



## Impact of KHO-KHO Playing on Physiological Changes and Development of Some Specific Skill Related Physical Fitness Factors

### KEYWORDS

Kho-Kho play, Aerobic capacity, Skill related physical fitness, Cardio-vascular fitness.

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### ABSTRACT

The present study was carried out to identify the impact of Kho-Kho playing on physiological changes and skills related physical fitness. From the results of the present study it can be concluded that Kho-kho playing significantly increase the speed, agility and explosive strength, so for coaches it is very essential to design a specific training schedule to target the specific SRPF component development. Moreover in terms of physiological perspectives Kho-Kho playing has significant contribution towards development of aerobic capacity and thereby endurance, decrement of resting as well as peak heart rate thereby improves cardiorespiratory fitness also.

### INTRODUCTION

Kho-Kho is Indian traditional game. Kho-Kho game is played particularly in rural and urban areas. Kho-Kho game was originated in India and has considerably long tradition. The Kho-Kho game is, at present, becoming the most popular amongst the indigenous activities in Physical Education in India and neighbouring countries in South Asia. Different games provided to do the body activities, differently. The theory of coordinative abilities is thought to be rapidly getting recognition in the world of sports. However, there is no general agreement regarding the number of coordinative abilities required for sports.

Monitoring of a training programme provides useful information to both scientists and coaches in relation to its effectiveness, the athlete's physical condition and preparation for competition. In order for monitoring to be effective (i.e. providing updated and accurate information on physiological profiling), the tests need to be administered at regular, predetermined intervals based on training cycles. Additionally, testing should be specific to the sport ideally conducted in the athlete's training environment in order to obtain ecologically valid and reliable results. A situation where physiological, anthropometric and sport-specific data can be obtained simultaneously provides the most accurate and informative results, due to the ease of comparisons and the complete profiling achievement. Research in other team sports has suggested that changes in performance parameters over the course of a season may not follow the expected trend. It was found that pre-season training of field hockey players decreased body fat percentage, increased maximum oxygen uptake, but decreased muscular strength.

The extensive research was carried-out by Menial and Schobel (1987) regarding introduction of new and wide term coordinative abilities in place of agility as one of the basic component of physical fitness. For achieving excellence in the field of Kho-Kho and Kabaddi, these components of physical fitness and coordinative ability must be possessed by the 'Kabaddi and Kho-Kho' player. Studies by Jana et al., 2013 had showed that there were no significant difference in lean body mass, body mass index and percentage of body fat amongst football and Kho-Kho players which established an important fact that in body contact sports and for sports which requires ample of endurance, strength, agility, speed physical fitness remains

same for the athletes involving in same type of sports. Research studies by Dhanula et al., 2012 had shown that there were significant differences in body composition; trunk & hip flexibility of Kabaddi & Kho-Kho Players. Furthermore regarding to muscular endurance between both the groups, showed significant difference. Research study has proved that Kho-Kho players are having good speed and agility compare to Kabbadi player.

Although a few work has been done regarding comparison level of them with normal people or with other sports persons. Therefore in the context of the previous studies it has observed that Kho-Kho playing might have an impact on development of speed, agility and explosive strength, which is not reported by any research studies till date. Therefore the present study unveils the impact of Kho-Kho playing towards the physiological changes and development of some specific skill related physical fitness factors.

### MATERIALS AND METHODS

#### The subjects

The subjects of the present study were randomly selected from Chakda of Nadia district. Total 44 female players were selected randomly and the age ranging from 15yrs to 19yrs. The study was approved by the Departmental Ethics Committee and the players provided written, informed consent to participate. All subjects were familiar with all the testing that took place, which included both field and laboratory assessments.

#### Experimental Design

To observe the impact of Kho-Kho playing we have taken total of 44 females of age group 15-18 from the district of Nadia. They were divided into two groups namely (n=22) control and experimental.

Control group → Female subjects of age group (15-18) below 19 years who were not involved in Kho-Kho playing or any sports or heavy physical activity.

For Experimental group → Female subjects of age group (15-18) below 19 years who were involved in Kho-Kho playing of about 2 months

A time period was set for 1 and half month [6] during the training period of Kho-Kho players (to allow the physiological and physical impact on the body system) which are

mentioned here as experimental time period. However no such training was given for control group subjects.

All the parameters were tested for both the groups before and after experimental time period to observe whether kho-kho playing has any impact towards increment in agility, explosive strength, and speed.

#### Measurement of physiological data

##### a. Age:

Age of the subjects were recorded from their college and university register.

##### b. Height:

Height of the subjects was recorded in centimetre (cm.) using anthropometric rod.

##### c. Weight:

using a portable weighing machine, weight of the subject was recorded in kg and approximate to nearest whole numbers.

##### d. Resting and Peak heart rate:

Resting and peak heart rate of the subjects was recorded according to the standard procedure by using automated upper arm-cuff HR monitor.

##### e. Aerobic capacity:

Aerobic capacity of the subject was determined according to the standard procedure by using digital treadmill.

#### Procedure of collecting data

The subjects were assembled and informed about the purpose of the study. They were instructed to complete the tests following the standard procedure. They were motivated to give their best performance. Tests were taken two times i.e. before and after experimental time period.

#### Flying 30 meter Test

##### Test Administration:

This test requires the subject to sprint 60 metres.

- The subject conducts a warm up for 10 minutes
- The assistant marks out a 60 metre straight section (AC) with cones and places a cone at the 30 metre point (B)
- From a sprint start with appropriate start commands (on your marks, set, "GO") from the assistant the subject sprints the 60m
- The assistant starts the stopwatch on the command "GO"

The assistant records the time the subject torso crosses the 30 metre point (B) and the 60 metre point (C)

#### 'T' Drill Test

Test Administration: This test requires the subject to touch a series of cones set out in "T" shape whilst side stepping and running as fast as possible.

- The subject warm up for 10 minutes
- The tester places 3 cones 5 metres apart on a straight line (A, B, C) and a 4<sup>th</sup> cone (D) was placed 10 metres from the middle cone (B) so that the 4 cones form a 'T'.
- The subject stands at the cone (D) at the base of the "T" facing the "T"
- The subject gives the signal to 'Go', starts the stopwatch and the athlete commences the test

- The athlete runs to and touches the middle cone (B), side steps 5 metres to the left cone (A) and touches it, side step 10 metres to the far cone (C) and touches it, side step 5 metres back to the middle cone (B) and touches it and then runs 10 metres backwards to the base of the 'T' and touches that cone (D)
- The tester stops the stopwatch and records the time when the subject touches the cone at the base of the "T"

#### Standing Broad Jump

##### Test Administration:

A demonstration of the standing broad jump was given to a group of subjects to be tested. The subject was then asked to stand behind the starting line with the feet parallel to each other. The subject was instructed to jump as farthest as possible by bending knee and swinging arms to take off for the broad jump in the forward direction. The subject was given three trials. Scoring: The distance between the starting line and the nearest point of landing provides the score of the test. The best trial is used as the final score of the test.

#### Statistical Analysis

The collected data were analyzed by using statistical method. Mean and Standard Deviation were calculated for each parameters of each group. The significance of difference between the mean values of two groups of subject was analysed using Student's 't' test by using MICROCAL ORIGIN PRO 7 software.

## RESULTS

#### Analysis of physiological variables:

Table 1 represents the Mean±SE value of physiological variables of subjects of control group and experimental group. Mean and SE of height of control group and experimental group were 143.65 ± 14.32 cm and 146.27±17.73 cm and the Mean and SE of weight of control group and experimental group were 45.36 kg±4.63 and 40.52 kg ±5.65 respectively. Resting and peak heart rates of Kho-Kho player were significantly higher than the general student (\*P<0.01) whereas aerobic capacity also increased with training for Kho-Kho playing 68.25% (\*P<0.01).

**Table 1: Personal data of control students and Kho-Kho players**

Personal data	Group	
	Control subjects	Kho-Kho player
Age (Yrs.)	16.98 ±1.23	16.32±1.36
Height (cm)	143.65 ±14.32	146.27±17.73
Weight (kg)	45.36±4.63	40.52±5.65*
Resting heart rate (bpm)	70.40±1.39	57.20±2.08*
Peak heart rate (bpm)	143.17±2.19	132.27±4.16*
Aerobic capacity (ml/kg/min)	33.70±1.78	56.70±3.01*

**Values are expressed as Mean±SE. \* P<0.01 as compared to general student values using Student's 't' test.**

Table 2 represents the resting heart rate, peak heart rate and aerobic capacity of control students as well as Kho-Kho players. Resting heart rate, peak heart rate and aerobic capacity were not significantly differing after experimental time period for control group as they were not involved in Kho-Kho playing. But the resting heart rate

was significantly decreased for experimental group after experimental time period and peak heart rate and aerobic capacity were significantly increased. The possible explanation is that they were involved in Kho-Kho playing.

**Table 2: Changes of physiological variables of control students and Kho-Kho players before and after experimental time period**

Test	Pretest		Post test	
	Control subjects	Kho-Kho players	Control subjects	Kho-Kho players
Resting heart rate (bpm)	70.40±1.39	57.20±2.08	71.29±2.43	50.20±2.43*
Peak heart rate (bpm)	143.17±2.19	132.27±4.16	145.04±5.18	126.54±5.18*
Aerobic capacity (ml/kg/min)	33.70±1.78	56.70±3.01	34.34±4.01	64.38±4.01*

Values are expressed as Mean±SE; \* P < 0.01 as compared to general student values using Student's't' test.

Table 3 represents the Mean±SE values of 30 meter fly test, 'T drill test' and standing broad jump test of control subjects and also Kho-Kho players. Speed, explosive strength (legs) and agility were not significantly increased after experimental time period for control group as they were not involved in Kho-Kho playing. But the speed, explosive strength of legs and agility were significantly (\* P < 0.01) increased for experimental group after experimental time period as they were involved in kho-kho playing.

**Table 3: Changes of values of 30 meter fly test, T drill test and standing broad jump test of control students and Kho-Kho players before and after experimental time period**

Tests	Groups					
	Control subjects			Kho-Kho players		
	30 meter fly test (Sec)	T drill test (Sec)	standing broad Jump test (mts)	30 meter fly test(Sec)	T drill test (Sec)	standing broad Jump test (mts)
Pretest	4.48±0.32	14.13±0.71	1.48±0.19	4.38±0.74	13.17±0.77	1.68±0.19
Post test	4.42±0.33	14.18±0.68	1.49±0.64	3.36±0.73*	11.57±1.06*	2.17±0.33*

Values are expressed as Mean±SE; \* P < 0.01 as compared to general student values using Student's't' test.

## DISCUSSION

The game of Kho-kho is based on natural principles of physical and mental development and fosters a healthy combative spirit among the youth. Kho-Kho game demand physical fitness, strength, speed and endurance, and a good amount of agility. Dodging, feinting and bursts of controlled speed make this game quite thrilling. To catch by pursuit - to chase, rather than just run - is the capstone of Kho-Kho. Several studies that so far done are focused on psychological factors or comparative study based on body composition, flexibility etc. Some physiological works regarding cardiopulmonary changes during periodized training through a year has already been reported. Therefore the present study is an attempt to investigate the impact of this playing towards development of explosive strength, agility and speed.

We have observed for Kho-Kho playing group that all the parameters has increased significantly due to Kho-Kho playing whereas all these 3 parameters were not increased significantly, the possible reason might be due to organized training that leads to some physiological changes which is not possible for control group. Bioenergetically it is the admixture of both aerobic and anaerobic activities so speed is developed and so does the explosive strength. Moreover for Kho-Kho playing group (experimental) aero-

bic capacity has significantly increased after experimental time period which is the indicative measurement of endurance, moreover resting heart rate decrement correlates with the resting bradycardia due to training so does the peak heart rate. All these physiological parameters were not increased in case of control group as they were not involved in Kho Kho playing.

## CONCLUSION

It can be concluded from the present study that Kho-kho playing significantly increases the speed, agility and explosive strength, so for coaches it is very essential to design a specific training schedule to target the specific SRPF component development. It may also be an important criterion for selection of players based on the discussed parameters. Moreover in terms of physiological perspectives Kho Kho playing has significant contribution towards development of aerobic capacity and thereby endurance, decrement of resting as well as peak heart rate thereby improves cardiorespiratory fitness also.

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