**International Journal of Physical Education and Sports**
www.phyedusports.in
Volume: 7, Issue: 10, Pages: 18-25, Year: 2023
Impact Factor: 3.125 (RIF)3.61 (IJI)
**ISSN- 2456-2963**

# Compare the Hip Flexibility, Spine Flexibility and Shoulder Flexibility of Kho-Kho and Kabaddi Players

**Mr. Ram jee[1], Dr. Raj Veer Singh**

[1]Research Scholar, Department of Physical Education, D.D.U Gorakhpur University, Gorakhpur, U.P., India.
[2]Assistant Professor, Department of Physical Education, D.D.U Gorakhpur University, Gorakhpur, U.P., India.

**Received Sep 12, 2022; Accepted Sep 30, 2022; Published Oct 01, 2022**

## Abstract

The purpose of this study was to compare the Hip flexibility, spine flexibility and shoulder flexibility of Kho-Kho and Kabaddi players. A total of sixty (N=60) subjects were randomly chosen for this study. Out of 60 players, 30 players were from Kho-Kho and 30 from Kabaddi. The age of the players ranged from 18 to 28 years. The variable undertake for the study are : selected motor variables namely Hip flexibility, spine flexibility and shoulder flexibility were considered as criterion for the study. Hip flexibility was tested by sit and reach test, spine flexibility was bridged up test and shoulder flexibility was tested by shoulder rotation test. Mean and standard deviation of each variable were calculated and t-test was computed to analyze the significance of difference between the means. All statistical calculations were done by standard statistical procedure. To determine the differences, if any, between the two groups of players, the independent t-test was calculated. Statistical significance was tested at 0.05 level of confidence. It is concluded from the result that Kho-Kho players are superior to Kabaddi players in the term of flexibility.

**Key Words**: Hip Flexibility, Spine Flexibility and Shoulder Flexibility.

## 1. Introduction:

Flexibility, encompassing hip, spine, and shoulder flexibility, is vital for athletes in Kho-Kho and Kabaddi, significantly enhancing performance and reducing the risk of injuries.

In Kho-Kho, hip flexibility is crucial for executing quick directional changes, efficient crouching, and sprinting. These movements demand a full range of hip motion and contribute to maintaining balance during rapid transitions. Spine flexibility supports agile movements, allowing players to twist and turn their torsos rapidly. This flexibility is essential for diving and dodging, enabling players to execute these actions without injury. A flexible spine also supports better core strength and posture, vital for sustaining form during high-intensity play. Shoulder flexibility is critical for reaching and tagging opponents quickly and efficiently, facilitating rapid arm movements necessary for tagging and evasion. Although less common, throwing or catching the ball is also improved with shoulder flexibility.

In Kabaddi, hip flexibility is essential for effective tackling techniques and escaping from holds. It enhances footwork and agility, allowing players to move fluidly in different directions. Low squat positions adopted during raids and defenses require considerable hip flexibility. Spine flexibility is key for escape techniques, where raiders often bend backward to avoid tackles. Defenders need to maintain low, stable stances, and a flexible spine aids in sustaining these positions comfortably while absorbing impacts and reducing back injury risks. Shoulder flexibility allows defenders to grip and hold raiders efficiently, while raiders extend their arms fully to touch opponents. It also helps prevent injuries during physical confrontations common in Kabaddi.

Overall, flexibility improves range of motion, coordination, and balance, leading to more effective movements and reducing injury risk. It aids in quicker recovery and enhances muscular endurance, enabling athletes to maintain high performance levels throughout the game. Incorporating flexibility training into their fitness regimen is crucial for athletes in both sports, significantly boosting performance and minimizing injury risks.

## 2. Methods and Materials:

**2.1 Subjects:** To attain the purpose of the study, sixty (n-60) male subjects were selected for this study from D.D.U Gorakhpur University Gorakhpur who represented inters university tournaments. Thirty players (n-30) were selected from Kabaddi game and thirty players (n-30) were selected from Kho-Kho games. Students were selected on the basis of random sampling technique as subjects for this study.

**2.2 Criterion measure:**

- **Shoulder Flexibility:** Shoulder flexibility was measured by shoulder rotaion test and the score were recorded as the distance cover in inches.
- **Spine Flexibility:** Spine flexibility was measure by bridged up test and the scores were recorded in inches.
- **Hip & Back Flexibility:** Hip and back flexibility was measured by conducting the sit and reach test and the scores were recorded in inches.

**2.3 Statistical procedure:** Mean, standard deviation and standard error of mean was used for descriptive statistics whereas Independent sample T test was used for Inferential Statistics.

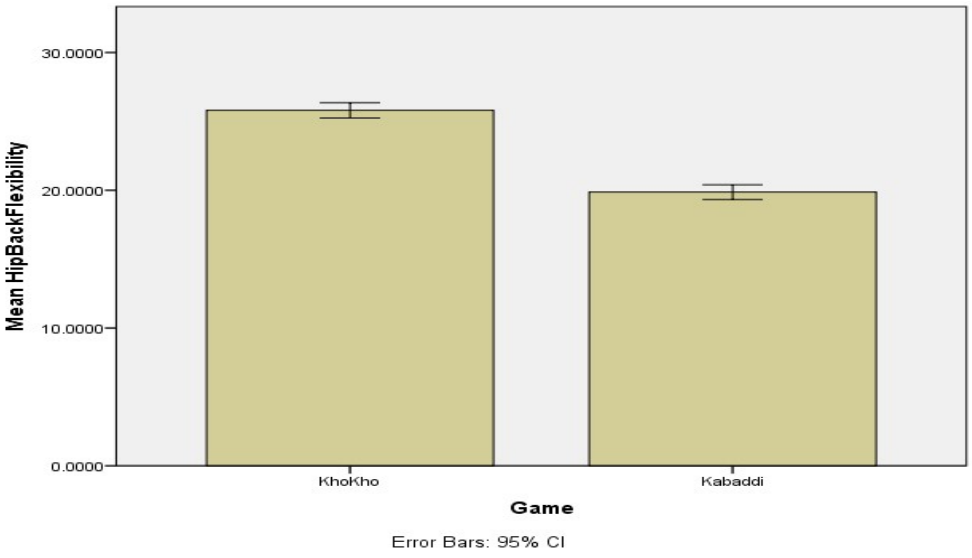
## 3.Results and Discussion:

**TABLE NO. 1**

| | Game | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Hip-Back Flexibility** | KhoKho | 30 | 25.8000 | 1.49482 | .27292 |
| | Kabaddi | 30 | 19.8667 | 1.43198 | .26144 |

Table 1 provides data on hip back flexibility scores for participants in Kho-Kho and Kabaddi. In the Kho-Kho group, which includes 30 participants, the mean hip back flexibility score is 25.80 units. This group has a standard deviation of 1.49 and a standard error of the mean of 0.27. Conversely, the Kabaddi group, also with 30 participants, shows a significantly lower mean hip back flexibility score of 19.87 units. The standard deviation for this group is 1.43, with a standard error of the mean of 0.26.

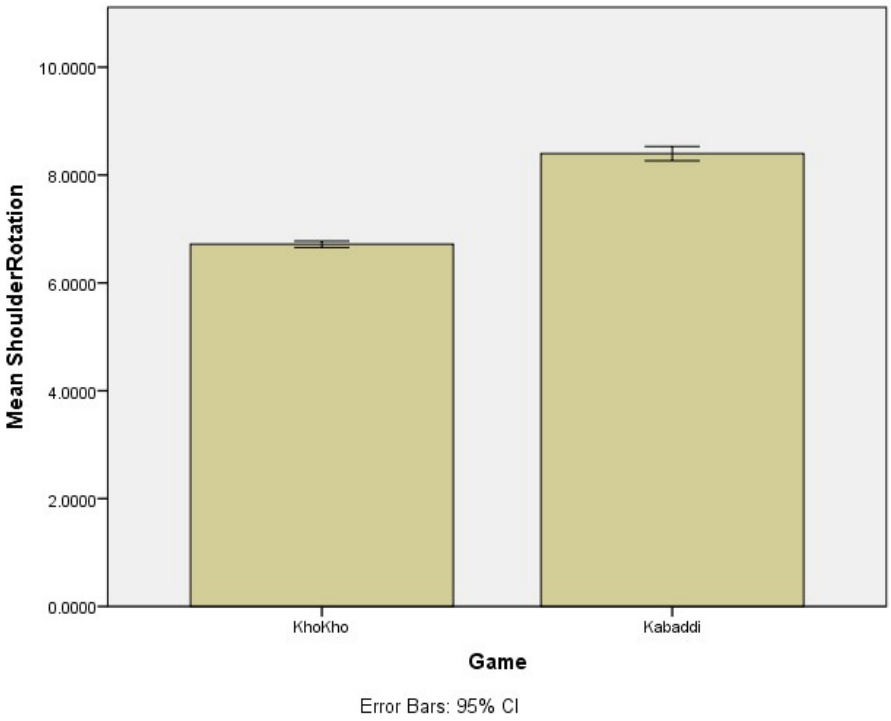
These statistics indicate that Kho-Kho players have higher hip back flexibility on average compared to Kabaddi players. The considerable difference in their mean scores highlights this disparity. The relatively low standard deviations and standard errors for both groups suggest that the measurements are consistent and reliable within each sport. Therefore, it can be concluded that participation in Kho-Kho is associated with greater hip back flexibility than participation in Kabaddi.




**Graphical representation of Mean Hip-Back Flexibility of Kho-Kho and Kabaddi Players.**

**Table 2** presents the results of statistical tests comparing hip back flexibility scores between participants in Kho-Kho and Kabaddi.

**Levene's Test for Equality of Variances:** This test checks if the variances of hip back flexibility scores are equal between the two groups. The F-statistic is 0.110 with a p-value of 0.741. Since the p-value is greater than the conventional significance level of 0.05, it suggests no significant difference in variances between the groups




**t-test for Equality of Means:** This test assesses whether there is a significant difference in mean hip back flexibility scores between Kho-Kho and Kabaddi players. Assuming equal variances, the t-statistic is 15.699 with 58 degrees of freedom and a p-value of 0.000. When equal variances are not assumed, the t-statistic remains 15.699, with degrees of freedom adjusted to 57.893, and a p-value of 0.000. Both scenarios indicate a highly significant difference in mean hip back flexibility scores between the two groups.

The mean difference in hip back flexibility scores is estimated to be 5.93333 units, with a standard error of 0.37794. The 95% confidence interval for this mean difference ranges from 5.17681 to 6.68985 units. These findings strongly suggest that Kho-Kho players have significantly higher hip back flexibility scores compared to Kabaddi players, as evidenced by the large and significant positive mean difference. The consistency of results between the equal and unequal variance assumptions further enhances the reliability of these findings

| Independent Samples Test | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | T | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| **Hip-Back Flexibility** | Equal variances assumed | .110 | .741 | 15.699 | 58 | .000 | 5.93333 | .37794 | 5.17681 | 6.68985 |
| | Equal variances not assumed | | | 15.699 | 57.893 | .000 | 5.93333 | .37794 | 5.17678 | 6.68988 |

**Table 2**

| | Game | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Shoulder Rotation** | KhoKho | 30 | 6.718000 | .1585364 | .0289447 |
| | Kabaddi | 30 | 8.398000 | .3518856 | .0642452 |

**Table 3**

Presents data regarding shoulder rotation measurements for participants in both Kho-Kho and Kabaddi games. In the Kho-Kho group, comprising 30 observations, the mean shoulder rotation is recorded at 6.718 units, with a standard deviation of approximately 0.159 and a standard error of the mean of about 0.029. Conversely, in the Kabaddi group, also comprising 30 observations, the mean shoulder rotation is notably higher at 8.398 units. For this group, the standard deviation is approximately 0.352, and the standard error of the mean is about 0.064. These statistics indicate that participants in the Kho-Kho demonstrate a significantly better shoulder rotation on average compared to those in the Kabaddi, as evidenced by the substantial difference in their mean shoulder rotation values

| Independent Samples Test | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| **Shoulder Rotation** | Equal variances assumed | 17.404 | .000 | -23.842 | 58 | .000 | -1.6800000 | .0704645 | -1.8210500 | -1.5389500 |
| | Equal variances not assumed | | | -23.842 | 40.307 | .000 | -1.6800000 | .0704645 | -1.8223802 | -1.5376198 |

**Table 4**

**Table 4** presents the results of statistical tests comparing shoulder rotation measurements between participants in Kho-Kho and Kabaddi.

**Levene's Test for Equality of Variances:** This test evaluates whether the variances of shoulder rotation measurements are equal between the two groups. The results show a significant difference in variances, with an F-statistic of 17.404 and a p-value of 0.000, indicating unequal variances between the groups.

**t-test for Equality of Means:** This test examines if there is a significant difference in mean shoulder rotation between the Kho-Kho and Kabaddi groups. Assuming equal variances, the t-statistic is -23.842 with 58 degrees of freedom and a p-value of 0.000. When not assuming equal variances, the t-statistic remains -23.842, with degrees of freedom adjusted to 40.307, and a p-value of 0.000. Both scenarios indicate a highly significant difference in mean shoulder rotation between the groups.

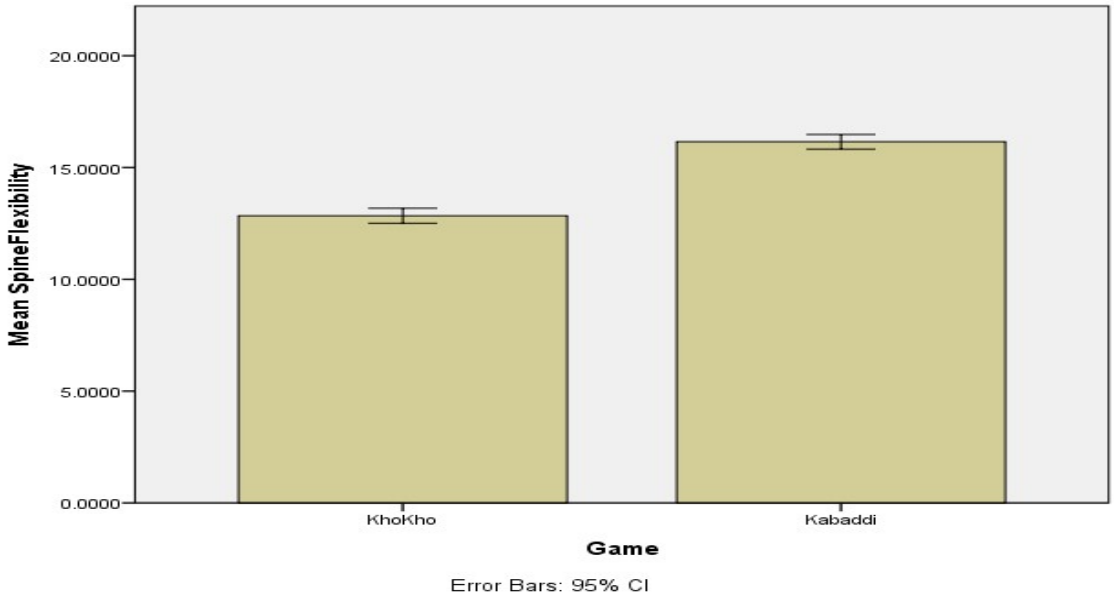
The mean difference in shoulder rotation is estimated to be -1.68 units, with a standard error of 0.070. The 95% confidence interval for this mean difference ranges from -1.821 to -1.539 units. These findings suggest that Kho-Kho players exhibit significantly higher shoulder rotation on average compared to Kabaddi players, as evidenced by the large and significant negative mean difference. The consistent results between the equal and unequal variance assumptions further enhance the reliability of these conclusions.

**Table 5** provides data on spine flexibility measurements for participants in both KhoKho and Kabaddi games. In the KhoKho group, consisting of 30 observations, the mean spine flexibility is recorded at approximately 12.84 units, with a standard deviation of approximately 0.89 and a standard error of the mean of about 0.16. Conversely, in the Kabaddi group, also comprising 30 observations, the mean spine flexibility is notably higher at around 16.15 units. For this group, the standard deviation is approximately 0.88, and the standard error of the mean is about 0.16. These statistics suggest that participants in the Kho-Kho demonstrate significantly better spine flexibility on average compared to those in the Kabaddi, as evidenced by the substantial difference in their mean spine flexibility values.

| | Game | N | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| **Spine Flexibility** | KhoKho | 30 | 12.843333 | .8923751 | .1629247 |
| | Kabaddi | 30 | 16.150000 | .8803408 | .1607275 |

**Table 5**

**Graphical representation of Mean Spine Flexibility of Kho-Kho and Kabaddi Players**



| Independent Samples Test | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | | | | |
| | | F | Sig. | t | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference | |
| | | | | | | | | | Lower | Upper |
| **Spine Flexibility** | Equal variances assumed | .003 | .015 | -14.448 | 58 | .000 | -3.3066667 | .2288619 | -3.7647836 | -2.8485498 |
| | Equal variances not assumed | | | -14.448 | 57.989 | .000 | -3.3066667 | .2288619 | -3.7647854 | -2.8485480 |

**Table 6** presents the results of statistical tests comparing spine flexibility between participants in Kho-Kho and Kabaddi.
**Levene's Test for Equality of Variances:** This test assesses whether the variances of spine flexibility scores are equal between the two groups. The F-statistic is extremely low at 0.003, with a p-value of 0.015, indicating a significant difference in variances between the groups.
**t-test for Equality of Means:** This test evaluates whether there is a significant difference in mean spine flexibility scores between Kho-Kho and Kabaddi players. Assuming equal variances, the t-statistic is -14.448 with 58 degrees of freedom and a p-value of 0.000. When equal variances are not assumed, the t-statistic remains -14.448, with degrees of freedom adjusted to 57.989, and a p-value of 0.000. Both scenarios show a highly significant difference in mean spine flexibility scores between the two groups.
The mean difference in spine flexibility scores between Kho-Kho and Kabaddi players is estimated at -3.3067 units, with a standard error of approximately 0.229. The 95% confidence interval for this mean difference ranges from -3.765 to -2.849 units. These findings suggest that Kho-Kho players have significantly higher spine flexibility on average compared to Kabaddi players, as evidenced by the substantial and highly significant negative mean difference. The consistent results under both equal and unequal variance assumptions further reinforce the reliability of these conclusions.

## 4. Conclusion:

Based on the statistical analyses:

- **Hip Back Flexibility:** Kho-Kho players demonstrate significantly higher hip back flexibility scores compared to Kabaddi players, as indicated by a large and significant positive mean difference. The consistency of results across equal and unequal variance assumptions enhances the reliability of this finding.
- **Shoulder Rotation:** The analysis shows that Kho-Kho players have significantly greater shoulder rotation than Kabaddi players. This finding is supported by consistent results across different variance assumptions, indicating robustness in the statistical comparison.

- **Spine Flexibility:** Kho-Kho players exhibit significantly greater spine flexibility compared to Kabaddi players. Similar to the other measures, this conclusion is bolstered by consistent findings under both equal and unequal variance assumptions, further affirming the reliability of the statistical analysis.
- In summary, these statistical findings provide strong evidence that Kho-Kho players generally possess higher levels of hip back flexibility, shoulder rotation, and spine flexibility compared to their counterparts in Kabaddi. These differences highlight distinct physical attributes and training emphasis between the two sports.

## 5. References:

[1]. Aggarwala, J., Dhingra, M., Bhatia, V., Hasan, U., & Chatterjee, S. (2019). Analysis of Physical and Physiological Requirements of Indian Male Junior Kabaddi Players in Relation to their Playing Positions. Spor Hekimliği Dergisi, 54(4), 215–224. https://doi.org/10.5152/TJSM.2019.135

[2]. Aman, J. E., Elangovan, N., Yeh, I. L., & Konczak, J. (2015). The effectiveness of proprioceptive training for improving motor function: A systematic review. Frontiers in Human Neuroscience, 8(JAN). https://doi.org/10.3389/FNHUM.2014.01075

[3]. Barnett, L. M., Stodden, D., Cohen, K. E., Smith, J. J., Lubans, D. R., Lenoir, M., Iivonen, S., Miller, A. D., Laukkanen, A., Dudley, D., Lander, N. J., Brown, H., & Morgan, P. J. (2016). Fundamental movement skills: An important focus. Journal of Teaching in Physical Education, 35(3), 219–225. https://doi.org/10.1123/JTPE.2014-0209

[4]. Biswas, M., & Halder, S. (2015). A Comparative Study on Selected Anthropometric Variables and Motor Abilities between Women Kho-Kho and Kabaddi Players. ~ 66 ~ International Journal of Physical Education, Sports and Health, 2(1), 66–68. www.kheljournal.com

[5]. Bryant, E. S. ara., James, R. S., Birch, S. L. ouis., & Duncan, M. (2014). Prediction of habitual physical activity level and weight status from fundamental movement skill level. Journal of Sports Sciences, 32(19), 1775–1782. https://doi.org/10.1080/02640414.2014.918644

[6]. Chatru L Rathod, & Nadakatti, V. (2016). a Comparative Study on Selected Physical Fitness Components of Kabaddi and Kho-Kho Players. International Journal of Physiology, Nutrition and Physical Education, 1(2), 61–63. http://pe.lsrj.in/UploadedArticles/465.pdf

[7]. Chatru L Rathod, & Nadakatti, V. (2016). a Comparative Study on Selected Physical Fitness Components of Kabaddi and Kho-Kho Players. International Journal of Physiology, Nutrition and Physical Education, 1(2), 61–63. http://pe.lsrj.in/UploadedArticles/465.pdf

[8]. Chronicle, B. M.-J. of E. (2015). a Comparative Study of Speed and Endurance Among Netball and Basketball Players. Academia.Edu, 4(1), 94–97. http://www.academia.edu/download/37431468/Journal_of_Educational_Chronicle__Vol._5__No._2__December__2014.pdf#page=97

[9]. Chronicle, B. M.-J. of E. (2015). a Comparative Study of Speed and Endurance Among Netball and Basketball Players. Academia.Edu, 4(1), 94–97. http://www.academia.edu/download/37431468/Journal_of_Educational_Chronicle__Vol._5__No._2__December__2014.pdf#page=97

[10]. Components of Fitness. (n.d.). Retrieved April 6, 2024, from https://www.brianmac.co.uk/conditon.htm

[11]. Components of Fitness. (n.d.). Retrieved April 6, 2024, from https://www.brianmac.co.uk/conditon.htm

[12]. Coordination and Movement Skill Development The Key to Long Term Athletic Success. (n.d.). Retrieved April 6, 2024, from https://www.everythingtrackandfield.com/coordination-movement-skill-development-the-key-to-long-term-athletic-success

[13]. Coordination and Movement Skill Development The Key to Long Term Athletic Success. (n.d.). Retrieved April 6, 2024, from https://www.everythingtrackandfield.com/coordination-movement-skill-development-the-key-to-long-term-athletic-success

[14]. Cyrino, E. S., da Silva, D. R. P., Cucato, G. G., Casonatto, J., Avelar, A., de Costa Trindade, M. C., Cyrino, L. T., & do Nascimento, M. A. (2013). Comparison between two motor tests used for muscular strength/endurance analysis in young women. Revista Brasileira de Cineantropometria e Desempenho Humano, 15(3), 315–325. https://doi.org/10.5007/1980-0037.2013v15n3p315

[15]. Cyrino, E. S., da Silva, D. R. P., Cucato, G. G., Casonatto, J., Avelar, A., de Costa Trindade, M. C., Cyrino, L. T., & do Nascimento, M. A. (2013). Comparison between two motor tests used for muscular strength/endurance analysis in young women. Revista Brasileira de Cineantropometria e Desempenho Humano, 15(3), 315–325. https://doi.org/10.5007/1980-0037.2013v15n3p315

[16]. Deepak, Kumar, N., Yadav, A., & Sagre, S. (2022). Relationship between motor ability and anthropometric components of Kho-Kho and Kabaddi players. International Journal of Physiology, Nutrition and Physical Education, 7(2), 200–203. https://doi.org/10.22271/journalofsport.2022.v7.i2d.2590

[17]. Deepak, Kumar, N., Yadav, A., & Sagre, S. (2022). Relationship between motor ability and anthropometric components of Kho-Kho and Kabaddi players. International Journal of Physiology, Nutrition and Physical Education, 7(2), 200–203. https://doi.org/10.22271/journalofsport.2022.v7.i2d.2590.

**Mr. Ram jee**

Research Scholar,

Department of Physical Education,

D.D.U Gorakhpur University,

Gorakhpur, U.P., India.