

A Comparative Study on Explosive Strength and Reaction ability between Female Kabaddi and Kho Kho Players

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Abstract

Background: Competitive game requires high level of skill related fitness including reaction time and explosive strength in kabaddi and kho-kho games to perform frequently higher level of performance. **Objective:** The purpose of the study is to find out the difference of explosive strength and reaction ability between junior level female kabaddi and kho kho players. **Method:** Fifty junior level female kabaddi players and fifty kho kho players were required in this study from different sports club in West Bengal. The age of the subjects ranged between 14 to 16 years. Explosive strength and reaction ability was considered as variables and which was measured by standing broad jump and nelson hand reaction test respectively. **Result:** The obtained results show that significant difference found in explosive strength ($p=0.05$) and reaction ability ($p=0.03$) between female kabaddi and kho kho players. It is also found that the explosive strength (1.67 ± 0.17) and reaction ability (3.28 ± 1.49) of the kho kho players are higher in comparison to kabaddi players (1.56 ± 0.12 and 5.19 ± 1.74). **Conclusion:** It is concluded that there are significant differences found in explosive strength and reaction ability between female kabaddi and kho kho players. It is also found that kho kho players have a better leg strength and reaction ability in contrast to kabaddi players.

Keywords: Kabaddi, Kho Kho, Motor fitness, Explosive strength, Reaction ability.

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INTRODUCTION

Today sports is highly emerging in the context of modern competitive performance as it serves a vital role in the social and cultural functioning of each event [1]. Games and sports have been also a part of human life and its almost emerged as universal cultural phenomena [2]. Physical fitness is the most significant determinant of excellent performance in sports [3, 4]. Physical fitness and development of neuromuscular skills have assumed greater improve in the present time due to the emphasis that is being placed on the development of human resources [5]. Since inception of the human civilization motor ability was the only criteria for any sort of performance. Recent studies have increasingly indicated the positive effects of motor fitness and sports performance [6, 7]. The success and failure of the performance often depends on capabilities in applying motor abilities to execute a particular task. Various studies in the field of sports revealed that motor fitness plays a significant role in performance [8-10].

The games of kabaddi and kho kho are typical Indian major games and played throughout the country especially in rural areas [11]. Both kabaddi and kho-kho can be played in a small area and practically no equipment is necessary [5]. Kho kho is an outdoor strenuous but healthy and interesting game, whereas kabaddi is an aggressive and heavy body contact game [12, 13]. Kho- kho is less aggressive [10, 14] and less body contact game in comparison to kabaddi. Kho-kho and kabaddi players are differing with each other in their skills, techniques and strategies [1, 15].

Kabaddi is a combative team game, where players play with absolutely no equipment, in a rectangular court with seven players on each side of the ground [16]. In kabaddi the basic defense position are in three zones, like- center zone and left zone, the defensive players occupying one of these zones have specific functions to perform. Kabaddi is also an established national game of Bangladesh, and the state

game of Tamil Nadu, Karnataka, Punjab and Andhra Pradesh in India. Teams take turns sending a raider to the opposite team's half, where the goal is to tag or wrestle members of the opposite team before returning to the home half. The goal of the defenders is to stop the raider from returning to the home side before taking a breath [17]. Kabaddi is also a team game of speed, stamina, endurance, strength and skill. Although it is a team event where individual fitness plays a vital role in the success of the team [18, 19]. Kabaddi is a both attacking and defensive game. Especially the attack is an individual effort while defense is a combined effort [19]. The game of kabaddi requires a high level of motor fitness and neuromuscular coordination in order to perform very complex movement during the game [20].

According to the rules of kho-kho game, each of the participating teams consists of twelve players, though only nine players take the field for a contest. After the toss, one team sits in a row down the middle of the court, with alternate members facing opposite directions [17]. Modern kho kho demands that the players are not only masters about the movements and understand exactly when to use them but also they can perform quickly and as accurately as possible and when demanded [21, 22]. Agile and sprightly players who are capable of following each situation as it arises by skillful and quick movement have a great advantage to achieve higher performance [19, 23, 24].

Competitive game requires high level of skill related fitness and both reaction time and explosive strength [25] are two important skill related fitness components used in kabaddi and kho-kho game frequently to produce top level performances on the mat [26]. Under these circumstances the researcher was interested to compare the motor fitness between junior level female kabaddi and kho kho players.

Objective

The objective of the study is to determine the differences of explosive strength and reaction ability between junior level female kabaddi and kho kho players.

METHOD AND MATERIALS

Participants

In this investigation total one hundred junior level players (n=100) were selected out of which fifty (n=50) active female kabaddi players and fifty (n=50) kho kho players were selected randomly from a large number of populations from Kho Kho Academy Ashoknagar, Naihati Naboady Sab Payechhir Asar, and Ichhapur Kho Kho Kabaddi Club under the state of West Bengal. The age of the subjects ranged between 14 to 16 years. The inclusion criteria for subject selection were the following: participant should be

female and needed to have a good fitness on the basis of routine fitness examination, all the participants were advanced/experienced and active players in respect of their match performance. The exclusion criteria consisted of individual's report of using psychotropic drugs or having neurological disease, difficulty in focusing/concentrating, based on an interview, not to be involved in other ongoing research activity. Each participant was informed about the research procedures and signed the written consent form for participation in the study. Before randomization of the subjects the homogeneity test was acquired. Demographic data including age, standing height, body weight, resting heart rate, resting respiratory rate, resting blood pressure etc. were also taken from each participant. Details demographic status of the participant is given to Table-1.

Variables Studied

In this study explosive strength and reaction ability was considered as variables. Under this circumstances explosive strength was measured by standing broad jump whereas, Nelson Hand reaction test was the standard criteria for measuring reaction ability.

Data Collection Procedures

Proper instructions regarding the objectives of the study were oriented to all the participants. All the data were collected in full resting condition. Before administering the test all the subjects properly oriented through demonstration by the investigator and they were motivated to give their best effort in performing all items prescribe for them. The researcher contacted and consulted with the respective head of the club during the data collection and their written consent was also taken for subject participation. The data was collected in two consecutive days for all the subjects.

Statistical Analysis

The obtained data was analyzed by descriptive statistics viz. mean, standard deviation, standard error of mean and further independent 't' test was also used for generalizing the statistical significant difference of explosive strength and reaction ability between junior level kabaddi and kho kho players. The level of significance was considered at 0.05.

RESULTS

The obtained results show that significant difference found in explosive strength (p=0.05) and reaction ability (p=0.03) between junior level female kabaddi and kho kho players. It is also found that the explosive strength (1.67 ± 0.17) and reaction ability (3.28 ± 1.49) of the kho kho players are higher in comparison to kabaddi players (1.56 ± 0.12 and 5.19 ± 1.74). Details of the results are given to Table 1, 2 & 3 and Figure 1 & 2.

Table 1: Demographic status of the participants

Groups	N	Age (years)	Height (cm.)	Weight (Kg.)	BMI (kg/m ²)	RSBP	RDPP	RHR	Experiences
		Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D	Mean ± S.D
Kabaddi	50	15.6 ± 1.98	124.14 ± 5.28	38.07 ± 4.15	24.7 ± 1.4	122 ± 1.2	84 ± 0.9	69 ± 0.9	4.2±1.2
Kho Kho	50	15.09 ± 1.82	129.46 ± 5.78	39.34 ± 5.42	23.3 ± 1.35	117± 0.8	79± 0.7	71± 0.6	4.25±1.1

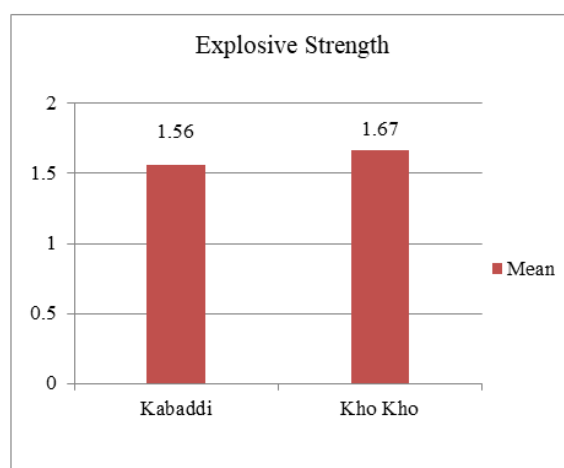
SD= Standard deviation; BMI=Body mass index; RSBP= Resting systolic blood pressure; RDPP=Resting diastolic blood pressure; RHR=Resting heart rate

Table-2: Comparison of explosive strength between junior level female kabaddi and kho kho players

	Groups	N	Mean	SD	SEM	df	t value	p value
Explosive strength	Kabaddi	50	1.56	±0.12	0.03	98	2.6*	0.05*
	Kho Kho	50	1.67	±0.17	0.05			

*Significant at 0.05 level of confidence; $t_{0.05}(98) = 1.98$ ($p < 0.05$)

*p-value <0.05 is considered to be significant

**Figure 1: Comparison of explosive strength between junior level female kabaddi and kho kho players****Table 3: Comparison of reaction ability between junior level female kabaddi and kho kho players**

	Groups	N	Mean	SD	SEM	df	t value	p value
Reaction ability	Kabaddi	50	5.19	±1.74	0.13	98	4.6*	0.03*
	Kho Kho	50	3.28	±1.49	0.12			

*Significant at 0.05 level of confidence; $t_{0.05}(98) = 1.98$ ($p < 0.05$)

*p-value <0.05 is considered to be significant



Figure 2: Comparison of reaction ability between junior level female kabaddi and kho kho players

DISCUSSION

Every competitive sport requires high level of skill related fitness to execute the particular task for high performance to the opponent during the field [26]. Scientist identified that Strength, and reaction time are the important abilities for any successful performance [27]. In the age of 14 to 16 years the neuro physiological factor develops and continues still puberty [28]. This age is gradually acquired higher physical fitness and their physical demands are more [29, 30]. In this stage motor action increases more which may be due to the effects of structural growth on the myelination of neurons [31, 32].

The result of the present study shows that kho kho players have a better leg strength in comparison to kabaddi players. The cause of this result may be that in the game of kho kho, explosive leg strength is needed to do lots of movements like- pole dive, ground dive, flying field drive, quick release the sitting block, and also running & chasing. Scientists found that movement pattern of kho kho game is more explosive strengthable and rapidable [10, 33]. Another researchers found that greater muscular strength is strongly associated with improved force-time characteristics that contribute to an athlete's overall performance [34–36]. During the movement of explosive strength muscle fibers are activated [37] in order to stimulate hypertrophy which helps to activate high threshold motor unit [38] and by the size principles, typically stimulates all the available motor units to meet the demands of the physical activities. Thus kho-kho players frequently used these ability for showing better performance [26] and this might be the main cause of this findings.

Other side kabaddi is also a strength game where every player requires more strength endurance, arm strength, grip strength and cardiovascular strength to struggle with the opponent. Many kabaddi players have produced moments of magic in the kabaddi field due to their motor fitness. During this game player performs more isometrically in muscular contraction where length of the muscle does not change but muscle tension remains more [39]. Muscular strength is determined by how much force you can exert or how much weight you can lift. Muscular endurance refers to the ability of a muscle to sustain repeated contractions against resistance for an extended period of time [35]. Kabaddi as a sport has always demanded utmost discipline, hard work and perseverance from the athletes who aspire to reach the peak. Since kabaddi is an extremely physical sport, strengthening the core becomes crucial, especially when a raider clashes with a defender. Sudden changes in trajectory can be effectively executed only with a rock-solid core.

The result is also found that kho kho players have better reaction ability in comparison to kabaddi players. In the game kho kho is very agile and faster

while much more specific anticipatory reaction time is required rather than kabaddi performance. Because an attacking team member while sitting on a square, a chaser is required to be in reading position through he was touched by his team mate excepting him to utter the word 'kho' only after which he will start the pursuit. A slight movement of the doing before the utterance of the word 'kho' by the attacker will turn out to be counterproductive and such kho kho players who lack the touch and auditing reaction will grave to be liabilities. Similarly, the chaser on hearing the word 'kho' uttered by the attacker is required to make critical analysis of the situation related to his position to that of the defender. On account of pregame reposition of such movements during training and competitions the kho kho players who discharge the duties as predominantly chasers, develop better reaction time and concentration [40]. Scientists also noticed that reaction ability is positively associated with higher level of performance in kho kho [41, 42]. Reaction time is depending upon the characteristics of the stimuli as well as various conditions of the nerve impulse limits, reaction time speed of movements and quick reaction are prized qualities in kho kho.

CONCLUSION

It is concluded that there is significant differences found in explosive strength and reaction ability between junior level female kabaddi and kho kho players. It is also found that kho kho players have a better leg strength and reaction ability in contrast to kabaddi players.

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