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Skill test battery in Kho-Kho for women

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Abstract

The purpose of the study was to develop test for assessment of skill ability of women Kho-Kho players. Kho-Kho playing ability demands speed, agility, coordination, balances and flexibility. The test items constructed were administered to 60 female Kho-Kho players, age range between 17 to 25 years. Factor analysis was employed to analyze the data. Two factors were identified offensive skill test with five items and defensive skill test with three items. The test constructed will help the coaches, trainer and teachers for selection, of the players, to monitor performance to predict the performance and for other purposes.

Keywords: Kho-Kho, indigenous sports and women players

Introduction

Skill test is a tool which can be used to assess performance of a player and provides unbiased and validated evaluation. Skill test assess a player in variety of positions and situations which actually occurs during play. This kind of tests which assess skill outcomes in games and sports are used by coaches and researchers, to estimate player's ability and also for talent identification. Sports specific technical skill test is important to differentiate among the players of different caliber and also useful in predicting performance [1].

Kho-Kho is one of the popular traditional sports in India. The origin of Kho-Kho is difficult to trace, but many historians believe, that it is a modified form of 'Run Chase', which in its simplest form involves chasing and touching a person [2]. Kho-Kho is a traditional Indian sport that dates back to ancient India and is believed to have been mentioned in the Mahabharata, an epic that narrates the war between two sets of royal cousins [3].

With its origins in Maharashtra, Kho-Kho in ancient times, was played on 'raths' or chariots, in premodern times and was known as Ratha [2, 3]. The present form of the game, played by individuals on foot, was invented in 1914 by Pune's Deccan Gymkhana club [2]. Kho-Kho is a tag game where one team tries to chase and touch the members of the other team while the other team tries to avoid being touched [4, 5, 6].

Like other indigenous games, Kho-Kho is simple, inexpensive and enjoyable and game of high alertness. The game demands high level of physical fitness specifically speed, agility and endurance, dodging and feinting along with mental toughness. Kho-Kho is widely played across South Asia and also has a presence in some regions outside South Asia, such as South Africa and England [4]. It is a competitive game and has been demonstrated at the 1936 Berlin Olympics and the 1982 Asian Games [5]. It is also a medal sport in the South Asian Games [2]. The first league of its kind called Ultimate Kho-Kho was launched in India in August 2021 [1]. Kho-Kho has been recognized by the International Kho-Kho Federation (IKF) and is played at the national and international levels [3, 4]. In India, the Kho-Kho Federation of India (KKFI) governs the sport and organizes national championships and selection trials for international competitions [5, 6, 7].

Assessing sports-specific technical skills plays a vital role in classifying players, selecting individuals for teams, and designing effective training programs [7, 8, 9]. The evaluation of these skills provides insights into an athlete's unique abilities and their capacity to perform in specific positions. Consequently, researchers continuously strive to develop comprehensive tests that accurately assess performance across a wide range of sports and games [10, 11, 12]. Skill test in Kho-Kho for different age and gender have developed. Test items were also developed for female players in Kho-Kho and other indigenous sports like Kabaddi [14, 15, 16].

Objective of study

The objective of the study was to develop instrument to measure performance in Kho-Kho.

Selection of subject

For the purpose of the study 60 female Kho-Kho players age group from 18 to 25 years were selected.

Selected test item

For present study of 12 skill test were developed, items were as follows- Ball touch Kho, Tapping, Covering, Fast attack Kho, Shuttle Run, Reaction Time, Pole Turn, Squat Sit, Cone zigzag run, Fast attack run, Ring game, Dozing & Running

In preparing test battery to measure playing ability of Kho-Kho the principal axis factor (PAF) with a varimax of (orthogonal) rotation of 12 items was conducted on data obtained. The tests were conducted and data was collected on 60 Kho-Kho female players age between 18-25 years. The data was analyzed and initial results showed that the variables under study co-related with each other which indicates that the variables measures similar underlying attribute that is playing ability in Kho-Kho, further the results showed that the co-relation was neither too high or too low, which qualifies the data for factor analysis.

An examination of Kaiser-Meyer-Olkin measure of sampling adequacy on selected skill item suggested that the sample was factorable (KMO=.654). In the next stage of factor analysis test one explains 37.61% of total variance.

Table 1: Communalities before and after extraction

Variables	Initial Values	Extraction Values
Cone Zig-Zag Run	1	.367
Pole Turn	1	.583
Ball Touch Kho	1	.692
Tapping	1	.518
Squat Sit	1	.312*
Shuttle Run	1	.236*
Doze Run	1	.573
Reaction Time	1	.132*
Covering	1	.546
Fast Attack Kho	1	.528
Ring Game	1	.152*
Fast Attack Run	1	.555

*standard value taken .35 factor loading level (Stevens field, 2000)

The communalities before and after extraction is shown in table 1. 4 Principal component analysis is based on initial assumption that all variance is common hence before extraction communalities are one for all. The extraction value shows that 37.617% variance is common or shared, the values in extraction can be explained in terms of proportion of variance by underlying factors.

Table:2 explains that two factors have been extracted. The rotated components matrix gives same information as component matrix. When loading less than 0.35 were excluded the analysis yielded two-factor solution with a simple structure (factor loading \Rightarrow .35).

Two factors with Eigen values greater than one have been extracted (3.009) here factor one explains 37.617% variance, whereas factor two explains 20.224% (1.069) variance, after rotation we can observe the eigenvalues are presented in the table. Rotation has the effect of optimizing the factor structure and relative importance of the two

factors is equalized, after extraction it accounts for 32.58% (2.607) and 25.054% (2.004).

Table 2: Principal axis factor (PAF) with a varimax of (orthogonal) rotation matrix of 12 items

Variables	Factor 1	Factor 2
Cone Zig-Zag Run		.367
Pole Turn	.583	
Ball Touch Kho		.692
Tapping	.518	
Squat Sit	.312	
Shuttle Run	.236	
Doze Run		.573
Reaction Time	.132	
Covering	.546	
Fast Attack Kho	.528	
Ring Game	.152	
Fast Attack Run	.555	
Eigenvalues	3.009	1.602
Percentage of total variance	32.588	25.054
Number of test measures	05	03

The two-factor skill test

Five Test items loaded into factor 1 It is clear from table 1 that these 5 tests all related to attacking skill of the players where the player's ability to give Kho, touch the defensive player, attack the player by covering the allowed area, ability to attack with high speed and to use the pole effectively to turn and touch the defensive player (Items Ball touch kho, Tapping, Covering, Fast attack kho, Pole turn respectively). This factor was labeled as Offensive Skill Test.

Three test items

(Cone zigzag Run, Fast attack Run, and Dozing & Running) load on to second factor related to the ability of players to stay in field for longer duration and running away from the chasers during the game, the ability to change the running path with in the field, speed and ability to give dodge to chaser and run. This factor was labeled as Defensive Skill Test.

Table 3: Two factor classification of tests.

Offensive Skill Test		Defensive Skill Test,	
Pole Turn	.583	Cone Zig-Zag Run	.367
Tapping	.518	Ball Touch Kho	.692
Covering	.546	Doze Run	.573
Fast Attack Kho	.528		
Fast Attack Run	.555		
Eigenvalues	3.009		1.602
Percentage of total variance	32.588		25.054
Number of test measures	05		03

Skill Test: The detailed description the tests are given below

A: Offensive Skill Tests

Ball touch Kho

Objective of the test is to measure, ability to give correct Kho with speed.

Tools: Stop watch, measuring tap, Lime, whistle, 8 balls, marked Kho-Kho court.

Administration Process: 8 balls are placed in each square box of all the blocks. On command the player start running

from starting point at pole, the player touches the first ball and calls Kho loudly. When the player touches the ball it moves from its place and the player sits in the place of the ball, player repeat the action with with all the next seven balls. A particular player is given 2 trials.

Score: Best time in seconds out of two trials.

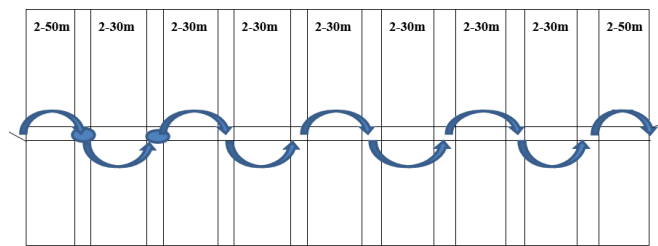


Fig 1: Ball Touch Kho: Measurements

Tapping

Objective: Objective of the test is to measure capacity to deaccelerate with coordination, body balances, flexibility and reaction time.

Tools: Stop watch, measuring tap, Lime, whistle, 4 cone.

Ground: Kho-Kho court, 23.50 meter & 4meter, pole to first block 2.50 meter, 2nd block to 7th block 2.30 meter, and 8th to 2nd pole 2.50 meter distance, and square box 3*3 c.m.

Administration Process

4 cone are placed in between first & eight sitting blocks alternatively, from the starting point at pole. On command go the player starts running from one side of the starting line, he has to touch all the four cone one by one during the running, while checking the speed, controlling the body and lunging forward with maximum flexibility after reaching the pole the players turns back from opposite side and repeats the same and complete the test. Two trials are given.

Score: Time in second of best out of two trial is the score.

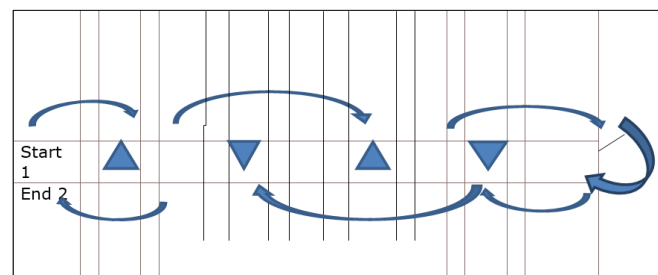


Fig 2: Drawing Showing Ground Position

Covering: Covering Skill Test

Objective: Objective of the test ability of player to attack when the defender is trying dodge with out changing direction.

Tools: Stop watch, measuring tap, Lime, whistle.

Administration Process: For the test the player who is tested sits in block three, other player assist by sitting in block five, the player assist by touching the first player and pounces Kho. On listening Kho first player move three steps forward (assuming chaser is 3 meter at right side) and move speedily right side to sit in box no 5. Two trials are given, best is recorded.

Measurement: Time in seconds taken to complete the work.

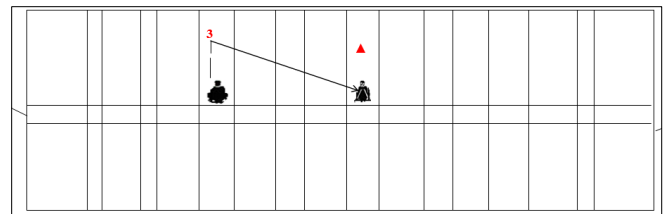


Fig 3: Drawing Showing Ground Position

Fast attack Kho

Objective: Objective of the test to measure ability of player to attack with speed. To measure the immediate given Kho with speed in game condition.

Tools: Stop watch, measuring tap, Lime, whistle, ect.

Administration Process: On command the player starts sprinting from starting line at pole, the player runs with maximum speed and sit in 3rd box and again, from sitting position again sprints and sit in box no 6, then sprints to pole 2 and repeat the same and finishes at the end point. Two trials are given and best is recorded.

Measurement: Time in second taken to complete the work.

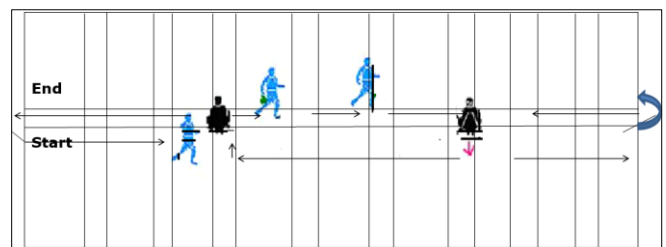


Fig 4: Drawing Showing Ground Position

Pole Turn

Objective: Objective of the test is to test the ability to use the pole effectively to attack.

Tools: Stop watch, measuring tap, Lime, whistle.

Administration Process: A player standing in pole runs and gives Kho to the player sitting on box the sitting player after getting the call Kho runs fast to reach the pole no 1 and hold the pole and turs the body to attack the defender time is noted for the whole action, that is running from the sitting position to turning the body around the pole. Two trials are given and best time is recorded.

Measurement: Time in seconds taken to complete the work.

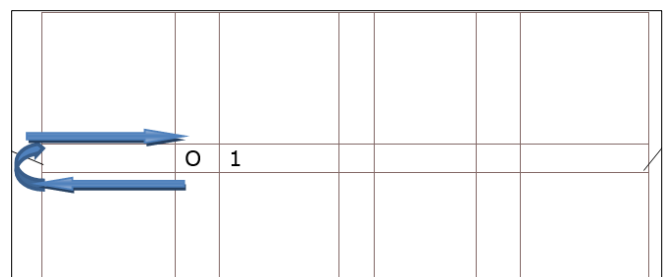


Fig 5: Drawing Showing Ground Position

B: Defensive Skill Tests

1) Cone zigzag run: Cone Zig-Zag Running (Single Chain)

Objective: Objective of the test is measure agility, coordination, alertness and reaction ability, during defensive play.

Tools: Stop watch, measuring tap, Lime, whistle, 8 cone and marked standard Kho-Kho court.

Administration Process: Eight cones are placed in all the sitting box. On command go player starts running from the left side from starting point in the center crosses the cone then runs from right side and reaches to cone two same pattern is repeated in all the cones, and the player return to starting point in the same manner. Two trials are given and best is recorded.

Measurement: Time in second taken to complete the work.

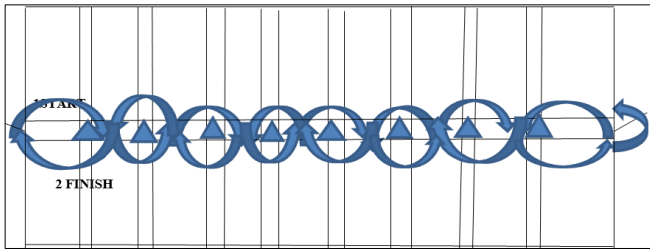


Fig 6: Drawing Showing Ground Position

2) Fast attack run

Objective: Objective of the test is measure ability controlled sprint which is important for offence as well as defense.

Tools: Stop watch, measuring tap, Lime, whistle

Administration Process: Player starts sprinting on command go from starting point at pole one, after reaching second pole holds the pole and take turn at pole and sprints back to pole one to complete the test. Two trials are given and best is recorded.

Measurement: Time in second taken to complete the work.

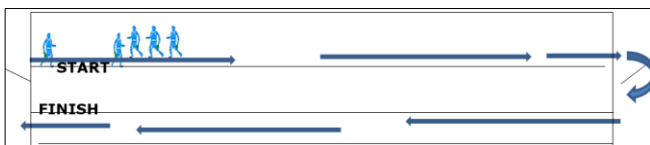


Fig 7: Drawing Showing Ground Position

3) Dozing & Running: skill Test:

Objective: Objective of the test were develop to Dozing Running skill test. A player how much control over running speed, with proper coordination of body balances with flexibility and effectively react with game condition.

Tools: Stop watch, measuring tap, Lime, whistle, 5 cone ect.

Ground: The ground measurements are 30 feet in length & 12 feet in width. At the center point (A) of the 12 feet line, 5 cones are placed at six feet distance each covering thirty feet in length.

Administration Process: On command go player starts side running from point A to B (6 feet) then turns face and again move side running to point C (30 feet) changes face complete side running to point A, then does zigzag running across the cones (5 cones at 6 feet distance total (30 feet) comes back to point A repeats the same other side (A to D and D to E finishes the test E to A side running) and finishes the test at point A. Two trials are given and best is recorded.

Score: Time in seconds taken to complete the work.

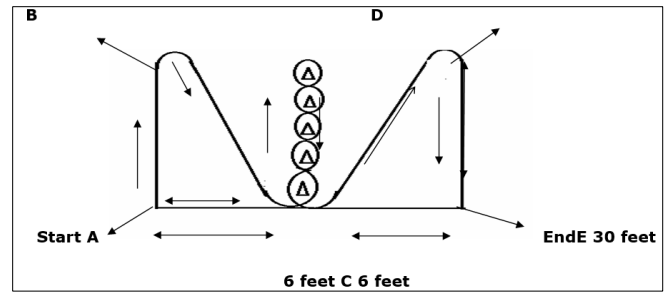


Fig 8: Drawing Showing Ground Position

Conclusion

Offensive Skill Test	Defensive Skill Test.
Pole Turn	Cone Zig-Zag Run
Tapping	Ball Touch Kho
Covering	Doze Run
Fast Attack Kho	
Fast Attack Run	

In conclusion, the assessment of sports-specific technical skills is a critical element in player classification, selection, and training program planning. The development of robust assessment tests in Kho-Kho which includes five offensive and three defensive skill tests will empower decision-makers to identify talented players, optimize team composition, and design targeted training regimes. By incorporating skill assessments into sports management practices, organizations can improve player development and ultimately achieve higher levels of success. The test battery developed and validated, can be used for the evaluation of players.

Conflict of interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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