

## Development of Regression Equation to Predict Kho-Kho Junior Boys' Performance with the help of Digit Ratio, Stress-Vulnerability and Selected Anthropometric Variables

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### Abstract

The purpose of the study is to develop a regression equation to predict the performance of Kho-Kho Junior boys with the help of digit ratio, stress-vulnerability and selected anthropometric variables. Fifty junior level male Kho-Kho players were selected randomly as the subjects for the study, where the age of the subjects was confined within the range of 15-18 years. The subjects were selected from various state of India. The data has been collected by the method of tests for the chosen variables. All the tests have been conducted at National Level Junior Kho-Kho boys. The author personally visited the venues of Junior and Senior National tournaments, invitational tournaments and coaching camps. Moreover, whenever necessary the author approaches his subjects personally for the required assistance and guidelines for the test. To find out correlation between Independent Variables (Finger Ratio (2D:4D), Anthropometric Variable and stress vulnerability) and Dependent Variable (Kho-kho performance), partial correlation was used, for joint contribution of Independent Variables (Finger Ratio (2D:4D), Anthropometry and Stress Vulnerability) and dependent variable (Kho-kho performance) multiple correlation was used and for prediction on the basis of independent variables (Finger Ratio (2D:4D), Anthropometric and stress vulnerability) to dependent variable (Kho-kho performance), multiple regression was formulated. One model was established by multiple regression analysis. The result of the study has shown that in the proposed model, R value of 0.36 is the relationship between independent variables (Height) and dependent variable (khokho Performance). Adjusted R square value of 0.13 justifies that 13% of khokho Performance is explained by Height.

**KEYWORDS:**Regression equation, Digit ratio, stress-vulnerability, anthropometric variables

### Introduction

*“Children can benefit if their talent is identified at the right age. If the talent is identified at an early age, parents can work towards polishing it. Such recognition can help children in long-run and they can have a better and bright future.”*

“Talent identification may be a method that includes creating a conclusion a few performer’s talents and giving that person a chance to try and ensure one thing that he or she is suitable; gifted kids should be known on their capacity to be the simplest players within the upcoming, not their current talents,” Davidset al.

Identification of talent in youth sports is usually considered as an art rather than a scientific exercise. Academicians and tutors normally have a discussion that what indicators of natural talent for a particular sport. Aspects like genetic knowledge and structure are thought to work out possible ability. A study conducted by Kumar

and Chauhan in 2013 disclosed that Kho-Kho as a competitive sport contains a sure specific demand in regard to measuring. A recent analysis argues that one thing as straightforward as finger lengths might predict athletic artistry. It can be predicted that the relative lengths of the index to ring finger is a marker of aptitude. People with extended ring fingers are also possessed, additional precocious sportsmen.

In the modern scientific age, competitive sports have become such a complex phenomenon that the subject has to go under various micro scientific investigations to achieve optimum performance. Sports scientists of various specific fields help sportsmen to advance their performance up to the optimal level. Competitive sports has become a means to show the ascendancy of the country over the other and this trend is considered to divert the attention from accumulating the most lethal weapons which are the threat to the whole mankind.

The remarkable advancement in the platform of physical education, as well as sports, is the result of the researches and experiments done by the sports scientists with the full prop up and encouragements of the governments of the various countries. Hence, the sports programs are a very expensive affair and for most of the sports advanced countries, it has become a multimillion business right from selecting their sportspersons to the Olympic Gold Medal.

“To achieve excellence in Olympics is a multi-million investment; so before investing, the first and foremost question confronting a physical education tutor or coach, when he/she assembles his/her prospective candidates at the beginning of the session is, which of sportspersons will help him/her to achieve his/her ultimate goal. Earlier, physical performance was considered as the only reference for a player. The recent progress of sports science has prepared an accurate technique existing for the valuation of a person’s potential for a particular sports event. Sports are now dominated by a scientific breed of coaches. These new generation coaches are interested in a combination of physical talent with other qualities that not only influence performance but also help to sustain the sportsperson in their commitment of sports Jack” H.L

The identification of future elite sportspersons in early childhood has become a necessity. The sportspersons selected for specific sports activities require suitable environment/conditions and sports facilities including advance/latest sports equipment, rational style of life and services of sports experts like well-educated and experienced coaches, sports physicians, dietitians, sports psychologists, and sports medicine specialists. Such facilities are necessary for all selected sportspersons of various sports events. Hence, precise identification, assortment, and assignment of young talents are having charming significance all over, according to *Dirix A et al.*

### **Objectives of the Study**

The proposed research work focuses on the objectives mentioned in the following:

1. To determine the finger ratio, anthropometric profile and stress vulnerability of Junior Kho-Kho boys.
2. To find out the partial correlation of finger ratio with performance of Junior Kho-Kho boys.
3. To find out the partial correlation of anthropometry with performance of Junior Kho-Kho boys.
4. To find out the partial correlation of stress vulnerability with performance of Junior Kho-Kho boys.
5. To find out the joint contribution of finger ratio, anthropometry and stress vulnerability in performance level of Junior Kho-Kho boys.

6. To predict the performance level of Junior Kho-Kho boys based on finger ratio, anthropometry and stress vulnerability.

### Hypotheses

The below mentioned hypothesis has been made for this particular study, which was based on an extensive review of literature.

H1: There will be significant relationship between digit ratio and performance level of Junior Kho-Kho boys.

H2: There will be significant relationship between anthropometry and performance of Junior Kho-Kho boys.

H3: There will be significant relationship between stress vulnerability and performance of Junior Kho-Kho boys.

H4: There might be significant relationship of Junior Kho-Kho boys' performance with the digit ratio, anthropometry and stress vulnerability.

### Procedure and Methodology

The data has been collect by method of the tests for the chosen variables. All the tests had been conducted at National Level Junior Kho-kho boys. The author personally visited the venues of Junior National tournaments, Invitational tournaments, coaching camps.

The data relating to Kho-kho performance of players at different level has been taken by help of Kho-kho federation of India along with other majors like observation of competitions with the help of experts in this area.

### Results and Discussions of the Findings

The statistical investigation of composed information in the form of data on physical, physiological and psychological parameters on fiftyboys from Kho-kho belonging to schools, clubs and institutions has been discussed in this section. The data connect to numerous physical, physiological and psychological parameters and the colleceted information has been examined using the descriptive statistics i.e. mean, standard deviation, standard error, median, mode, sample variance, kurtosis, skewness and range. Further, regression equations were developed on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability.

### Statistical Findings

The conclusion concerning to descriptive statistics and correlation technique for the various physical, physiological and psychological variables of fifty boys have been tabulated in Table No. 1.1 to 1.28.

**1. Table- 1.1**

**Descriptive statistics of Kho-kho performance of Junior Boys**

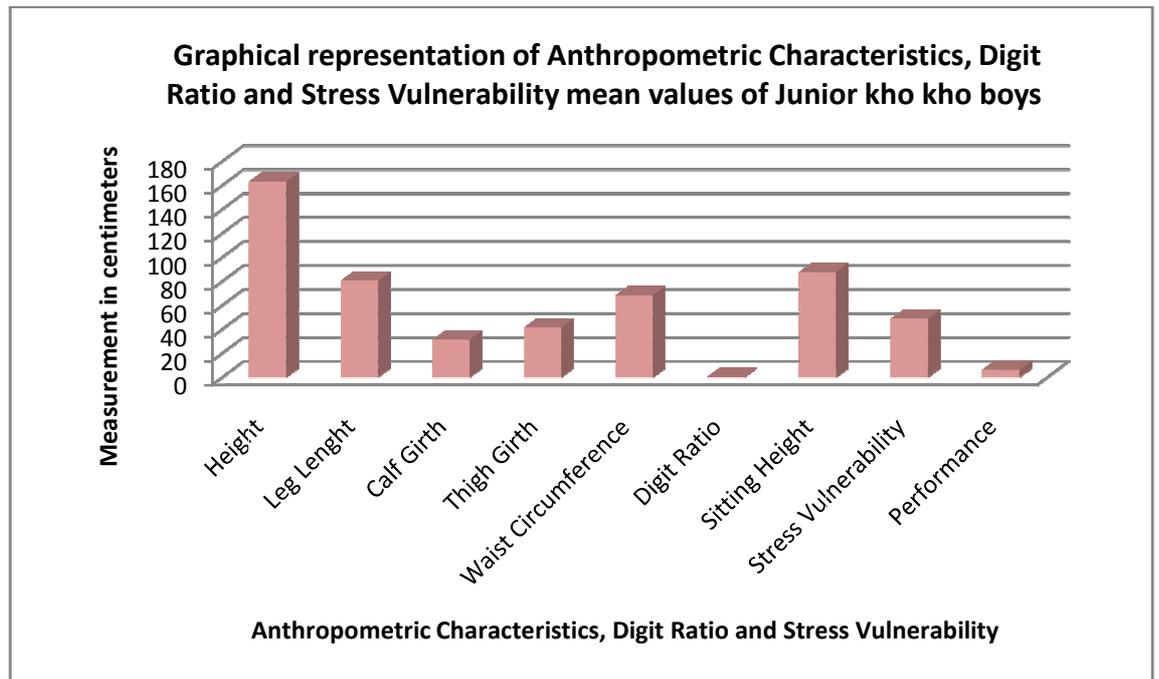
	N	Mean		Std. Deviation	Skewness		Kurtosis	
		Statistic	Std. Error		Statistic	Std. Error	Statistic	Std. Error
Height	50	163.3800	.69217	4.89435	-.062	.337	-1.426	.662
Leg Length	50	80.7000	.43729	3.09212	-.069	.337	-1.144	.662
Calf Girth	50	31.3600	.28250	1.99755	-.057	.337	-.799	.662
Thigh Girth	50	41.6800	.41349	2.92379	-.706	.337	-.328	.662

Waist Circumference	50	68.5600	.40321	2.85114	-.525	.337	-.012	.662
Digit Ratio	50	.5928	.00450	.03184	-.070	.337	-.141	.662
Sitting Height	50	87.8800	.34834	2.46312	-.530	.337	.664	.662
Stress Vulnerability	50	49.0400	1.81916	12.86343	.003	.337	-1.051	.662
Performance	50	6.5400	.23423	1.65628	.109	.337	-1.160	.662

Table- 1.1 revealed that the descriptive statistics of fifty subjects in Anthropometric, Digit Ratio, Stress Vulnerability and Kho-Kho Performance with respect to Junior Kho-kho boys.

1. In Height, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 163.38, 4.89, -.06 and -1.42 respectively.
2. In Leg Length, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 80.70, 3.09, -.06 and -1.14 respectively.
3. In Calf Girth, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 31.36, 1.99, -.05 and -.79 respectively.
4. In Thigh Girth, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 41.68, 2.92, -.70 and -.32 respectively.
5. In Waist Circumference, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 68.56, 2.85, -.52 and -.01 respectively.
6. In Digit Ratio, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found .59, .03, -.07 and -.14 respectively.
7. In Sitting Height, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 87.88, 2.46, -.53 and .66 respectively.
8. In Stress Vulnerability, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 49.04, 12.86, .003 and -1.05 respectively.
9. In Kho-Kho Performance, observed mean (statistics), standard deviation, Skewness (statistics), standard error of Skewness, kurtosis (statistics), standard of kurtosis are found 6.54, 1.65, .10 and -1.16 respectively.

**Figure 1.1:** Graphical representations of Anthropometric Characteristics, Digit Ratio and Stress Vulnerability mean values of Junior Kho-kho boys.



**Table- 1.2**

**Model Summary related to estimating khokho Performance of Junior Kho-kho boys on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability**

Model	R Value	R Square Value	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.366 <sup>a</sup>	.134	.116	1.55753	2.355
a. Predictors: (Constant), Height					
b. Dependent Variable: Performance					

Table- 1.2 shows the model summary for estimating khokho Performance on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability in Junior Kho-kho boys. One model was established by multiple regression analysis.

In this model, R of .36 is the relationship between independent variables (Height) and dependent variable (kho-kho Performance). Adjusted R square of .13 justifies that 13% of Kho-kho Performance is explained by Height.

**Table 1.3**  
**ANOVA Table for estimating Kho-kho Performance on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability in junior Kho Kho boys.**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	17.977	1	17.977	7.410	.009 <sup>a</sup>
	Residual	116.443	48	2.426		
	Total	134.420	49			
a. Predictors: (Constant), Height						
b. Dependent Variable: Performance						

Table- 1.3 of ANOVA is related to the utility of one established model. In this model, F. Value of 7.41 is significant at .05 level, this model is found effective in estimating Kho-kho Performance on the basis of Height.

**Table- 1.4**  
**Coefficients of Regression Model for estimating Kho Kho Performance on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability in Junior Kho Kho boys.**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	26.759	7.431		3.601	.001
	Height	-.124	.045	-.366	-2.722	.009
a. Dependent Variable: Performance						

Table- 1.4 shows the coefficients of regression model for estimating khokho Performance on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability in Junior Kho-Kho boys. On The basis of table 1.4 established model is:

<b>Model: Kho- Kho Performance = 26.75 +-.12* Height</b>
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**Discussion of Findings**

Bailey AA, and Hurd PL(2005) conducted an investigation on the topic “Finger length ratio (2D:4D) correlates with physical aggression in men but not in women”. Researchers were scrutinized the association among trait hostility, examined by a questionnaire, and digit dividend ratio in both the genders (male and female). Men with characteristics of inferior, additional masculine, ratio of the finger lengths had advanced attribute to physical violence totals (r(partial) = -0.21, N = 134, P = 0.028). Scientists have attained in conclusion where there is no correlation in parameters like the length ratio in the fingers to female aggression traits. These observations are goes in agreement with the postulate that testosterone has an administrative influence on mature level of aggression in males. There were extensive literature which deals with the importance of digit ratio to the performance of sports ability. Some of the notable oservations in this field has been made by Voracek et al.

(2010) and Bennett et al. (2010). On the basis of the results, it may be concluded that digit ratio are not affected by aggression in boys.

### Conclusion

For estimating khokho Performance on the basis of Anthropometric variables, Digit Ratio and Stress Vulnerability in junior level male kho-kho players and established model is: **Kho-kho performance = 26.75 +- .12\* Height**. The relationship between Calf Girth and Thigh Girth ( $R=.32$   $p=.02$ ), Calf Girth and Digit Ratio ( $R=.37$   $p=.00$ ), Thigh Girth and Digit Ratio ( $R=.61$   $p=.00$ ) & Sitting Height and Stress Vulnerability ( $R= -.29$   $p=.04$ ) were found positive correlation at .05 level of significance. On the other hand, height and leg length, height and calf girth, height and thigh girth, height and waist circumference, height and digit ratio, height and sitting height & height and stress vulnerability; leg length and calf girth, leg length and thigh girth, leg length and waist circumference, leg length and digit ratio, leg length and sitting height & leg length and stress vulnerability; calf girth and waist circumference, calf girth and sitting height & calf girth and stress vulnerability; thigh girth and waist circumference, thigh girth and sitting height & thigh girth and stress vulnerability; waist circumference and digit ratio, waist circumference and sitting height & waist circumference and stress vulnerability' digit ratio and sitting height & digit ratio and stress vulnerability no relationship were found.

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