



International Journal of Physical Education, Sports and Health

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIIF): 5.38
IJPESH 2023; 10(2): 242-245
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www.kheljournal.com
Received: 22-12-2022
Accepted: 29-01-2023

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Relationship of selected strength and flexibility measures with playing ability in kho-kho plyers

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Abstract

Background: Strength and Flexibility are the parameters that correlated with Physical Fitness. If these qualities are improved then the overall Kho-Kho playing ability can be improved.

Method: 38 Players were selected. Arm Strength and Leg Strength were measured by roger's formula and Squat test. The Flexibility components Trunk, ankle and Shoulder were measured by Sit & reach test, Goniometry and Apley's scratch test. Five- Point rating scale was used to judge Playing ability by three expert coaches. Pearson's Spearman correlation analysis were used, $p < 0.05$.

Result: The results showed significant positive correlations of Arm Strength & Leg Strength with Playing ability (Arm $r=0.49$ and Leg $r=0.55$). Also the Flexibility components showed average significant correlation (Trunk=0, Ankle=0.20, Shoulder=0)

Conclusion: Leg strength is highly significant correlated with Playing ability. Other measures also showed average significant relationship with playing ability in Kho-Kho Players.

Keywords: Strength, flexibility, playing ability, kho-kho player

Introduction

Kho-kho is a most popular of India. It is played between two teams by twelve nominated players; among them nine play during the match. It is nothing but highly modified version of 'Run Chase;' It is also said that the game kho-kho was played using chariots during ancient period and because the chariots called 'Rath' in Sanskrit and Hindi, the game was popular by name 'Rathera The morden form of Kho-Kho was shaped by the Deccan Gymkhana of Pune which was founded by Lokmanya Tilak ^[1]. The result of the game depends upon the time spend by the runners and the points scored by the chasers. For getting point or to play better in Kho-Kho, players should be very much physically fit ^[2]. Strength and Flexibility are the parameters that correlated with Physical Fitness. Each of these components affects Sports. Both components are very important in the Kho-Kho game as they require for running, Sudden changing position, and chasing. Contribution of these components gets better performance. The coach and experts are looking for to bring better performance through execute the different preparing techniques ^[3]. If these qualities are improved by any means then the overall Kho-Kho playing ability can be improved. However, less research has been found on Kho-Kho Players Playing ability & its association with Lower limb strength and muscle flexibility. Thus the need of study to find the correlation between strength and flexibility measures with Playing ability among Kho-Kho Players.

Materials and Methods

Study site: Jummadadan Vyayam Mandir (Vadodara), Divyasamarth Sports Ground.

Study population: Kho-Kho Players

Proposed sample size: 38

Sampling method: Convenient and purposive sampling

Study duration: 10 to 12 months after ethics approval

Study design: Analytical cross-sectional Study

Inclusion criteria ^[4]

1. Healthy individuals with age group between 18 to 25
2. Male & Female Kho-Kho Players.
3. Active Participants which are practicing for the last 6 months (State, National, District level)

Exclusion criteria

1. Any recent Musculoskeletal injuries
2. Neurological problem
3. Any recent surgery

Method:

Kho-Kho Players were selected based on Inclusion criteria & Exclusion criteria after taking ethical clearance from University Ethical Committee, KPGU. Written informed consent were taken from all the Participants. Then Strength & Flexibility components was measured.

Outcome Measures

For Strength

1. Arm Strength^[5]:- By Roger's Formula
2. Leg strength test^[6]:- By Squat test



Fig 1: Pull ups



Fig 2: Push ups



Fig 3: Squat test

For Flexibility

1. Ankle Flexibility ^[7]: By Goniometre
2. Trunk Flexibility ^[8]: By Sit & Reach test
3. Shoulder Flexibility ^[9]: By Apley's Scratch test



Fig 4: Ankle Flexibility



Fig 5: Shoulder Flexibility



Fig 6: Trunk Flexibility

Kho-Kho Playing Ability: Five point rating scale ^[10] was used to judge Playing ability by Three experts who has excellent knowledge about Kho-Kho game. They put players in real situation and judge Players according to their performance. Finally the Playing ability score was average of three experts rating.

Analysis of Data

Data were analysed using a statistical technique descriptive statistics and Coefficient of Correlation (r-value) was calculated using Pearson's Product Correlation Method. The level of Significance was considered for the study was 0.05 level.

Result and Discussion

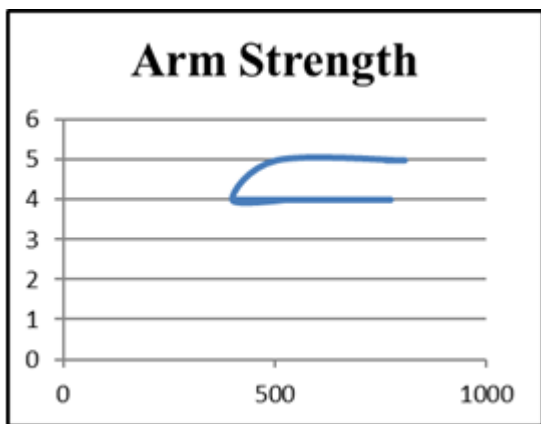
The coefficients of correlation obtained for relationships of the selected strength and flexibility measures to Kho-Kho playing ability have been presented in table no.1

Table 1: Correlation of Strength & Flexibility measures with Playing ability

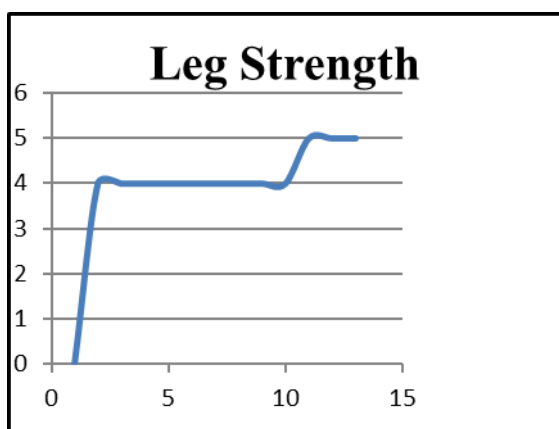
Variables	Coefficient of Correlation (r)	Relationship
Arm Strength	0.49	Low Positive
Leg Strength	0.55	Average Positive
Ankle Flexibility	0.20	Low Positive
Trunk Flexibility	0	Linear
Shoulder Flexibility	0	Linear

The findings with table revealed that strength measure of Leg strength contributed significantly to the Playing ability in Kho-Kho ($r=0.55$). This may be due chasing skills like sudden

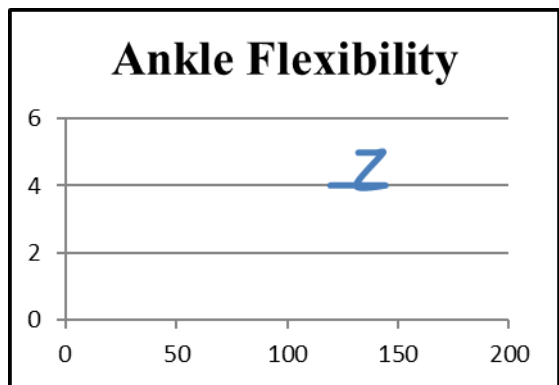
changing positions, pole diving, giving kho, getting in square and getting off from square, So a kho-kho player is required to perform the techniques. It is involve lots of repeated jumping and thereby the leg strength might have dominated.



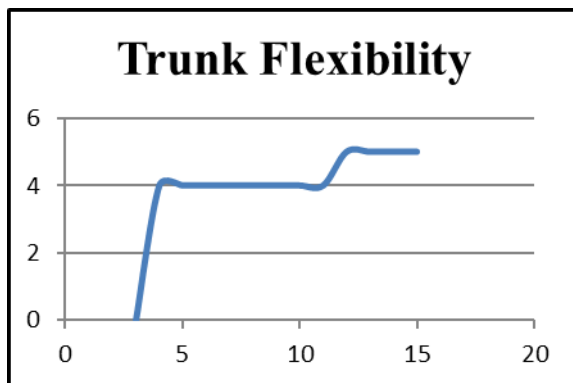
Graph 1: Correlation between Arm Strength & Plying Ability



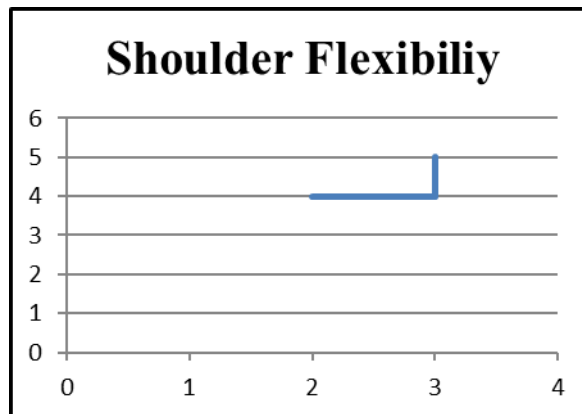
Graph 2: Correlation between Leg Strength & Playing Ability



Graph 3: Correlation between Ankle Flexibility & Playing Ability



Graph 4: Correlation between Trunk Flexibility & Playing Ability



Graph 5: Correlation between Shoulder Flexibility & Playing Ability

There is study conducted by Gopa Saha (2022) concluded that kho-kho players have a better leg strength contrast to kabaddi players^[11]. Scientists found movements which is included in Kho-Kho game is more Strengthable and Rapidable^[12]. Another researchers found that to improve athlete's performance muscular strength is strongly associated^[13]. To activate high threshold motor unit in order to stimulate hypertrophy, there is activation of muscle fibers during the movement of explosive strength^[14] and by the size principles, typically stimulates all the available motor units to meet the demands of the physical activities. Thus, these abilities are frequently used by Kho-Kho Players for increase the performance^[15] and this might be the main reason of this outcome.

The arm strength also contribute to significant relationship ($r=0.49$) to Kho- Kho playing ability due to Grasping direction, giving kho etc. techniques. Similar study which is conducted by Dr. R. Jagathesan (2018) concluded that there is close relationship between arm strength and playing ability in Kho-Kho Players^[16].

Flexibility measures of Ankle flexibility has low but significantly correlated with Playing ability ($r=0.20$). Trunk ($r=0$) and Shoulder flexibility ($r=0$) have linear relationship with Playing ability because of sudden changing positions and chasing techniques.

It is enables the tendons ligaments and muscles around the ankle to accommodate for these sudden movements or changes of direction and help the player from unwanted injuries. There is study conducted by E. Narsinga Rao (2020). In this study author have Analyze Injuries among the Kho-Kho Players of Osmania University and concluded that there is 54% risk of injuries in lower extremity in Kho-Kho players, where as upper extremities 36%, head 12%, neck 4%, and spine 4%^[17].

Another study which is conducted by S.Paul (2017) concluded that Kho-Kho performance was significantly related to speed, agility, leg power, flexibility, static balance and eye hand coordination. They tells that movements which are dodging and tapping done only in flexible Player^[17].

So, to perform every techniques perfectly and effectively, players require enough amounts of Strength and flexibility as result of the present study shows.

Conclusion

On the basis of the result drawn with the mentioned methodology the following conclusions:

1. There is a Positive relationship between Arm strength with playing ability of Kho- Kho players.
2. There was a Positive relationship between Leg Strength

with playing ability of Kho-Kho Players.

3. There is a Positive relationship between Ankle Flexibility with Playing ability in Kho-Kho Players.
4. There is Linear relationship between Trunk flexibility and Shoulder flexibility with Playing ability in Kho-Kho Players.

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