of children with ID. Thus, it is recommended to give emphasis on physical activity and lifestyle modification along with institutional training to develop their potential.

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## Research Article

# Practice of yogasana and pranayama on physical parameters of adolescents boys

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### ABSTRACT

The purpose of the present investigation was to elicit the effects of yogasana and pranayama practice on physical and physiological parameters of male adolescents. The subjects for the study were adolescent boys studying between 13 and 16 years. Total 80 subjects studying at a private school were selected through simple random sampling technique for the present investigation. 40 subjects each were placed in treatment as well as control group. All the subjects selected for this study were tested twice before treatment (pre-test) and at the conclusion of treatment (post-test) with a time gap of 24 weeks. Selected physical capability parameters and testing tools were used in the present investigation. Treatment in the form of selected yogic asana along with pranayama was given to selected subjects in the specified treatment group. Twenty-four weeks of training included systematic yogasana and pranayama training for 6 days in a week. To examine the hypothesis of the study, paired samples "t" test was used. There were significant differences in pre and post-test scores of experimental group and such a difference was not found in control group. In case of relative shoulder strength, abdominal strength, normal chest circumference, and expanded chest circumference although there were significant differences in pre and post-test scores of experimental group, significant differences were also observed in control group results. On the basis of the results obtained from the present investigation, it is concluded that 24-week yogasana training improves physical capabilities including leg strength and flexibility in adolescent boys. Hence, yoga should be practiced regularly to improve physical dimension of the health.

**Keywords:** Adolescents, Health, Physical fitness, Pranayama, Yogasana

### INTRODUCTION

The nature of children's recreational pursuit has changed significantly over the last few decades. The emergence of television, computer games, and the internet has tremendously reduced time stipulated for outdoor recreational activities. The present-day children are now spending much of their free time engaged in sedentary pursuits. Regular physical activity is associated with health and longevity.<sup>[1,2]</sup> However, the majority of adults and young people around the globe are insufficiently physically active for health benefits. The situation is similar in both developed and developing countries, with a large body of research evidence indicating declining levels of physical activity and physical fitness within all age groups. Physical inactivity is widely recognized as a major risk factor

for chronic diseases and ranks between the second and sixth most important risk factor in contributing to the population burden of disease in the society.<sup>[3-5]</sup> Its prevalence is higher than that of all other modifiable risk factors.<sup>[5]</sup> Physical inactivity during the early years of life is currently indicated as a major contributor to the increasing levels of obesity, and other serious medical conditions, being seen in children and adolescents in Europe and elsewhere.<sup>[6,7]</sup> The increase in political, media, and scientific interest on obesity since the late 1990's has placed physical activity on top among current public health issues. The word "yoga" comes from a Sanskrit root "yuj" which means union, or yoke, to join, and to direct and concentrate one's attention.<sup>[8,9]</sup> Regular practice of yoga promotes strength, endurance, and flexibility and facilitates characteristics of friendliness, compassion, and greater self-control, while cultivating a sense of calmness and well-being.<sup>[10,11]</sup> Sustained practice also leads to important outcomes such as changes in life perspective, self-awareness, and an improved sense of energy to live life fully and with genuine enjoyment.<sup>[12-14]</sup>

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Yoga has been practiced for 1000 of years. It is based on ancient theories, observations, and principles of the mind–body connections. Substantial research has been conducted to look at the health benefits of yoga – yoga postures (asanas), yoga breathing (pranayama), and meditation. Adolescence is a Latin word means “to grow up” is a transitional stage of physical and mental human development generally occurring between 12 years and 19 years. Adolescence is a transitional stage of physical and mental human development generally occurring between puberty and legal adulthood. Dramatic changes in the body, a development in a person’s psychology and transitions through one’s academic career being occurs in this period. It is generally regarded as an emotionally intense and often stressful period. Yoga physiology is the study of how the body reacts and adapts to yogic exercise, in both the long and short term to a routine (Smith, 2007). The present application of yoga as a therapeutic intervention takes advantage of the

various psycho-physiological benefits of the component practices. Numerous scientific studies have reported beneficial physical and physiological changes after yoga training. Yogic techniques produce consistent physiological changes and have sound scientific basis.<sup>[15,16]</sup> In philosophical terms, yoga refers to the union of the individual self with the universal self.<sup>[17]</sup> Numerous studies have indicated improvement in physical and physiological functions due to regular practice of yoga. Yoga and pranayam may be as effective as or better than exercise at improving a variety of health-related outcome measures.<sup>[18]</sup> Despite a growing body of clinical research studies and some systematic reviews on the therapeutic effects of yoga, there is still a lack of solid evidence regarding its physical and physiological benefits. There is inconsistent evidence with several studies reporting positive effects of the yoga interventions, but other studies are less conclusive. The discrepancies might have been resulted from differences between the study populations (e.g., age, gender, and health status) and the details of the yoga interventions. The purpose of the present investigation was to elicit the effects of yogasana and pranayama practice on physical parameters of male adolescents.

**Table 1: Details on physical capabilities along with respective testing tools**

S. No.	Physical parameters	Testing tools
1	Leg Strength	Leg Dynamometer test
2	Shoulder Strength	Standing Vertical Arm Press Test
3	Abdominal Strength	Sit up test (knee bending)
4	Flexibility	Stand and Reach test
5	Body Weight	Weighing Machine
6	Chest assessment	Measuring Steel Tape

## METHODOLOGY

The subjects for the study were adolescent boys studying in 7<sup>th</sup>–10<sup>th</sup> standard and their age ranged between 13 and 16 years. Total 80 subjects studying at a private school at Mysore were selected through simple random sampling technique for the present investigation. 40 subjects each were placed in

**Table 2: Summary of results on physical capabilities at pre and post- test situations of experimental group**

	Relative Shoulder Strength		Leg Strength		Abdominal Strength		Flexibility		Normal Chest Circumference		Expanded Chest Circumference	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Sample size	40	40	40	40	40	40	40	40	40	40	40	40
Arithmetic mean	.4238	.5313	64	85	14	24	22	28	28	29	31	34
Standard deviation	.09	.10	13.15	21.55	5.34	7.16	6.24	4.37	2.07	2.08	2.08	2.22
Standard error of the mean	.0135	.0157	2.0786	3.4068	.8447	1.1323	.9864	.6913	.3274	.3276	.3285	.3515
Paired samples t-Mean difference	-1.075		-21.6000		-9.8500		-6.2425		-.7500		-1.3775	
Standard deviation	.089		17.0907		3.6483		3.9819		.2996		.8511	
't' value	7.639		7.993		17.075		9.915		15.834		10.236	
Degrees of Freedom	39		39		39		39		39		39	
Two-tailed probability	P = .000		P = .000		P = .000		P = .000		P = .000		P = .000	

**Table 3: Summary of results on physical capabilities at pre and post- test situations of control group**

	Relative Shoulder Strength		Leg Strength		Abdominal Strength		Flexibility		Normal Chest Circumference		Expanded Chest Circumference	
	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test	Pre-Test	Post-Test
Sample size	40	40	40	40	40	40	40	40	40	40	40	40
Arithmetic mean	.4483	.4203	64	64	14	12	17	17	29	31	30	32
Standard deviation	.13	.12	15.38	15.22	8.26	7.25	7.83	9.09	4.04	3.80	3.80	3.78
Standard error of the mean	.0207	.0186	2.4315	2.4059	1.3063	1.1470	1.2384	1.4372	.6384	.6011	.6010	.5980
Paired samples t-Mean difference	.0280		-3.650		1.6500		-.7900		-1.8575		-1.5200	
Standard deviation	.0353		6.7555		2.0575		6.2331		1.0333		.5543	
't' value	5.014		.342		5.072		.802		11.370		17.342	
Degrees of Freedom	39		39		39		39		39		39	
Two-tailed probability	P = .000		P = .734		P = .000		P = .428		P = .000		P = .000	

**Table 4: Summary of “t” test results on physical capabilities at pre and post-test situations of both groups**

		Mean ± SD	SEM	“t” Value
<b>Relative Shoulder Strength</b>	Experiment (Pre-test)	.4238 ± .09	.0135	7.639
	Experimental (Post-test)	.5313 ± .10	.0157	
	Control (Pre-test)	.4483 ± .13	.0207	5.014
	Control (Post-test)	.4203 ± .12	.0186	
<b>Leg Strength</b>	Experiment (Pre-test)	64 ± 13.15	2.0786	7.993
	Experimental (Post-test)	85 ± 21.55	3.4068	
	Control (Pre-test)	64 ± 15.38	2.4315	342
	Control (Post-test)	64 ± 15.22	2.4059	
<b>Abdominal Strength</b>	Experiment (Pre-test)	14 ± 5.34	.8447	17.075
	Experimental (Post-test)	24 ± 7.16	1.1323	
	Control (Pre-test)	14 ± 8.26	1.3063	5.072
	Control (Post-test)	12 ± 7.25	1.1470	
<b>Flexibility</b>	Experiment (Pre-test)	22 ± 6.24	.9864	9.915
	Experimental (Post-test)	28 ± 4.37	.6913	
	Control (Pre-test)	17 ± 7.83	1.2384	.802
	Control (Post-test)	17 ± 9.09	1.4372	
<b>Normal Chest Circumference</b>	Experiment (Pre-test)	28 ± 2.07	.3274	15.834
	Experimental (Post-test)	29 ± 2.08	.3276	
	Control (Pre-test)	29 ± 4.04	.6384	11.370
	Control (Post-test)	31 ± 3.80	.6011	
<b>Expanded Chest Circumference</b>	Experiment (Pre-test)	31 ± 2.08	.3285	10.236
	Experimental (Post-test)	32 ± 2.22	.3515	
	Control (Pre-test)	30 ± 3.80	.6010	17.342
	Control (Post-test)	32 ± 3.78	.5980	

treatment as well as control group. All the subjects selected for this study were tested twice before treatment (pre-test) and at the conclusion of treatment (post-test) with a time gap of 24 weeks. The details on physical parameters and testing tools are given in Table 1.

Treatment in the form of selected yogic asana along with pranayama was given to selected subjects in the specified

treatment group. Control group did not take part in any form of physical training and observed normal daily routine. Twenty-four weeks of training included systematic yogasana and pranayama training for 6 days in a week. The training was scheduled in the morning 80 min which included 10 min for warm up, 60 min for pre-planned treatment, and another 10 min for cool down. To examine the hypothesis of the study, paired samples “t” test was used.

## RESULTS

The results on pre and post-test situations of experimental and controlled groups, respectively, are given in Tables 2 and 3, respectively.

Table 4 depicts that mean of leg strength on pre-test and post-test of experimental group was 64 and 85, respectively, whereas the mean of leg strength of pre-test and post-test of control group was 64 and 64, respectively. The “t” value in case of experimental group was 7.993 and for control group, it was 342, respectively. The flexibility on pre-test and post-test of experimental group was 22 and 28, respectively, whereas the mean of flexibility of pre-test and post-test of control group was 17 and 17, respectively. The “t” value in case of experimental group was 9.915 and for control group, it was 0.802, respectively. In these cases, null hypothesis is rejected at 0.05 level of significance. In case of relative shoulder strength, abdominal strength, normal chest circumference, and expanded chest circumference although there were significant differences in pre and post-test scores of experimental group, significant differences were also observed in control group results.

## DISCUSSION

Yogasana and pranayama practice have innumerable health benefits. Its regular practice enhances quality of life. Results from study by Woodyard<sup>[19]</sup> show that yogic practices enhance muscular strength and body flexibility. The present investigation exhibited significant differences in leg strength and flexibility among adolescent boys receiving 24 weeks yogasana and pranayama training. The finding from the present study is supported by many similar studies. Petrofsky *et al.*<sup>[20]</sup> highlighted that the yoga and yoga-related training increases the abdominal muscular endurance among the obese people. Karunakaran and Ramesh<sup>[21]</sup> suggested that 12 weeks of yogic pranayama and meditation improve the hip flexibility level. Similarly, Ramesh and Subramaniam<sup>[22]</sup> confirm that yogic practices improve the level of flexibility.

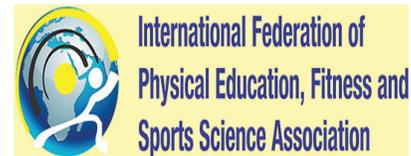
## CONCLUSION

Regular practice of yogasana and pranayama enhances physical capabilities. On the basis of the results obtained

from the present investigation, it is concluded that 24-week yogasana training improves physical capabilities including leg strength and flexibility in adolescent boys. Hence, yoga should be practiced regularly to improve physical dimension of the health.

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## Research Article

# Comparison of upper body muscle strength among Kabaddi players and Kho-Kho players of Yadadri Bhuvanagiri district between the age group of 14 and 16 years

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### ABSTRACT

The purpose of the study was to find the effect of upper body muscle strength among Kabaddi players and Kho-Kho players of Yadadri Bhuvanagiri district. For the present study, the 25 Kabaddi players and 25 Kho-Kho players of Yadadri Bhuvanagiri District between the age group of 14 and 16 years. The pull-ups test pre and post-test were conducted among two groups to assess upper body muscle strength. The Kabaddi players mean in pull-ups test is 12.12 and Kho-Kho players mean is 8.48. The standard deviation of Kabaddi players is 1.379 and Kho-Kho players is 0.146. Hence, Kabaddi players are having better pull-ups performance compare to Kho-Kho players. Hence, there is difference between Kabaddi players and Kho-Kho players in pull-ups, i.e., upper body muscle strength. The Kabaddi players performance is better than Kho-Kho players in pull-ups test.

**Keywords:** Kabaddi, Kho Kho, Pull-ups etc.

### INTRODUCTION

Sports activities are classified into several areas such as performance sports, physical education, rehabilitation sports, fitness, leisure sports, and adventure sports. Each area of sports caters to the requirements and demands of a particular section of the society. The area of performance sports has gained much more publicity and importance than the other areas.

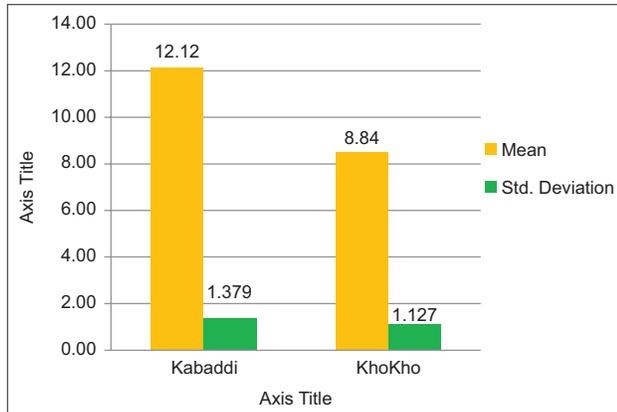
Kabaddi is a contact team sport played between two teams of seven players. The objective of the game is for a single player on offense, referred to as a “raider”, to run into the opposing team’s half of the court, touch out as many of their players and return to their own half of the court, all without being tackled by the defenders in 30 s. Points are scored for each player tagged by the raider, while the opposing team earns a point for stopping the raider. Players are taken out of the game if they are touched or tackled but are brought back in for each point scored by their team from a tag or a tackle.

The game of Kho Kho is based on natural principles of physical development. It is vigorous and fosters a healthy competitive spirit among youths. It is not merely running with speed but it is a “CHASE” a natural instinct to overtake to pursue, to catch a kill. No doubt speed is the heart and to stand to a relentless pursuit of 9 min at a stretch (turn), this heart demands stoutness, Velu and Arumugam (2018) studied the analysis of selected biomotor qualities between Kabaddi and Kho-Kho players to achieve the purpose of the study 60 men Kabaddi ( $n= 30$ ) and Kho Kho ( $n= 30$ ) players, who were participated intercollegiate tournament in the Manonmaniam Sundaranar University intercollegiate competitions, Tirunelveli during academic year of 2017–2018 were selected. The selected players’ ages ranged from 18 to 25 years. The selected biomotor qualities variables for this study were speed, agility, and muscular strength of Kabaddi and Kho-Kho players. The selected variables were tested with standardized test items. The speed was assessed by 50 m dash, agility was assessed by  $4 \times 10$  m shuttle run, and muscular strength was assessed by bent knee sit-ups. The static group comparison design was employed for the study. The collected data were statistically analyzed by using independent “*t*” test. In this case, 0.05 level of significance was used to test the hypothesis. It is concluded that there was

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**Figure 1:** Comparison of mean among “Kabaddi Players” and “Kho-Kho Players” in pull-ups

**Table 1: The significant mean difference between pull-up players between Kabaddi and Kho-Kho players is tested using one-way ANOVA**

Pull-ups					
Descriptives	n	Mean	Standard deviation	Standard error	
Kabaddi	60	12.12	1.379	0.178	
Kho Kho	60	8.48	1.127	0.146	
Total	120	10.30	2.214	0.202	
ANOVA					
	Sum of squares	df	Mean square	F	Sig.
BG	396.033	1	396.033	249.681	0.000
WG	187.167	118	1.586		
Total	583.200	119			

a significant differences exist between Kabaddi and Kho-Kho players on selected biomotor qualities such as speed, agility, and muscular strength.

### Purpose of the Study

The purpose of the study was to find the effect of upper body muscle strength among Kabaddi players and Kho-Kho players of Yadadri Bhuvanagiri district.

## METHODOLOGY

For the present study, the 25 Kabaddi players and 25 Kho-Kho players of Yadadri Bhuvanagiri district between the age group of 14 and 16 years. The pull-ups test pre and post-test were conducted among two groups to assess upper body muscle strength.

## RESULTS AND DISCUSSION

The Kabaddi players mean values in pull-ups are 12.12 and Kho-Kho players mean values are 8.48. Hence, Kabaddi players are having better pull-ups score compared to Kho-Kho players. The sum of squares) and mean square between the Groups is 396.033 the F value is 249.681 and Sig. of ANOVA is 0.000 that is below the value of 0.05. As a result, there are differences in pull-ups between Kabaddi and Kho-Kho players. The Kabaddi players performance is better in Kho-Kho players in pull-ups, i.e., upper body muscle strength.

The Kabaddi players mean in pull-ups is 12.12 and Kho-Kho players mean is 8.48. The standard deviation of Kabaddi players is 1.379 and Kho-Kho players is 1.127. Hence, Kabaddi players have better pull-ups compared to Kho-Kho players.

## CONCLUSION

It can be concluded that there is a significant difference between Kabaddi players in Kho-Kho players. The Kabaddi players have better upper-body muscle strength compared to Kho-Kho players.

### Recommendations

Based on the results of the present study, we are highlighting the selected upper body muscle strength between kabaddi and Kho-Kho players. The following recommendations are made on the basis of the results from the study which may be useful for future research work. The same study may be repeated on the other class of the society for different age groups. The study also helps the physical educationists and coaches understanding the knowledge and performance of the players.

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## Research Article

# The role of physical education activities in school education at Karaikal district

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### ABSTRACT

Physical education is not merely a play-time or leisure activity that brings satisfaction and comfort to individuals. It is the face of education and shares the same objectives as education in general. Physical education should be considered one of the most important parts of the school curriculum. It has several contributions to the total life of students in schools, and one of the major contributions is the promotion of the level of health and physical fitness among students. To ensure the total benefit of physical education for students, it needs to be well taught and organized through an effective physical education program for schools. The physical education teacher is the first factor to be concerned about in an effective physical education program. Taking this into account, it may be assumed that physical education teachers need to be prepared more carefully through effective professional preparation programs.

**Keywords:** Leisure-time, Physical activity, Physical education students, Physical education teachers, Physical education, School physical education

### INTRODUCTION

It can be argued that physical education can lay the foundations of pupils' physical health and lifelong active lifestyle. Quality physical education ought to provide pupils the opportunity for physical development and movement as well as a suitable milieu for personal and social development (Konstantinos and Owe, 2011). There is a relationship between physical education and health, and they are two sides of one coin. Physical education is a way of promoting high standards of health, and health is an integral part of physical education as well. Physical activity is defined as any bodily movement produced by skeletal muscles that result in energy expenditure (Caspersen *et al.*, 1985). Evidence suggests that increasing physical activity and physical fitness may improve academic performance and that time in the school day dedicated to recess, physical education class, and physical activity in the classroom may also facilitate academic performance. Physical education is the foundation of a Comprehensive School Physical Activity Program. It provides cognitive content and

instruction designed to develop motor skills, knowledge, and behaviors for physical activity and physical fitness (Centres for Disease Control and Prevention, 2011). Today, we urge our children to play to increase their knowledge when playing for later, when they are adults. Scientific research over the past 30 years has taught us that the most important period of human development is from birth to 8 years old. Four during these years, the development of cognitive skills, emotional well-being, social competence, and sound physical and mental health builds a strong foundation for success well into the adult years. Play is one of the most important ways in which young children gain essential knowledge and skills (UNICEF, 2018).

### PHYSICAL EDUCATION FOR LEISURE

Play is of vital importance for the healthy development of children. It allows children and adolescents to develop motor skills, experiment with their (social) behavioral repertoire, simulate alternative scenarios, and address the various positive and negative consequences of their behavior in a safe and engaging context (Sanne *et al.*, 2018). Play is considered one of the most important physical needs of the individual, and is as important as rest, recreation, and enjoyment. It is a free time activity, voluntarily chosen which provides joy,

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satisfaction, and development for the individual. Croombridge, wrote; we need to be thinking about it in very large comprehensive terms. We need leisure to rest; we need it for recreation, but also need it for development (Croombridge, 1966). The importance of play and recreation in the life of every child has long been acknowledged by the international community, as evidenced by the proclamation in the 1959 Declaration of the Rights of the Child (United Nations, 2013). Today life full with drastic change, violence, economic problem, rhythm of work, sorrow and joy, health and sickness. People from all economic levels and ages should have to think seriously of how to get away from the insufficiency, meaninglessness, and monotony of their lives. They need to find ways to spend their free time in meaningful activities to gain joy and happiness. Needless to say that the most significant differences between play and work are the degree of enjoyment that comes from either. Participating in different kinds of vigorous activities during free time will bring deep satisfaction and release from tension. Moderate-intensity activities are those that get you moving fast enough or strenuously enough to burn off 3–6 times as much energy per minute as you do when you are sitting quietly, or exercise that clock in at 3–6 METs. Vigorous-intensity activities burn more than six METs (Harvard T.H.CHAN, 2020). Vannier in his study pointed out that; work and play are like the two sides of a coin: each is an integral part of the other. We work so we can play or enjoy life during our free time, but we play so that we can work more productively (Vannier, 1966). Today, our children need to be taught how to play as well as how to work. Through vital physical activities, the child and the adult are revitalized, refreshed, and recreated. One of the important contributions which good primary or secondary physical education programs provide is that they enable students to make wise use of their leisure time. It helps them to develop tools with which they can play more effectively and efficiently as children, and later as adults.

## PHYSICAL EDUCATION FOR HEALTH

There is a relationship between physical education and health, and they are two sides of one connection. Physical education is a way of promoting high standards of health, and health is an integral part of physical education as well. Physical activity is central to health, and its importance clearly extends beyond its role in achieving energy balance to prevent and treat obesity and overweight. Adequate daily physical activity improves cardiovascular health, metabolic health, brain and mental health, and musculoskeletal health-benefits (Kohl and Cook, 2013). Obesity is a complex disease that affects whole body metabolism and is associated with an increased risk of cardiovascular disease (CVD) and Type 2 diabetes (Pinckard *et al.*, 2019). Regular physical exercise has several beneficial effects on overall health. While decreasing body mass and adiposity are not the primary outcomes of exercise, exercise can mediate several diseases that accompany obesity including Type 2 diabetes and CVD (Ashor *et al.*, 2015). There are several risk factors leading to the development and progression of CVD, but one of the most

prominent is a sedentary lifestyle (American Heart Association American Heart Disease and Stroke Statistics, 2018). A sedentary lifestyle can be characterized by both obesity and consistently low levels of physical activity. Ajisafe defines the meaning of health as follows: Health may be defined as a state of physical and mental well-being which enables the individual to live and to work at his optimum efficiently (Ajisafe, 1980). Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (Felman, 2020). Today, there is a great emphasis on the vital role of vigorous exercise and fitness in improving the health of the individual. People who are able to achieve good health and fitness should be able to live a more successful life, and this should also mean they would be less affected by disease. Clearly, the national strategy for controlling heart disease and its associated problems of obesity, hypertension, stroke, and diabetes, calls for vigorous activity in the lives of persons at all ages (Seefeldt, 1984). Reaching a high standard of health depends on the development of both physical well-being, fitness, and the practice of good habits for healthy living. This implies that promotion of physical well-being and fitness is one of the procedures needed to get good health, and these come from continuous and regular participation in physical activities. Optimum physical fitness cannot be developed without giving consideration to emotional, mental, and social fitness as well as to the development of healthful habits of living (Baley and Field, 1976). Through vigorous participation in a daily physical activity, people physical strength and shape will be enhanced and their daily work will be better. Physical education has another contribution to health. It helps students to know something of the capacities and limitation of their bodies, and gives them knowledge of how to improve their fitness and health. One of the highest goals of physical education programs in the schools is to achieve positive health among students. If this goal were achieved, the result would be a healthy and fit population of students who could act and react with high efficiency in modern society. Baley and Field give a picture of school health services with which this present writer agrees; Obviously in teaching physical education activities, physical educators cannot devoted a large amount of time to direct teaching of health but they can provide health learning whenever the opportunity presents itself. These opportunities are presented quite often. Comments can be made regarding posture, cleanliness, adequate rest, exercise, nutrition, smoking, and use of alcoholic beverages (Baley and Field, 1976). School lessons and other supervised periods are the only formal opportunities for the promotion of the knowledge, skills, attitudes, and values that underpin regular physical activity (Cale, 2020).

## PHYSICAL EDUCATION FOR EDUCATION

Physical Education is “education through the physical.” It aims to develop students’ physical competence and knowledge of

movement and safety, and their ability to use these to perform in a wide range of activities associated with the development of an active and healthy lifestyle (The Government of the Hong Kong Special Administrative Region, 2018). Play could be considered as a phase of learning, and learning as a phase of play as well. When children take part in various physical activities (jumping, throwing, and running), they will discover new environments, and their well-being will be promoted to and perhaps lead to reflective thinking. Hoffman *et al.* in their study pointed out that; Play is now considered part of the total learning experience rather than a diversion from academically respected experiences (Hoffman *et al.*, 1981). Play is multifaceted, complex, and dynamic, eluding easy definition. It is usually felt to be a universal activity and children are often portrayed as having an inherent desire and capacity to play (The Education Hub, 2019). A study which was conducted by the Maryland State Department of Education stressed the key role of physical education in the whole of the educational process. The study has identified that; Physical education is that essential part of the total educational experience which, through physical activity, contributes to the physical, mental, social, and emotional development of the individual (Maryland State Department of Education, 1983). Today, we urge our children to play to increase their knowledge when playing for later, when they are adults. By being actively involved in your child's play, you can help them learn and grow. You create opportunities to build a supportive and trusting relationship with your child and help build them up in the process. You have the power to help your child unlock the power of play! (Kylie Rymanowicz, Michigan State University Extension, 2015). Now we have realized the fact of the importance of physical education in our life. Needless to say, the person who has good well-being and health is more able to develop his abilities (such as acquisition of a variety of knowledge) than the person who has poor well-being and health. Andrew in his study points out that; because physical education is an integral part of education its activities must be selected and directed by the same criteria as education (Andrew, 1979). Play is children's work. Through play, children learn academic skills like math, science, reading, language, and literacy. They learn social skills like effective communication, conflict resolution, problem-solving, and cooperation (Kylie Rymanowicz, Michigan State University Extension, 2015). Learning through play has emerged as an important strategy to promote student engagement, inclusion, and holistic skills development beyond the preschool years (Rachel Parker *et al.*, 2022). Available evidence suggests that mathematics and reading are the academic topics that are most influenced by physical activity. These topics depend on efficient and effective executive function, which has been linked to physical activity and physical fitness (NIH National Library of Medicine, 2013).

This means that there is a relationship between physical education and education, and both of them strive to achieve

similar objectives. It seems very hard to find a study or an article concerned with the objectives of education which did not identify that one of the major objectives of education is to create good citizens. A good citizen is one who works conscientiously at this job and is able to be more productive. A good citizen lives peacefully and comfortably with his neighbors. Hoffman *et al.* identify the basic general aims of education as follows; as has always been true, the positive aspect of basic of education is that the fundamental skills are the foundation for mastery learning in all school subjects and the development of a fully functioning person (Hoffman *et al.* 1981). Today physical education plays an important role in the curriculum. From the writer's experience as a teaching staff member, it was noticed that students who participate actively in physical activities are more advanced and productive than their colleagues who do not participate in physical activities. This implies that physical education has an effect on the educational levels of students in schools. Today, teachers of physical education have a great function in the school. They should do their best to educate the administration and their other colleagues about the important function of physical education. They should explain how much benefit students could gain by participating in physical American Alliance for Health, Physical Education, Recreation and Dance, indicated that; save your job, save your program, you have to prove their worth. You have to show that physical education has educational value and is a vital part of the elementary school curriculum. You have to believe it and do something about it (Sakola and Parent, 1983).

## THE PREPARATION OF PHYSICAL EDUCATION TEACHERS

The youth of today may have been somewhat deprived of natural opportunity for active physical activities which are a biological necessity for optimum growth. The development of physical fitness and the acquisition of a variety of motor skills are fundamental needs to the individual. The physical education program should become one of the most vigorous means which help in meeting these needs. Physical education activities, under good leadership, would provide an excellent opportunity to those people involved in them. Physical education refers to the systematic learning of athletic, motor, and cognitive skills as well as the structured influence on student's habitual inclinations and health "about," "through" and "in" movement taught by certified teachers within school settings (Konstantinos and Göran, 2021). To accomplish these stated purposes, provision must be made in institutions of higher learning for the development of leadership essential to the success of such programs. It could be assumed that good professional preparation would create good teachers, and competent teachers could provide more advanced physical education programs. The teacher is the most important factor in a successful physical education program. Good qualified

teachers provide excellent leadership which can overcome poor equipment and facilities in schools. Sakola and Parent stated that; the teacher must come into our schools well prepared and certified to teach young children (Sakola and Parent, 1983). It seems that physical education teachers have a central role realizing curricular goals, transforming sports science and pedagogical knowledge into practice, taking into account the developments of the sport movement, and negotiating with local agents such as parents (Kougioumtzis, 2006; Kougioumtzis and Patriksson, 2009). A report presented to the Professional Preparation Conference of the American Association of Health, Physical Education, Recreation held in Washington in 1962, put forward four disciplines as the requirements for accepting students to physical education colleges. These included; students should be in good health, they should demonstrate desirable social traits, they should have potential for development in communication skills, and should have a science and humanities background. It also was recommended that students who submitted applications to the physical education courses should not chose for teaching a variety of sports activities only, but for leadership too (American Association of Health, Physical Education, Recreation, 1962). Hess agreed with above criteria for accepting students to physical education colleges and suggested the following; students should have an acceptable personality, they should possess emotional stability, they should have moral ethics, they should have general intelligence, and finally they should have a professional interest in teaching physical education (Hess, 1969). Bennet recommended that all physical education departments should start to establish a special clinical examination for students who wish to study physical education courses as their field of study. This will be to ensure more suitable students for study at these departments (Bennet, 1971). Whitehead *et al.* gave an important starting point for the procedures used in accepting students on physical education courses in British Universities, Colleges, and Institutions. Students who wished to gain a place in physical education courses had to involve themselves in difficult competition. The physical education institutes would evaluate applicant's application forms in different ways. The comments of the head teachers of students and their referees, student's involvement in a variety of sports and games, and other extra-curricular activities would all have weight in the selection process (Whitehead *et al.*, 1983). It should be noticed that the above authors all placed great emphasis on the quality of prospective physical education teachers for schools. They put forward a number of elements to be taken into account as criteria for the selection of students for the physical education courses at universities and colleges. They clearly believed that only students with high standards should be able to gain a place in a physical education college. One of the aims of this study is to improve the procedure used for accepting students at the physical education departments. Physical education students should have an appropriate cluster of social and physical traits,

as well as good health if they wish to be models in schools when they are teachers. How pupils can believes in physical education and its objectives if the physical education teachers are overweight or of poor appearance? Such teachers should set examples to pupils, and thus provide leadership.

## CONCLUSION

Play is considered one of the most important physical needs of the individual, and is as important as rest, recreation, and enjoyment. It is a free time activity, voluntarily chosen which provides joy, satisfaction, and development for the individual. Physical education is the foundation of a comprehensive school physical activity program. It provides cognitive content and instruction designed to develop motor skills, knowledge, and behaviors for physical activity and physical fitness. Physical education is not merely a play-time or leisure activity which brings satisfaction and comfort to individuals. It is a facet of education and shares the same objectives as education in general. There is a relationship between physical education and health, and they are two sides of one conn. Physical education is a way of promoting high standards of health, and health is an integral part of physical education as well. Needless to say, the person who has good well-being and health is more able to develop his abilities (such as acquisition of a variety of knowledge) than the person who has poor well-being and health. Physical education activities, under good leadership, would provide an excellent opportunity to those people involved in them. The teacher is the most important factor in a successful physical education program. Good qualified teachers provide excellent leadership which can overcome poor equipment and facilities in schools. Taking this into account, it may be assumed that the physical education teachers need to be prepared more carefully through effective professional preparation programs. It could be assumed that good professional preparation would create good teachers, and competent teachers could provide more advanced physical education programs.

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## Research Article

# Effect of resistant band training on lower limb muscular strength of basketball players of Gulbarga University

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### ABSTRACT

Demand for the time of basketball match increasing due to the highness of the prodigious sports training inventions. Acclimatize to the demands of the competitions needs training modifications to tolerate high-level pressure and fatigue during the match. The objective of this study was to find out the effect of resistant band training on the lower limb muscular strength of Basketball players. To achieve, this purpose 30 ( $n = 30$ ) basketball players were selected from Gulbarga University, Karnataka, and their age ranged between 18 and 24 years. The subjects were divided at random into two groups of 15 each, Group I underwent resistant band Training ( $[n = 15, 50-60 \text{ min/day}/4 \text{ days/week}$  over the period of 8 weeks]), and Group II acted as control group ( $n = 15$ ) Muscular strength was assessed by half-squad test. Data were collected on half squad before and after the training period and were subjected to statistical treatment using analysis of the “t” ratio for the dependent group. In all the cases, a 0.05 level of confidence was fixed to test the significance. Within the limitations set for this study, it was concluded that the experimental group was significantly improved lower limb muscular strength than the control. Resistant band training shows a better effect ( $F = 3.88^*$ ) than the control group. Hence, it was recommended that include of resistant band training during medium- and long-duration matches May supports to the players to improve physiological status, ability to tolerate different positional demands, and reduce monotonous.

**Keywords:** Resistance band, Muscular strength.

### INTRODUCTION

Basketball is a team sport in which two teams, most commonly of five players each, opposing one another on a rectangular court, compete with the primary objective of shooting a basketball (approximately 9.4 inches [24 cm] in diameter) through the defender’s hoop (a basket 18 inches (46 cm) in diameter mounted 10 feet (3.048 m) high to a backboard at each end of the court while preventing the opposing team from shooting through their own hoop. A field goal is worth two points, unless made from behind the three-point line, when it is worth three. After a foul, timed play stops and the player fouled or designated to shoot a technical foul is given one, two, or three one-point free throws. The team with the most points at the end of the game wins, but if regulation play expires with the score tied, an additional period of play

(overtime) is mandated. Players advance the ball by bouncing it while walking or running (dribbling) or by passing it to a teammate, both of which require considerable skill. On offense, players may use a variety of shots - the layup, the jump shot, or a dunk; on defense, they may steal the ball from a dribbler, intercept passes, or block shots; either offense or defense may collect a rebound, that is, a missed shot that bounces from rim or backboard. It is a violation to lift or drag one’s pivot foot without dribbling the ball, to carry it, or to hold the ball with both hands then resume dribbling.

The five players on each side fall into five playing positions. The tallest player is usually the center, the second-tallest and strongest is the power forward, a slightly shorter but more agile player is the small forward, and the shortest players or the best ball handlers are the shooting guard and the point guard, who implement the coach’s game plan by managing the execution of offensive and defensive plays (player positioning). Informally, players may play three-on-three, two-on-two, and one-on-one.

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### Resistant Training

Resistance training is any type of physical activity in which is use the muscles against resistance. Which can be use different types of resistance training, such as resistance bands and tubes, free weights such as dumbbells, machines (or) even the own body weight, and can even do some exercise in the pool(www.besthealthnag.com).

### Muscular Strength

Muscular strength is the ability of a muscle the most or muscle resistance group to inexpert one force effort to overcome (www.readfiningsregth.com). Resistance band training: Resistance band training is a form of muscular strength exercise. Usually, resistant band training sessions may vary from 8 to 10 exercises. These short, intense workouts provide improved athletic capacity and strength condition, improved glucose metabolism, and improved fat burning. Hence, the purpose of the study was to find out the effect of soccer-specific high-intensity and low-intensity aerobic training on the lower limb of muscular strength.

## METHODOLOGY

To achieve, this purpose 30 ( $n = 30$ ) basketball players were selected from the University of Gulbarga, and their age ranged between 18 and 24 years. The subjects were divided at random into two groups of 15 each, Group I underwent resistant band training ( $[n = 15, 50-60 \text{ min/day/3 days/week over the period of 8 weeks}]$ ), and Group II acted as control. Exercise starts from 12 repetitions and three sets of the maximum ratio of respective training. Four, five, and six repetitions rules were implemented in every 2 weeks and one set was also implemented after 4 weeks. Lower limb muscular strength was assessed using half-squad test. Data were collected on lower limb muscular strength before and after the training period and were subjected to statistical treatment using analysis of the “t” ratio for the dependent group. In all the cases, a 0.05 level of confidence was fixed to test the significance. When the obtain “F” ratio was significant.

### JUSTIFICATION FOR SELECTION OF TRAINING METHOD

Speed, power, agility, and muscular strength are essential to the positive and quality participation of an athlete in the sport. These are improved on and enhanced through the use of this resistance training program. Muscular strength is improved on through the use of muscles, lateral walk, knee extension, and hip external rotation. This will benefit the athlete to be trained and able to perform those high-intensity and explosive movements that are required during the game. Such as jumping for the ball, kicking the ball, passing the ball, and challenging for the ball with an opponent on the field. All

of these exercises will improve an athlete’s muscular strength through hypertrophy, and the reduce repetitive tearing and fast repairing of muscle cells and tissues. It will also improve the capacity of a muscle to work at its maximum capacity for the duration of the game and be able to compete physically in the game. If the athlete wants to see improvements, they should train with a 4-min break between their sets and they must remain hydrated for the duration of the session and the time that is after the session. The program must be completed to at least two sets of each at a minimum requirement. If the athlete wants to push their body, they could add one more set to the number but no more because it can cause unwanted fatigue and exhaustion in the muscles. This can lead to an increased risk of injury because the form can disappear and the potential for injury from this can increase.

## RESULTS

Table 1 shows descriptive statistics and obtained “T” results.

The results presented in Table 2 showed that the pre-test mean value of lower limb muscular strength (M: 61.1332) was improved to 70.1000, respectively. After 8 weeks of resistant band training, the mean difference was 9.0666. The obtained “t” value of 3.882 was greater than the required “t” value of 2.28. Hence, it was proved that there was a significant improvement in lower limb muscular strength of university-level basketball players due to resistant band training.

## DISCUSSION

The common conclusion of the research findings is that as number of low number of repetitions and sets are decrease the muscular strength during the periods. However, the muscular endurance also partially influences in muscular strength. In the present study, resistant band training improves muscular strength. A variety of resistant band training and traditional resistance training has been designed to train metabolic

**Table 1: Value on a control group of basketball players**

Test	Mean	MD	SD	“t”
Pre-test	61.0	3.8666	0.2582	2.171
Post-test	65.0663			

\*Significant at 0.05 level of confidence

**Table 2: Description statistics and obtained “T” results table shows value on lower limb muscular strength of basketball players due to resistance band training**

Test	Mean	MD	SD	“t”
Pre-test	61.1332	9.0666	1.3019	3.882
Post-test	70.1000			

systems essential to basketball players. These mainly targets on the development of muscular strength. Many athletes attribute their success to resistance training. With the spacing of exercise and rest periods, a tremendous amount of work can be accomplished that would not normally be completed in a workout in which the exercise was performed continuously. Repeated exercise bouts can vary from a few seconds to several minutes or more depending on the desired outcome. The resistance training prescription can be modified in terms of resistance and duration of the exercise interval, the length and type of relief interval, the number of work intervals, and the number of repetition blocks or set per workout. It was concluded that every individual has a different level of fitness, which may change from time to time, and it may change with work or situation also. Physical fitness variables are very important to basketball players and form a condition for higher performance. Mal stated that the components of physical fitness such as strength, speed, endurance, flexibility, and various co-ordinative abilities are essential for a high technique and tactical efficiency. Depending on the demand of the game, each factor of physical fitness should be optimally developed. The present study reveals that there was a significant difference on lower limb muscular strength between the resistance band training group and the control group, due to the effect of 8 weeks of resistance band training.

## CONCLUSION

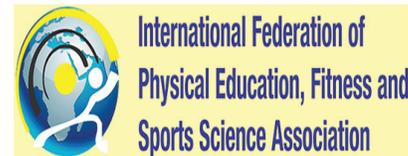
Hence, it was concluded that resistance band training is essential to improve lower limb muscular strength as well as the ability to tolerate muscular fatigue

## Recommendation

Resistance band training may support the players to improve physical and physiological status, ability to tolerate different positional demands, and reduce monotonous.

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## Research Article

# Effect of aerobic exercises on movement time of Kho-Kho players of social welfare residential degree colleges for women in Telangana state

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### ABSTRACT

The purpose of the study is to find Effect of Aerobic Exercises on Movement Time of Kho-Kho Players of Social Welfare Residential Degree Colleges for Women in Telangana State between the age group of 17 and 22 years. The study was formulated as a true random group design consisting of a pre-test and post-test. The subjects ( $n = 45$ ) were randomly assigned to three equal groups of fifteen college women Kho-Kho players in each. The groups were assigned as Experimental Group I (step aerobic exercises), Experimental Group II (floor aerobic exercises), and control group, respectively. Pre-tests were conducted for all the 45 subjects on selected reaction time test. After the experimental period of 12 weeks, post-test was conducted and the scores were recorded with reaction time test. It was concluded that 12 weeks of step aerobics training significantly improved the discriminatory reaction time of women Kho-Kho players.

**Keywords:** Aerobic exercises, Kho-Kho players, Movement time

### INTRODUCTION

Aerobic exercise refers to exercise that involves or improves oxygen consumption by the body. Aerobic means with oxygen and refers to the use of oxygen in the body's metabolic or energy-generating process. Benefits of aerobic exercise include the ability to utilize more oxygen during exercise, a lower heart rate at rest, the reduction of less lactic acid, and greater endurance.

Kho Kho is a traditional Indian sport that dates back to ancient India. It is the second-most popular traditional tag game in the Indian subcontinent after kabaddi. Kho Kho is played on a rectangular court with a central lane connecting two poles which are at either end of the court. During the game, nine players from the chasing team (attacking team) are on the field, with eight of them sitting (crouched) in the central lane, while three runners from the defending team run around the court and try to avoid being touched.

Movement time is the ability of athlete to quickly move a limb in the desired direction (Bompa *et al.*, 2019). Athletic examples involving movement time would include sports such as boxing, martial arts, and tennis with racquet positioning.

Biju (2019) studied the effect of plyometric exercise on movement time. Sixty male Kho-Kho Players ( $n = 60$ ) were randomly selected as subjects and their age ranged between 17 and 25 years. The selected subjects were randomly assigned into two equal groups with thirty subjects each ( $n = 30$ ). Group I experimental and Group II Control group experimental groups underwent their respective experimental treatment for 12 weeks 3 days per week and a session on each day. Control group was not exposed to any specific training apart from their curriculum. Movement time was taken as variable for this investigation. The pre and post-test were conducted 1 day before and after the experimental treatment. Analysis of covariance (ANCOVA) was used to analysis the collected data. Scheffe's test was used as a *post hoc* test to determine which of the paired mean differed significantly. The results revealed that there was also a significant difference between experimental groups on movement time ( $P \leq 0.05$ ). Further, it related that the plyometric training and plyometric training

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produced significant improvement ( $P \leq 0.05$ ) on movement time as compared to control group.

### Purpose of Research

The purpose of the study is to find Effect of Aerobic Exercises on Movement Time of Kho-Kho Players of Social Welfare Residential Degree Colleges for Women in Telangana State between the age group of 17 and 22 years.

## METHODOLOGY

The study was formulated as a true random group design consisting of a pre-test and post-test. The subjects ( $n = 45$ ) were randomly assigned to three equal groups of fifteen college women Kho-Kho players in each. The groups were assigned as Experimental Group I-(step aerobic exercises), Experimental Group II (floor aerobic exercises), and control group, respectively. Pre-tests were conducted for all the 45 subjects on selected reaction time test. After the experimental period of 12 weeks, post-test was conducted and the scores were recorded with Movement Time Test. The subjects were given respective training to the subjects 5 days a week Monday to Wednesday except and Fridays from 6.30 to 7.30 a.m. The difference between initial and final scores on reaction time and movement time was considered as the effect of respective experimental treatments. To test statistical significance of the differences in means of selected variables, ANCOVA was used. In all cases, 0.05 level was fixed to test the hypothesis.

### Movement Time Test

#### Purpose

The purpose of the study is to measure the ability to react and move quickly and accurately in accordance with a choice stimulus.

#### Equipment

Lime powder, measuring tape, and stop watch.

#### Procedure

The subject faced the tester while crouching in an on-guard position at a spot exactly between the two sidelines. The tester holds the stopwatch in his upraised hand; the tester then abruptly waves his arm to either the left or right and simultaneously starts the watch. The subjects respond to the hand signal and attempt to run as quickly as possible, in the indicated direction, to the boundary line. The watch is stopped when the subject crosses the correct line. If the subject should start to move in the wrong direction, the watch continues to run until the subject reverses direction and reaches the correct sideline. Six trials were given, three to each side, but in a random sequence. A rest interval of 20 s was provided between each trial (Barrow and McGree, 1979).

### Scoring

The time for each trial was read to the nearest tenth of a second. The average score was recorded.

## RESULTS AND DISCUSSION

The post-experimental period scores on variable, movement time were presented. As can be seen, there was no significant difference between aerobic training and step aerobics training on movement time. Further, comparing with the control group, both training effects contributed for the improvement of movement time among women Kho-Kho players. The pre-test and post-mean comparison among the three groups is presented in Table 1.

As can be seen from the results presented in Table 2, experimental groups, aerobic training, and step aerobics training proved significant differences in movement time from pre-test to post-test levels. There was no significant difference between pre and post-test scores on movement time among the control group. The pre and post-test scores on movement time of the women Kho-Kho players are presented in Figure 1

The ANOVA results presented in Table 3 proved that there were no significant differences on movement time among the three groups as the obtained F value 1.4 was less than required

**Table 1: The “t” ratio comparisons on movement time for final test scores**

Group	Mean	MD	SD	SDM	t'
Aerobics	0.267	-0.004	0.040	0.010	-0.409
Step aerobics	0.271		0.035		
Aerobics	0.267	-0.025	0.040	0.009	-2.870*
Control	0.292		0.027		
Step aerobics	0.271	-0.021	0.035	0.008	-2.621*
Control	0.292		0.027		

\*Significant

**Table 2: “t” ratio comparisons on movement time to determine training effects**

Due to aerobics training					
Test	Mean	MD	SD	t'	
Pre	0.312	-0.045	0.026	-9.438*	
Post	0.267				
Due to step aerobics training					
Pre	0.310	-0.039	0.010	-21.09*	
Post	0.271				
On control group					
Pre	0.299	-0.007	0.015	-1.583	
Post	0.292				

\*Significant

**Table 3: ANOVA results on movement time on pre and post-test scores**

	Aerobics	Step-aerobics	Control group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained F
Pre-test mean	0.312	0.310	0.299	Between	0.003	2	0.001	1.400
				Within	0.089	87	0.001	
Post-test mean	0.267	0.271	0.292	Between	0.011	2	0.005	6.942*
				Within	0.068	87	0.001	

\*Significant

**Table 4: Post hoc analysis results on post-test means of movement time**

AerobicsTrg	Step aerobics	Control	Mean Diff	Reqd. I
0.267	0.271		-0.004	0.018
0.267		0.292	-0.025*	0.018
	0.271	0.292	-0.021*	0.018

\*Significant

F value, based on initial scores. Further, after the experimental treatments, there existed significant differences among the groups on movement time. Since significant difference was obtained, the paired mean comparisons were made and results are presented in Table 4.

The paired mean comparisons proved that there was no significant difference between aerobic training and step aerobics training group after the experimental treatment. The results further proved, comparing with control group, it was found that aerobic training and step aerobics training were significantly better than control group in altering movement time among women Kho-Kho players.

## CONCLUSION

It was concluded that 12-week floor aerobics and step aerobics training significantly improved movement time of women

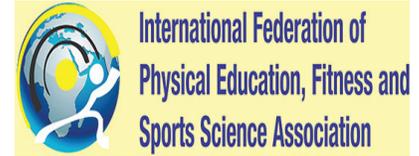
Kho-Kho players compared to control group. However, a comparison between the treatment groups proved that there was no significant difference between the experimental treatments on movement reaction time among college women Kho-Kho players.

## RECOMMENDATIONS

The results of this study proved that floor aerobics training and step aerobics training significantly altered selected variable's simple reaction time, choice reaction time, discriminatory reaction time, and movement time of degree college women Kho-Kho players. Efforts may be taken to include floor aerobics and step aerobics training in the training schedule of the players, which would improve the performances of the Kho-Kho players.

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## Research Article

# Effect of resistance training for development of explosive power among kabaddi players of osmania University

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### ABSTRACT

The objective of the study is to determine the effect resistance training exercises for the development of Explosive Power among Male Kabaddi Players of Osmania University between the age group of 18 and 25 years. The sample for the present study consists of 20 Male Kabaddi Players out of which 10 are experimental groups and 10 are controlled groups. Resistance training exercises were given to the Experimental Group along with general training in Kabaddi and control group has doing general training in Kabaddi for 8 weeks. To assess the Standing Broad Jump Test was used in the pre-test and post-test of the study. This study shows that the Experiment Group increased the Explosive Power compared to the control group due to resistance training. It is concluded that due to resistance training, there is an improvement in explosive power among Kabaddi players.

**Keywords:** Explosive power, Kabaddi, Resistance training etc.

### INTRODUCTION

Motor Fitness refers to the ability of an athlete to perform successfully at their sport. Performance sports aim at high sports performances and for that the physical and psychic capacities of sportsmen are developed to extreme limits. This normally does not happen in other areas of human activity.

Resistance training is considered as most important for better performance in all sports. In this training, resistance is used for muscular contraction to build muscular strength, muscular endurance, size of the skeletal muscle, and anaerobic strength.

#### Types of Resistance Training

- Weight Training
- Terraband Exercises
- Own Body Exercises
- Medicine Ball Exercises.

Kabaddi is basically a combative sport, with seven players on each side; played for a period of 40 min with a 5 min break

(20-5-20). The core idea of the game is to score points by raiding into the opponent's court and touching as many defense players as possible without getting caught on a single breath.

Meesala and Johnson (2019) The present study was undertaken to analyze the effect of turbulence training (TTGKP), combination of weight-plyometric training and combined turbulence training and Weight-Plyometric training (CTWPTGKP) on explosive power of kabaddi players. Total  $n = 60$  male intercollegiate level participated men kabaddi players age ranging from 18 to 25 years selected from various colleges from Vizianagaram district of Andhra Pradesh. The kabaddi players chosen for the study were randomly divided into four groups each group  $n = 15$  kabaddi players, i.e., one empirical group: Turbulence training group kabaddi players (TTGKP), second empirical group: Combined weight-plyometric training group kabaddi players (CWPTGKP), three empirical group: combined turbulence training and weight-plyometric training group kabaddi players (CTWPTGKP) and one control kabaddi players group (CKPG). CKPG were restricted to participate in any activities. The trainings were given for a period of 12 weeks. The data were collected before and after the training by conducting standing broad jump. The obtained data's were analyzed by Analysis of Covariance (ANCOVA). The level of significant was fixed at 0.05 levels. The results of

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**Table 1: Paired sample t-test of experimental group and control group of kabaddi players in standing broad jump test**

Explosive strength (Standing broad jump)	n	Pre-test		Post-test		Mean Differences	T-Cal	Critical Value	df	P-value
		Mean	SD	Mean	SD					
Experimental group	30	2.2410	0.06381	2.6030	0.0570	2.045	3.548	2.045	29	0.000
Control Group	30	2.4533	0.0292	2.2880	0.8779	2.045	14.724	2.045	29	0.001

the study showed that turbulence training treatment (Package I) combined weight-plyometric training treatment (Package II) and combined turbulence training and weight-plyometric training (Package III) significantly improved explosive power of the kabaddi players when comparative with control group.

Kumar (2020) studied about the effect of Plyometric and Circuit Training on selected Physical Variables among Sprinters in Hyderabad District of Telangana State. To achieve this purpose, forty-five Sprinters in the age group of 16–20 years who have participated in the Hyderabad Open Sprints Athletics Championships at Gachibowli Stadium, Hyderabad, for the year 2019 were taken as subjects.

### Purpose of Research

The purpose of the research is to determine the effect of resistance training exercises for the development of Explosive Power among Kabaddi Players of Osmania University between the age group of 18 and 25 Years.

### Population and Sample Group

#### Sample of the study

The sample for the present study consists of 20 Male Kabaddi Players out of which 10 are experimental group and 10 are controlled group.

S. No	Name of the University	Sample	Total number of subjects
1	Osmania	10 Raiders 10 Defenders	20

## METHODOLOGY

Resistance training exercises such as Bicep Curl, Leg Press, Bench Press, and Half Squat were given to experimental group on alternate days, i.e., three sessions per week and controlled group were given the general training for 8 weeks. Pre-test and post-test were conducted in Standing Broad Jump among experimental group and controlled group of Kabaddi Players of Osmania University.

## RESULTS AND DISCUSSION

The independent samples t-test statistics is applied for the Study. The comparison was made among Experimental Group and Control Group in pre-test and post-test mean.

The above table shows that explosive power (standing broad jump) in the experimental group in pre-test assessment of mean is 2.2410 with 0.06381 standard deviation. When the resistance training was implemented among the kabaddi players, i.e., post-test assessment mean was 2.6030 with 0.0570 standard deviation. The mean difference of pre-test to post-test is 0.046. The paired “t” test calculated value is 3.548 which is higher than the table value (2.045) at 29° of freedom at 5% level of significance. Hence, it shows that there is a significant difference between the pre-test to post-test assessment among the kabaddi players.

Whereas the control group of pre-test assessment of mean is 2.453 with 0.0292. The post-test assessment mean is 2.2880 with 0.8779 standard deviation. The mean difference between pre-test to post-test is 0.149. The paired “t” test calculated value is 14.724 which is higher than the table value (2.045) at 29 degrees of freedom at 5% level of significance. Hence, it shows that there is a significant difference between the pre-test to post-test assessment among the kabaddi players.

In Standing Broad Jump, the Experimental Group Pre-test is 2.2410 and post-test is 2.6030; there is an improvement from 2.4533 to 2.6030 due to Resistance Training and Control Group Pre-test is 2.4533 and post-test is 2.2880; there is a decrease in performance due to general training. It reveals that statistically significant difference in explosive power (standing broad jump) between the experiment group and control group, which means that in experimental group resistance training effectively improvement than the control group.

## CONCLUSION

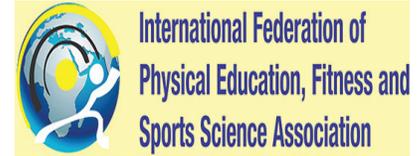
It is concluded that resistance training will be improvement in explosive power among Kabaddi Players. In this study, due to the resistance training exercises, there is an improvement in explosive power among Kabaddi Players.

## RECOMMENDATIONS

It is recommended that similar studies can be conducted on other events in other events and also female Kabaddi Players. This type of study is useful to coaches to give proper coaching for the development of motor qualities for improvement of performance in Kabaddi.

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## Research Article

# The test battery reliability of the health-related physical fitness test

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### ABSTRACT

The Health-related Physical Fitness Test (HRPFT) includes four subtests which measure components of physical fitness affecting a positive health state. The validity and reliability of each subtest have been demonstrated to be adequate, as the overall validity of the battery. However, test battery reliability has not been established. The purpose of this study was to estimate the multivariate reliability of the HRPFT as a battery, using a dataset obtained from middle school children. Test battery reliability was estimated using a canonical correlation analysis. Estimates were calculated for boys and girls 11–14 years of age, and the HRPFT was highly reliable for all age groups and both sexes. Multivariate reliability of the HRPFT as a test battery is satisfactory under all conditions for these middle school-children.

**Keywords:** Fitness tests, Health-related physical fitness test, Reliability, Test battery reliability, Test battery

### INTRODUCTION

In 1980, the Health-related physical fitness test (HRPFT) was published by the American alliance for health, physical education, recreation, and dance (AAHPERD). This battery was designed to measure components of physical fitness affecting a positive health state, in particular, cardio-respiratory function, body fatness, and low-back muscular skeletal function. The subtests in this battery were carefully selected as the most valid field tests available and the reliability of each subtest has been established (AAHPERD 1984). The total test battery reliability has not been estimated.

Over the years, many test batteries have been developed in physical education. It has been common practice for the test developer to describe the validity and reliability of each subtest in the battery as well as the overall validity of the battery.

Test battery reliability has not been mentioned, perhaps because the methodology for estimating this reliability co-efficient has not been readily available. In 1984 Wood and Safrit proposed using a modification of a multivariate statistical procedure

proposed by Thomson (1940) to estimate the reliability of a battery of tests in physical education. A canonical correlation model was recommended, using test-retest data.

### METHODOLOGY

When tests are used as a cluster, as in a test battery, the reliability of the cluster is as important as the reliability of each individual subtest. The overall estimate of reliability provides an indicator of measurement error that occurs between subtests, although it is also affected by the within-test error. The purpose of this study was to estimate the multivariate reliability of the HRPFT as a battery, using a dataset obtained from middle-school students.

To estimate test battery reliability, the battery was administered to subjects twice. Because two of the HRPFT subtests require strenuous physical exertion, they should not be administered twice on the same day. At least several days should elapse between testing days. In this study, testing took place in May 1984, with 8 days between testing periods.

### Statistical Analysis

The entire student body was tested at Hyderabad Public School in Hyderabad, Telangana, and permission to conduct the study was obtained from the External Research Committee of the

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Hyderabad Public School, Hyderabad. The Human Subjects Committee of the Department of Physical Education at the University of Hyderabad from the Principal and physical education staff at Hyderabad Public School.

Because the testing was conducted as a part of the regularly scheduled physical education classes, student and parental permission for student participation was not required. The total number of subjects was 655. Due to absence on one or both testing days, complete data were collected for 545 students, 280 males and 265 females.

The breakdown by grade and age is shown in Table 1.

### Description of Tests

The HRPFT consists of four subtests-9 min run test, skinfold Measures, sit-and-reach test, and sit-up-test. Instructions in the test manual (AAHPERD 1980) were used in administering the subtests. The Technical Manual (AAHPERD 1984) was also used for reference. The 9-min run test for distance is a measure of cardio-respiratory function. A 300 m track was marked on a grassy area on the school grounds. Traffic cones, marked with numbers 0 through 29, were placed around the track at 10 m intervals. The sum of skinfold test, taken at the triceps and subcapular sites, is an estimate of body composition, particularly of body fatness. A Lange skinfold caliper was used to take these measurements. The sit-and-reach test measures low-back musculoskeletal function. After approximately 1 min of passive stretching. The students were seated on the floor with their feet placed against the end of a specially constructed box. They were instructed to reach as far as possible along the top of the box, which was marked with a metric scale. The sit-up test measures abdominal strength, another dimension of musculoskeletal function. The student was asked to execute as many sit-up as possible in 1 min.

### Testing Team

The testing team consisted of 7 students and staff member from the measurement and Biodynamics Laboratories at the University of Hyderabad, Telangana. All of the skinfold testers were

trained in skinfold measurement and had taken these measures on a regular basis in the biodynamics laboratory. 2 male testers measured the boys and 2 female testers measured the girls. Before testing, the entire team met in the measurement Laboratory to review the subtests and the subtest protocol. The skinfold testers also met with a staff member in the Bio Dynamics Laboratory to ensure Consistency in taking the skinfold measures.

### Subtest Protocol

Instructions for the 9-min run test included directions on self-scoring, using the marked cones. Students ran as a group and were instructed to keep a count using their fingers as counters of the number of laps completed. At the end of the test, students stopped next to the nearest cone and waited for test administrators to record their scores.

Test administrators recorded the score in meters using the formula  $(300 \times \text{number of laps completed}) + (10 \times \text{cone number})$ . Test administrators aided the students in keeping a count of laps completed. Otherwise, standard instructions were used. For the skinfold test and the sit-and-reach test, the tester's initials were recorded next to the score so that the same tester could test the student on the next occasion. The order of testing was consistent over both testing sessions.

### Data Analysis

Test battery reliability was estimated using a Canonical Correlation Analysis (CCA) (Wood and Safrit 1984). Because a Monte Carlo study by Wood and Safrit (1987) demonstrated that, for all practical purposes, the CCA approach provided an accurate estimator of test battery reliability. Although another estimator had less bias and error, the increase in accuracy over the CCA estimator was very small. Thus, the CCA was selected for use in this study due to the relative ease of interpretation of this procedure.

The five-step procedure employed both canonical correlations and redundancy estimates to estimate reliability in light of the shared variance between two administrations of a test battery. Structure co-efficient was also considered in interpreting the estimate. To compare the reliability of the present sample with previously reported subtest reliabilities, univariate interclass and intraclass test-retest reliability coefficient were calculated for each subtest separately. Because separate HRPFT norms are reported for boys and girls, gender differences for each subtest in each age group were examined using a series of t-tests for independent groups.

Finally, descriptive statistics were computed for the dataset, along with local norms for middle school boys and girls.

## RESULTS

Descriptive statistics for boys and girls by grade are presented in Table 2. Since the tests were administered in regularly

**Table 1: Middle school sample sizes by age and grade**

Age	Males	Females
11	27	44
12	88	92
13	104	85
14	58	43
15	3	1
Grade		
6	87	99
7	86	88
8	107	78
Total	280	265

**Table 2: Descriptive statistics (By grade)**

Grade	Skinfold Test (mm)	Sit-up Test (no.)	Sit-and-reach test (cm)	DR=9-min run test (m)
Males:				
6				
Day 1	19.5 (8.4)	37.8 (9.8)	23.3 (6.4)	1,676.7 (237.9)
Day 2	20.1 (8.9)	40.4 (9.5)	22.9 (6.4)	1,720.4 (327.1)
7				
Day 1	21.8 (11.6)	39.0 (9.7)	22.9 (7.1)	1,812.1 (244.4)
Day 2	21.9 (11.7)	42.1 (10.6)	23.3 (7.3)	1,750.5 (222.0)
8				
Day 1	21.7 (11.5)	41.8 (8.8)	23.7 (12.9)	1,858.0 (272.8)
Day 2	20.7 (10.8)	44.2 (10.4)	23.0 (7.3)	1,867.8 (277.2)
Females:				
6				
Day 1	22.9 (8.7)	33.5 (8.4)	28.1 (5.8)	1,396.8 (291.8)
Day 2	22.0 (9.7)	36.5 (9.1)	28.4 (6.3)	1,477.2 (270.4)
7				
Day 1	21.4 (7.2)	36.5 (9.1)	29.8 (6.6)	1,661.5 (240.2)
Day 2	20.8 (7.7)	39.5 (9.6)	31.0 (6.0)	1,606.9 (245.3)
8				
Day 1	25.4 (6.7)	35.8 (9.2)	30.5 (7.8)	1,609.5 (182.9)
Day 2	24.8 (6.7)	38.2 (9.2)	31.7 (8.1)	1,606.8 (224.1)

scheduled physical education classes which were determined by grade, analysis by grade seemed appropriate. The middle-school data were also analyzed by age, for purposes of comparison, as shown in Table 3.

The data for 15-year-old boys and girls were not included due to an extremely small sample size. Complete analysis was undertaken only for ages 12 and 13 because these groups had larger sample sizes. In general, the means of data for the Hyderabad Public School Samples were comparable to the data for the normative groups. The Hyderabad public school boys scored a little lower on the sit-and-reach test at all ages.

Overall, the normative groups were more variable than the public school samples. Gender differences were examined using a series of t-tests for independent groups.

Comparison approach was employed by dividing the experiment-wise alpha level (0.05) by four yielding a comparison-wise alpha of 0.012. These results are summarized in Table 4.

### Multivariate Test Battery Reliability

The primary purpose of this study was to calculate multivariate test battery reliability for the HRPFT. Battery reliability estimates were calculated for boys and girls at each age from 11 to 14 years using methods outlined by Wood and Safrit (1984). Note, however, that the reliability estimates for each age and gender group were based on sample sizes below the minimum sample size battery. This is especially true for boys

and girls aged 11 and 14 with sample sizes smaller than 60. The stability of the reliability estimates for these latter groups is questionable, and therefore, only the data for study. In these groups, all sample sizes were >80, thus increasing our confidence in the stability of the estimators.

Since the entire school population was tested, no sample was actually drawn, therefore, adding other students from outside the school would not be appropriate.

The optimum reliability estimate (ORE) is a function of subtest univariate test-retest reliability coefficients taken from the literature or from independent studies and of the subtest intercorrelations from the initial administration of the battery. It is a theoretical upper limit to the reliability of the battery and is used both as a screening device with which to judge the utility of proceeding with the reliability investigation and as a reference point with which to compare subsequent reliability analyses. The ORE can be viewed as an estimate of the "best" test-retest reliability attainable at a particular time under specific conditions.

## DISCUSSION

The HRPFT evidenced high battery test-retest reliability for boys and girls in grades 6, 7, and 8. Although one would expect high reliabilities for physical fitness test batteries, these coefficients have never been calculated. The univariate test-retest reliabilities for individual subtests were, for the most part, very high as well. This supports previous evidence of high

**Table 3: Descriptive statistics (by age)**

Age	Subtest:			
	Skinfold test (mm)	Sit-up Test (No.)	Sit-and-Reach (cm)	DR=9-min run test (m)
Males:				
11				
Day 1	20.4 (8.8)	37.6 (6.4)	25.2 (4.9)	1,618.1 (181.9)
Day 2	21.4 (10.3)	40.2 (6.4)	25.1 (5.4)	1,706.3 (210.8)
12				
Day 1	20.4 (10.5)	38.3 (10.5)	22.9 (7.0)	1,723.9 (247.2)
Day 2	20.6 (10.2)	41.0 (10.9)	27.7 (6.8)	1,716.1 (318.8)
13				
Day 1	20.5 (9.1)	40.4 (9.1)	23.1 (6.9)	1,839.8 (247.4)
Day 2	20.1 (9.5)	43.5 (10.2)	23.3 (7.4)	1,828.1 (252.5)
14				
Day 1	23.5 (14.2)	41.1 (9.7)	23.7 (6.6)	1,846.0 (272.4)
Day 2	22.8 (13.0)	43.4 (10.9)	22.6 (7.3)	1,842.1 (289.5)
Females:				
11				
Day 1	22.5 (8.5)	34.0 (6.8)	27.3 (5.1)	1,384.3 (312.1)
Day 2	22.1 (10.0)	36.2 (8.0)	27.5 (5.9)	1,481.6 (281.1)
12				
Day 1	21.5 (8.1)	35.2 (9.1)	29.4 (6.4)	1,524.1 (303.6)
Day 2	20.5 (8.6)	38.1 (9.5)	30.1 (6.5)	1,547.8 (268.8)
13				
Day 1	23.4 (6.7)	35.3 (9.5)	29.7 (6.9)	1,612.0 (212.0)
Day 2	22.8 (7.1)	38.3 (9.5)	31.1 (7.1)	1,576.7 (227.9)
14				
Day 1	26.6 (7.5)	36.0 (8.9)	30.3 (8.3)	1,629.6 (179.2)
Day 2	26.2 (7.3)	38.5 (10.0)	31.6 (7.8)	1,608.8 (227.1)

\*Mean: Standard Deviation in parenthesis

**Table 4: Analysis of gender differences (t-values) for each subject test by age**

Subtests	Age			
	11	12	13	14
S.F.	-1.01	-0.82	-2.49	-1.41
S.U.	2.29	2.10	3.74	2.71
S.R.	-1.71	6.52	-6.61	-4.31
D.R.	3.99	4.85	6.81	4.81

SF: Skinfold test, SU: Sit-up test, SR: Sit-and-reach test, DR: 9-min run test. At values demonstrating significant gender differences ( $P < 0.12$ ) using Bonferroni Test (one-tailed t-tests)

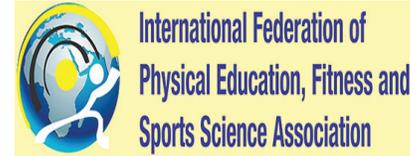
univariate reliability reported in studies of other age groups, including some middle-school-aged subjects, although small sample sizes were often used. In the distance run test, most of these coefficients were moderate in size.

In the middle school where the test was administered, health-related physical fitness was stressed in a number of the classes. The students understood the concept of pacing in the distance

run, and the 8<sup>th</sup>-grade students regularly ran for 8 min at the beginning of their physical education class. Yet motivation was an obvious problem for some of the students. In some cases, they refused to run and instead walked the entire distance.

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## Research Article

# Effect of plyometric training and resistance training on the development of leg explosive power among university sprinters of Telangana State

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### ABSTRACT

The purpose of the study was to find out the effect of plyometric training (PT) and resistance training (RT) on the development of leg explosive power among university sprinters of Osmania University. The selected university-level sprinters ( $n = 90$ ) were randomly assigned into 3 groups and each group consisted of  $n = 30$ . 30 sprinters underwent treatment of PT program; 30 sprinters experimental group-II, RT group underwent treatment of RT program; and control group 30 sprinters participated only their regular routine of sprint training for 12 weeks. To assess the leg explosive power, the standing broad jump test was used in the pre-test and post-test of the study. Accordingly, the results obtained showed that the intervention of PT and RT on leg explosive power significantly improved among treatment groups.

**Keywords:** Plyometric training, Resistance training, Sprinters etc.

### INTRODUCTION

Sprinting at top speed is a highly coordinated activity and therefore the patterning over increasing distances in efficient sprint mechanics is crucial in training the neuromuscular system to maintain high excitations of muscular contractions for the duration of the race (Bird, 2002; Majumdar and Robergs, 2011).

There are several phases in sprinting; for instance, the acceleration phase is the most important phase in a race. During this phase, after the sprinter has left the starting blocks, the athlete increases the length of their stride and decreases the amount of strides taken per second. Male sprinters usually have a stride rate of 4.6 strides per second, with female athletes little less with 4.8 strides per second. Elite sprinters reach their highest speed at around the 60-70-m distance, in a 100-m race, for men. Professional women sprinters reach their top speeds at around the 50-60-m distance. Top runners usually cover 20–30 m at top speed.

Speed–time curves for elite athletes performing a 100-m sprint: The biexponential curves reflect distinct phases that an athlete traverses when sprinting from a stationary start:

- Acceleration phase, denoted by the positive slope of the curve over the initial 60 m
- Attainment of maximal-speed phase, denoted by the peak of the curve
- Maintenance of maximal-speed phase, denoted by the negative slope of the curve over the final 40 m.

### Purpose of the Study

The purpose of the study was to find out the effect of plyometric training (PT) and resistance training (RT) on the development of leg explosive power among university sprinters of Osmania University.

### METHODOLOGY

The selected university-level sprinters ( $n = 90$ ) were randomly assigned into 3 groups and each group consisted of  $n = 30$ . 30 sprinters underwent treatment of PT program; 30 sprinters experimental group-II, RT group underwent treatment of RT program; and control group 30 sprinters participated only their regular routine of sprint training for 12 weeks. To assess the

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**Table 1: Analysis of variance of experimental groups and control group on leg explosive power (units in meters)**

Test	PT	RT	CG	SV	SS	df	MS	'F' Ratio	P-value
Pre-test									
Mean	2.42	2.41	2.39	Between	0.01	2	0.01	0.28	0.75
SD	0.14	0.15	0.17	Within	2.03	87	0.02		
Post-test									
Mean	3.03	2.64	2.22	Between	9.81	2	4.90	234.26	0.00
SD	0.17	0.12	0.14	Within	1.82	87	0.02		

\*Significant ( $P < 0.05$ )

leg explosive power, the standing broad jump test was used in the pre-test and post-test of the study.

## RESULTS AND DISCUSSION

### Results of Leg Explosive Power

Table 1 shows the analyzed data of leg explosive power.

#### Pre-test

The  $M \pm SD$  of the Group 1, 2, and 3 pre-test leg explosive power scores were  $2.42 \pm 0.14$ ,  $2.41 \pm 0.15$ , and  $2.39 \pm 0.17$ , respectively. The 0.28 pretest F value obtained was  $< 0.75$ ;  $P$ -value needed. "As a result, the pre-test men's importance of PT, RT, and control group of leg explosive power before the start of the respective treatments was found to be insignificant at 0.05 level of trust for degrees 2 and 87 of freedom; this study, therefore, confirms that the random allocation of subjects into three groups has been successful."

#### Post-test

The  $M \pm SD$  of the Group 1, 2, and 3 post-test scores were  $3.03 \pm 0.17$ ,  $2.64 \pm 0.12$ , and  $2.22 \pm 0.14$ , respectively. The 234.26 value obtained after test F was  $> 0.00$   $P$ -value. For the degrees of freedom 2 and 87, thus, the mean leg explosive power after the test showed significant confidence at 0.05.

## CONCLUSION

Accordingly, the results obtained showed that the intervention of PT and RT on leg explosive power significantly improved among treatment groups.

## Recommendations

Based on analysis of collected data, the investigators would like to recommend the research work to extend further more as mentioned below.

1. Similar research work should be done on similar set of sports to validate the results. Use a variety of training to develop physical strength, focusing on the development of other motivations through all methods that have to do with each quality to be created.
2. There are different types of strengths, which are needed to be a sprinter, maximal strength, explosive strength, and strength endurance. Maximal strength is the amount of force that can be generated from one all-out effort, irrespective of time. Explosive strength is strength per unit of time and is also known as speed strength.

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## Research Article

# Comparison of agility among high school kabaddi players and Kho-Kho players of central Telangana

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### ABSTRACT

The purpose of the study was to find the effect of agility among High School Kabaddi players and Kho-Kho players of Central Telangana. For the present study, there were 50 High School Kabaddi players and 50 Kho-Kho players of Central Telangana. The Shuttle Run test pre and post-test were conducted among two groups to assess the agility. The mean of Kho-Kho players is 8.913 with 0.590 standard deviation (SD) and mean of the Kabaddi Players is 9.094 with 0.562 SD. The mean difference between agility of the Kho-Kho and Kabaddi players is 0.180. This implies that the motor fitness variables such as agility of Kho-Kho and Kabaddi players showed significant differences. The Kho-Kho players have better agility compared to Kabaddi players.

**Keywords:** Agility, Kabaddi, Kho-Kho etc.

### INTRODUCTION

The word Kho is derived from Sanskrit word syu meaning “get up go.” Kho-Kho game is the India’s most popular game. The origin of Kho-Kho game is from Maharashtra. It is not clear how this game formed but it is said that Kho-Kho game was developed “Run and Chase.” Game as in this game you have to chase your friend. The first National Championship of Kho-Kho game was played in 1959-60 in Andhra Pradesh in Vijayawada.

Kabaddi is a popular contact sport in Southern Asia that first originated in Ancient India. It is played across the country and is the official game in the states of Punjab, Tamil Nadu, Bihar, Telangana, and Maharashtra. Outside of India, it is a popular activity in Iran, is the national game of Bangladesh, and is also one of the national sports of Nepal where it is taught in all state schools. Kabaddi is also popular in other parts of the world where there are Indian and Pakistani communities such as in the United Kingdom where the sport is governed by the England Kabaddi Federation UK.

There are many regional variations of the game of Kabaddi in India, including Sanjeevani, Gaminee, Punjabi, and Amar versions, all of which have slightly different interpretations of the game and its rules. There are also other games very similar to Kabaddi in both India and other countries that may not be pure Kabaddi, but they are very closely related. These include the game of Hadudu that is played in Bangladesh, the Maldives’ Baibalaa, and Maharashtra’s Hututu.

The governing body for Kabaddi is the International Kabaddi Federation and consists of over 30 national associations and oversees the game and its rules across the world.

Rawte and Kandar (2022) studied the comparison of agility between Kabaddi and Kho-Kho University-level male’s players of Guru Ghasidas Vishwavidyalaya, Chhattisgarh. Sample of the study consisted of 200 University-level male players (100 Kabaddi male players and 100 Kho-Kho male players) who were randomly selected as subjects. The selected subjects were between the age group of 18 and 28 years. To find the difference in the level of agility, mean, standard deviation, and independent samples “t” test was used to analyze the data. The result of the study shows that there is a significant difference between Kabaddi and Kho-Kho players with regard to their sports anxiety (sig 2-tailed-000) and Kho-Kho players found greater Sports Agility (Kabaddi mean-9.7928 and Kho-Kho mean-9.8839).

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**Table 1**

Group	Group statistics				t-test for equality of means			
	n	Mean	SD	SE	Mean Difference	t	df	P-value
Kho-Kho	50	8.913	0.590	0.083	0.180	1.485	98	0.141
Kabaddi	50	9.094	0.562	0.088				

Table value=1.984 at 98° of freedom and  $P=0.141>0.05$ .

### Purpose of the Study

The purpose of the study was to find the agility among High School Kabaddi players and Kho-Kho players of Central Telangana.

## METHODOLOGY

For the present study, there are 50 High School Kabaddi players and 50 Kho-Kho players from Central Telangana. The Shuttle Run test pre and post-test were conducted among two groups to assess the explosive power of legs.

## RESULTS AND DISCUSSION

Table 1 shows that independent t-test is used to test the significance mean difference in selected motor fitness agility among High School Kho-Kho and Kabaddi players of Central Telangana.

There is a significant mean difference in selected Motor Fitness variables like agility among High School Kho-Kho and Kabaddi players of Central Telangana.

The above table shows the agility of the selected Kho-Kho and Kabaddi players of Central Telangana. Mean of the agility of Kho-Kho players is 8.913 with 0.590 standard deviation (SD) and mean of the Kabaddi players is 9.094 with 0.562 SD. The mean difference between agility of the Kho-Kho and Kabaddi players is 0.180. This implies that the motor fitness variables such as agility of Kho-Kho and Kabaddi players are significantly differs.

## CONCLUSION

It can be concluded that there is a significant difference between Kabaddi players in Kho-Kho players. The Kho-Kho players have better agility than Kabaddi players.

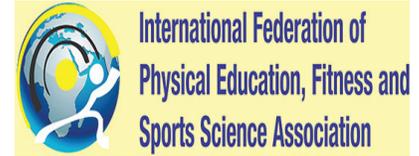
## RECOMMENDATIONS

Based on the analysis of collected data, the investigators would like to recommend the research work to extend further as mentioned below.

1. Similar research work should be done on similar set of sports to validate the results. Use a variety of training to develop agility, focusing on the development of other motivations through all methods that have to do with each quality to be created.
2. Further research, as well as the published findings, will contribute to the Kabaddi and Kho-Kho coaching.

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## Research Article

# A study on agility among Gurukul students in Medak district of Telangana state

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### ABSTRACT

The purpose of the study was to find out the agility among Gurukul students of Medak district in Telangana state. The Gurukula school system in the Medak district of Telangana aims to provide holistic education, including a focus on physical fitness. However, there is a need for a comprehensive understanding of the health-related physical fitness levels among Gurukula school students. The sample for the study consisted of 100 boys of the Gurukula schools between the age group of 12 and 15 years, i.e., 12 years (25 students), 13 years (25 students), 14 years (25 students), and 15 years (25 students). To compare the health-related fitness component, agility and shuttle run tests were conducted among all age groups. There is a relative difference in agility as per the age among Gurukula students.

**Keywords:** Agility, Health-related fitness, Physical fitness etc.

## INTRODUCTION

Physical fitness plays a pivotal role in the overall well-being of school students, influencing their health, academic performance, and lifelong habits. The Gurukula school system in the Medak district of Telangana aims to provide holistic education, including a focus on physical fitness. However, there is a need for a comprehensive understanding of the health-related physical fitness levels among Gurukula school students, encompassing components such as speed, agility, endurance, explosive strength, flexibility, muscular strength, medicine ball throw performance, and body mass index.

The existing literature on physical fitness often focuses on general trends, and there is a gap in research specific to Gurukula schools in the Medak district. Understanding the current status of health-related physical fitness among Gurukula school students is crucial for designing targeted interventions, informing physical education curriculum development, and promoting overall well-being within this unique educational context.

The main focus of Gurukuls was on imparting learning to the students in a natural surrounding where the Shisyas lived with each other with brotherhood, humanity, love, and discipline. The essential teachings were in subjects such as language, science, mathematics through group discussions, and self-learning.

### Purpose of the Study

The purpose of the study was to find out agility among Gurukul students of Medak district in Telangana state. The Gurukula school system in the Medak district of Telangana aims to provide holistic education, including a focus on physical fitness.

## METHODOLOGY

The sample for the study consisted of 100 boys of the Gurukula schools between the age group of 12 and 15 years, i.e., 12 years (25 students), 13 years (25 students), 14 years (25 students), and 15 years (25 students).

## RESULTS AND DISCUSSION

Table showing the mean values, SD, Std. error, df, “f” value, and Sig. (2-tailed) of speed levels among Gurukula school students of different age groups in the Medak district in relation to health-related physical fitness, i.e., agility in shuttle run test.

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S. No.	Age groups	n	Mean	SD	Std. error	df.	“f” value	Sig.(2-tailed)
1.	12 years	50	9.7110	0.49406	0.06987	196	30.325	0.000
2.	13 years	50	10.2210	0.51281	0.07252			
3.	14 years	50	10.8516	0.78540	0.11107			
4.	15 years	50	10.4666	0.61726	0.08729			

Detailed Analysis of Mean Agility Levels by Age group:

1. Age Group 12 (Mean: 9.7110)
2. Age Group 13 (Mean 10.2210)
3. Age Group 14 (Mean: 10.8516)
4. Age Group 15 (Mean: 10.4666).

## CONCLUSION

It can be conclude that there is a significant difference between the health-related fitness component, i.e., agility among different age groups.

## Recommendations

Based on analysis of collected data, the investigators would like to recommend the research work to extend further more as mentioned below.

1. Similar research work should be done on similar set of sports to validate the results. This type of study is useful

to develop the fitness among the Gurukul students in India

2. Further research, as well as the published findings, will contribute to the health-related fitness among students. The study also helps the physical educationists and coaches understanding the knowledge and performance of the fitness levels among the students.

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