Relationship of Physiological Variables with Performance of Collegiate Kho-Kho Players of Amravati University

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Abstract

The sports performance of Kho-Kho players which depends upon the Physiological Variables of the players, it is felt that there may be a positive relationship of these variables with the performance in Kho-Kho. The purpose of the study is to find out the relationship of Physiological Variables with Performance of Collegiate Kho-Kho Players and to develop a Prediction Equation for the forecasting of the performance of a Kho-Kho player depending upon the Physiological Variables.

It was hypothesised that there would be significant relationship of the Physiological Variables with performance of Collegiate Kho-Kho Players. The data pertaining to the present study were collected from the 200 players of the best eight teams and extras of Sant Gadge Baba Amravati University inter-collegiate Kho-Kho (Men) tournaments.

The data were collected by administering the tests for the selected variables viz. Pulse Rate, Hemoglobin, Blood Pressure (Systolic) and Blood Pressure (Diastolic).

On the basis of finding and within the limitation of present study it was found that there is little coorelation between Anthropometric Variables and Total Performance in Kho-Kho. In the light of derived results, it was found that the hypothesi made by the researcher was partially correct.

KEYWORDS: Physiological Variables, Performance in Kho-Kho

Introduction:

With the promotion of civilization, human approach has become more scientific in nature. Consequently, better and more accurate base of measurement has been developed. Inspire of the history of measurement of man being quite old and dating back to ancient civilization, the subject of test and measurement is still in infancy and some of the evaluations are still based on tests without establishing the validity, reliability and objectivity of these testy.

The determination of blood constituents are of great importance. It is related to health and disease. In human physical fitness consumes more oxygen. In fact the hemoglobin is responsible for the transports of oxygen wherever the concentrations of

hemoglobin increases which help in the required supply of oxygen. The normal average red blood cell (R.B.C.) count in adult male is taken as 5.5 millions per cubic millimeter and female 4.8 million per cubic millimeter. In describing third cell status of an individual it is necessary to evaluate the hemoglobin percentage.

The heamoglobin found in red blood cells is a complex molecule containing iron (Heme) and Protein (globin) and is capable of combining with oxygen. The interested things about this structure is that it contain iron and this iron is capable of combination with oxygen to form oxyhemoglobin in red blood cells by means of this function oxygen is carried to the tissues from the lungs.

Hemoglobin is basically organic material with a very interested organic structure known as home. The interested things about this structure is that it contain iron and this iron is capable of combination with oxygen to form oxyhemoglobin in red blood cells by means of this function oxygen is carried to the tissues from the lungs.

By raising the concentration of oxygen in the blood plasma, which increases (PO) one can determine the amount of oxygen that combines with hemoglobin. Although oxyhemoglobin does not contribute to the PO_2 in the blood because the oxygen is not free in solution hemoglobin, it is important in determining the amount of oxygen that diffuses in and out of the blood.

It should be noted from the above normal variations of hemoglobin is mostly due to alteration of number of red cell and not due to any change in the absolute quantity of hemoglobin in each cell. Anything that alters the red cell count will alter the percentage of hemoglobin proportionately.

The hemoglobin attributes changes in count under different situations, it differs from region to region less fit person from age to age.

The quantity of blood passing through different organs is not constant, but alters with variations in activity. it is the function of the smallest arteries and the arterioles, which immediately supply the delicate capillaries to vary the amount of flow according to the needs of the tissues.

The factors upon which blood pressure depends are the pumping action of the heart, the peripheral resistance offered to the outflow of blood from the arteries, which varies with elasticity and vasoconstriction, and the volume of the circulating blood. Only the first two are important variables during physical activity of the body. The blood pressure is varied during physical activity to provide an adequate blood supply. The variations are brought about by the regulatory activity of the vasomotor and cardiac center in the brain. Arterial blood pressure of man is usually determined in the brachial artery of the arm. It is considered indicative of the pressure in the arteries generally, although pressure varies from artery to artery. The maximum pressure caused by the systole of the heart is spoken of as the systolic pressure; the minimum pressure in the

artery between heart beats, that is the pressure at the end of the diastole of the heart is known as the diastolic pressure. Changes in blood pressure from birth to twenty years are of special interest to physical educators.

The physiological factors like Pulse Rate, Heamoglobin and Blood Pressure both Systolic and Diastolic are very important for a good performance in Kho-Kho. The performance of the Kho-Kho player depends on many factors related to skills viz. (1) Sitting In The Square, (2). Giving 'Kho', (3) Simple 'Kho', (4) Judgment 'Kho', (5) Late Kho, (6) Tapping, (7) Covering, (8) Running Dive, (9) Side Dive, (10) Spot Dive, (11) Pole Dive, (11) Running Pole Dive, (12) Sudden Change Of Target, (13) Trapping, (14) Pole Turning, (15) Entering The Field Of Play, (16) Positioning On The Post, (17) Single Chain, (18) Single Six-Up Chain, (19) 3 Six-Up Chain, (20) Ring Game, (21) Dodging, (22) Pulty/Sudden Turn and (23) Counter Action For Judgment 'Kho'.

Multiple regression equation describes the path of the mean values of the dependent variable Y, for all combinations of the independent variables X_1, X_2, X_3, ... X_k. The principal advantage of multiple regression equation is that it allows us to utilise more of the information available (independent variable) to us to estimate the dependent variable.

Multiple regression equation is expressed as:

$$\mathbf{Y = \square + \square_1 X_1 + \square_2 X_2 + \square_3 X_3 + \square_4 X_4 + \ldots\ldots + \square_k X_k}$$

in which $\square$ is a constant, $\square_1$, $\square_2$,..... $\square_k$ are constants known as partial regression coefficients, **Y** is the variable taken to be dependent and it is to be predicted/estimated and $\mathbf{X_1, X_2, X_3, ... X_k}$ are the independent variables.

Statement Of The Problem:

The present researcher is serving in an Arts, Science and Commerce College at Chikhaladara. He himself is an NIS Coach and giving special coaching in Kho-Kho to the inter-collegiate players of the college as well as to the players of the local colleges. Due to his personal curiosity in knowing the sports performance of Kho-Kho players which depends upon the Physiological Variables of the players, it is found that there is a positive relationship of these variables with the performance in Kho-Kho. To verify the relationship in a scientific way the problem is stated as "Relationship Of Physiological Variables With Performance Of Collegiate Kho-Kho Players".

Purpose Of The Study:

The purpose of the study is to find out the relationship of Physiological Variables with Performance of Collegiate Kho-Kho Players and to develop a Prediction Equation for the forecasting of the performance of a Kho-Kho player depending upon the Physiological Variables.

Significance Of The Study:

The significance of the study is justified on the grounds that (i) The present study would be the first of its kind in Sant Gadgebaba Amravati University, Amravati and perhaps in Maharashtra; (ii) The relationship of Physiological Variables with Performance of Collegiate Kho-Kho Players would be made known which may help the coaches in selecting the players; (iii) The Prediction Equation under study for the forecasting of the performance of Kho-Kho players considering the Physiological Variables would be helpful to the coaches of Kho-Kho; and (iv) The present study will motivate the future research scholars to undertake similar study in other games and sports at different level of participation.

Hypothesis:

It was hypothesised that there would be significant relationship of the Physiological Variables with Performance of Collegiate Kho-Kho Players.

Delimitation Of The Study:

The scope of the present study were delimited to (i) The study was delimited to the male Kho-Kho players only; (ii) The study was further delimited to the players of the best eight teams of Amravati University inter-collegiate Kho-Kho (Men) tournaments; (iii) The physiological variables were delimited to (a) Pulse Rate (b) Hemoglobin (c) Blood Pressure (Systolic) and (d) Blood Pressure (Diastolic).

Limitation Of The Study:

The present study had the limitations like (i) The Socio-Economic-Status of the students might be different (ii) The present research scholar did not consider the dietary and nutritional practices of the students; (iii) The variation in age of the students were not be taken into consideration and (iv) The climatic condition of different measurements were different.

Reviews Of Related Literature:

A summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with what is already known and what is still unknown and untested. Since effective research is based upon past knowledge, this helps to eliminate the duplication of what has been done, and provides useful hypotheses and helpful suggestions for significant investigation.

The research scholar made an attempt to go through the related literatures in libraries of Sant Gadgebaba Amravati University, Amravati; Degree College of Physical Education, Amravati and Rashtrasant Tukadoji Maharaj Nagpur University, Nagpur. From the **5 reviews** it was very clear that not even a single study was found which was

directly related to the present study on the Prediction of Kho-Kho playing ability on the basis of Physiological Variables. Hence the topic was a claimed to be a New One and has a greater scope to work with it as far Maharashtra State is concerned.

Method of study:

The data pertaining to the present study were collected from the 200 players of the best eight teams and extras of Sant Gadge Baba Amravati University inter-collegiate Kho-Kho (Men) tournaments.

No sampling method was used to select the players i.e. all the players of the best eight teams of of Sant Gadge Baba Amravati University Inter-Collegiate Kho-Kho (Men) competitions were selected.

The data pertaining to the study was collected by administering the tests for the selected variables. Before Collection of data, the subjects was given a chance to practice the prescribed tests so that they should become familiar with the tests and know exactly what is to be done to ensure uniform testing condition the subjects was tested during morning/evening and data were collected.

The details of the criteria are given below:

Physiological Variables: The following variables were considered as sub-criteria of Physiological Variables:

a. Pulse Rate. b. Hemoglobin.

c. Blood Pressure (Systolic). d. Blood Pressure (Diastolic).

The reliability of data was ascertained by confirming the reliability of instruments and the reliability of the testers. Reliability of the instruments was assured by the reputed manufacturers of the instruments. The tester's reliability was guaranteed by assessing the coefficient of correlation (reliability of coefficient) between the tester's data and the data collected by experts. The Coefficient of Correlation for all the above criteria was found significant.

Measurements of Physiological Variable:

1. Pulse-Rate:

Equipment: Stop watch, score sheet.

Test Description: The resting pulse rate on radial artery was taken early in the morning. The subject was tested in supine lying position on the bed. Fingertips were put on radial artery and the pulse rate was counted for sixty seconds with the help of stopwatch.

Scoring: The total number of pulse rate per minute for each subject was recorded.

2. Hemoglobin Test:

The hemoglobin concentration in gm/100 ml of blood was tested with the help of Sahlis Hemometre. The hemoglobin percentage in blood of subjects was measured by using Sahlis. It consists of (1) Sahlis Hemometre, (2) Hemoglobin pipette, (3) Hemometre, (4) Stirrer and (5) Spirit. In addition to this N/10 HCL, distilled water, cotton, needle was also used for estimation of hemoglobin of blood. The hemometer consists of two tubes. The color of these tubes is used as standard. The hemoglobin pipette has got one graduated. The hemometer tube is quaduated from 2 to 22. The hemometer tube is filled by N/10 HCL up to the mark 2. This converts hemoglobin in to acid haematin. The colour of the mixture was matched against the standard colour of mixture was matched with the standard colour of the hemometer.

Scoring: The reading of the hemoglobin scale on the tube was read at the lower meniscus of the solution. The scale provided the hemoglobin content in gram /100 ml of blood.

3. Blood Pressure (Systolic and Diastolic):

Equipments: Sphygmominometer.

Description of the Test: The instrument consists of a pressure cuff or armlet made of a flat rubber bag covered by an indispensable envelope of silk fabric. The cavity of the bag is connected by the length of rubber tubing to a graduate mercury manometer or an aneroid monometer and by another tube with a pressure bulge or an air pump fitted with an outlet valve. By this means the bag can be inflated to any desired pressure. A sphygmoninometer and a stethoscope were used to measure blood pressure (Systolic and Diastolic). The resting blood pressure (systolic and diastolic) was taken early in the morning. The subject was tested in supine lying position on the bed. The left upper arm of the subjects was encircled by an inflatable rubber bag containing in cuff was connected to a pressure pump and manometer. By pumping air, the pressure in the bag was rapidly raised to 200 mm Hg, which was sufficient to obliterate completely the brachial artery so that no blood comes through, the radial pulse disappeared. The pressure was then lowered to a point where the pulse could be felt by using a stethoscope, the pulsation of the brachial artery at the bed of the elbow could be distinctly heard. At this elbow could be distinctly heard. At this point the pressure shown on the dial was considered to be the systolic pressure. The pressure on the bronchial artery was then gradually reduced until the arterial pulse beats could be distinctly heard and the point at which the sound disappeared was accepted as the diastolic pressure.

Scoring: The systolic and diastolic blood pressure was recorded in mm Hg.

Measurement of Kho-Kho Performance:

The performance of the Kho-Kho players was made on the basis of (1) Sitting In The Square, (2) Running 'Kho', (3) Sitting 'Kho', (4) Judgement 'Kho', (5) Late 'Kho', (6) Tapping, (7) Covering on Cross lane, (8) Running Dive, (9) Side Dive, (10) Spot Dive, (11) Sitting Pole Dive, (12) Running Pole Dive, (13) Sudden Change Of Target, (14)Trapping/Clubbing, (15) Pole Turning, (16) Entering The Field Of Play (17) Positioning On The Post,; (18) Single Chain, (19) Single Six-Up Chain, (20) 3 Six-Up Chain, (21) Ring Game (22) Dodging, (23) Pulty and (24) Counter Action For Judgement 'Kho". For this the subjective judgement by the experts of Kho-Kho was made. There were five judges for this purpose. The mean performance of the players was recorded as the performance for the development of the Prediction equation of Kho-Kho playing ability.

Compilation Of Data:

The data pertaining to the study were collected by administering the tests for the selected variables. The data were collected in the prescrived proforma made for this purpose. After collection they were entered in Microsoft Excel for further processing. After the collection of the data, corelational statistical techniques were applied. To find the relationship of physiological variables with performance of collegiate Kho-Kho players, the research scholar used Pearson's Product Moment Correlation. Multiple Regression Analysis was applied to form the Regression Equation which was the core of the study.

Level of Significance:

To test the hypothesis the level of significance was set at 0.05 level of confidence, which was considered adequate for the purpose of this study. The details of the analyses are given in the following tables:

Table No. - 1
Showing Inter-Corelation Among Physiological Variables

	Height	Weight	PR	HB	BPS	BPD	Total
Height	1.000						
Weight	0.335	1.000					
PR	0.042	-0.022	1.000				
HB	0.106	0.064	-0.034	1.000			
BPS	-0.065	-0.098	-0.007	0.009	1.000		
BPD	-0.044	-0.077	-0.101	-0.033	0.889	1.000	
Total	0.041	-0.005	0.089	0.039	0.000	0.012	1.000

From the above table it is observed that the correlation between Height and Weight is 0.335; Height and Pulse Rate is 0.042; Height and Heamoglobin is 0.106; Height and Blood Pressure (S) is -0.065; Height and Blood Pressure (D) is -0.044 and Height and Total Performance is 0.041. It is also observed that the correlation between

Weight and Pulse Rate is -0.022; Weight and Heamoglobin is 0.064; Weight and Blood Pressure (S) is -0.098; Weight and Blood Pressure (D) is -0.077 and Weight and Total Performance is -0.005. Further it is observed that the correlation between Pulse Rate and Heamoglobin is -0.034; Pulse Rate and Blood Pressure (S) is -0.007; Pulse Rate and Blood Pressure (D) is -0.101 and Pulse Rate and Total Performannce is 0.089. Observation can be made that the correlation between Heamoglobin and Blood Pressure (S) is 0.009; Heamoglobin and Blood Pressure (D) is -0.033 and Heamoglobin and Total Performannce is 0.039. Both the Blood Pressures are correlated with 0.889 and Total Performance is having very neglible correlation with Blood Pressures.

Table No. - 2
Showing Regression Analysis Among Physiological Variables

Regression Statistics				
Multiple R	0.116	SE	8.164	
R Square	0.013	Observations	236.000	
	Coefficients	SE	t-Stat	P-value
Intercept - □	33.386	22.983	1.453	0.148
Height - □$_1$	0.056	0.105	0.532	0.595
Weight - □$_2$	-0.021	0.078	-0.268	0.789
PR - □$_3$	0.213	0.145	1.471	0.143
HB - □$_4$	0.465	0.706	0.658	0.511
BPS - □$_5$	-0.127	0.194	-0.652	0.515
BPD - □$_6$	0.153	0.207	0.737	0.462

From the previous table it is observed that the Multiple R for the selected variables is 0.116 and the R Square is 0.013 which are not significant at the 0.05 level of significance. The □ for the Prediction Equation is 33.386 and □□weight for the Height is 0.056, for Weight is -0.021, for Pulse Rate is 0.213, for Heamoglobin is 0.465, Blood Pressure (S) is -0.127 and for Blood Pressure (D) is 0.153. Hence the Prediction Equation for the above variables can be constructed as given below:

Performance = 33.386 + (0.056 x Height) + (-0.021 x Weight) + (0.213 x Pulse Rate) + (0.4650.465 x Heamoglobin) + (-0.127 x Blood Pressure (S)) + (0.153 x Blood Pressure (D))

The Inter-Corelation among Selected Physiological Variables is shown in Figure-1.

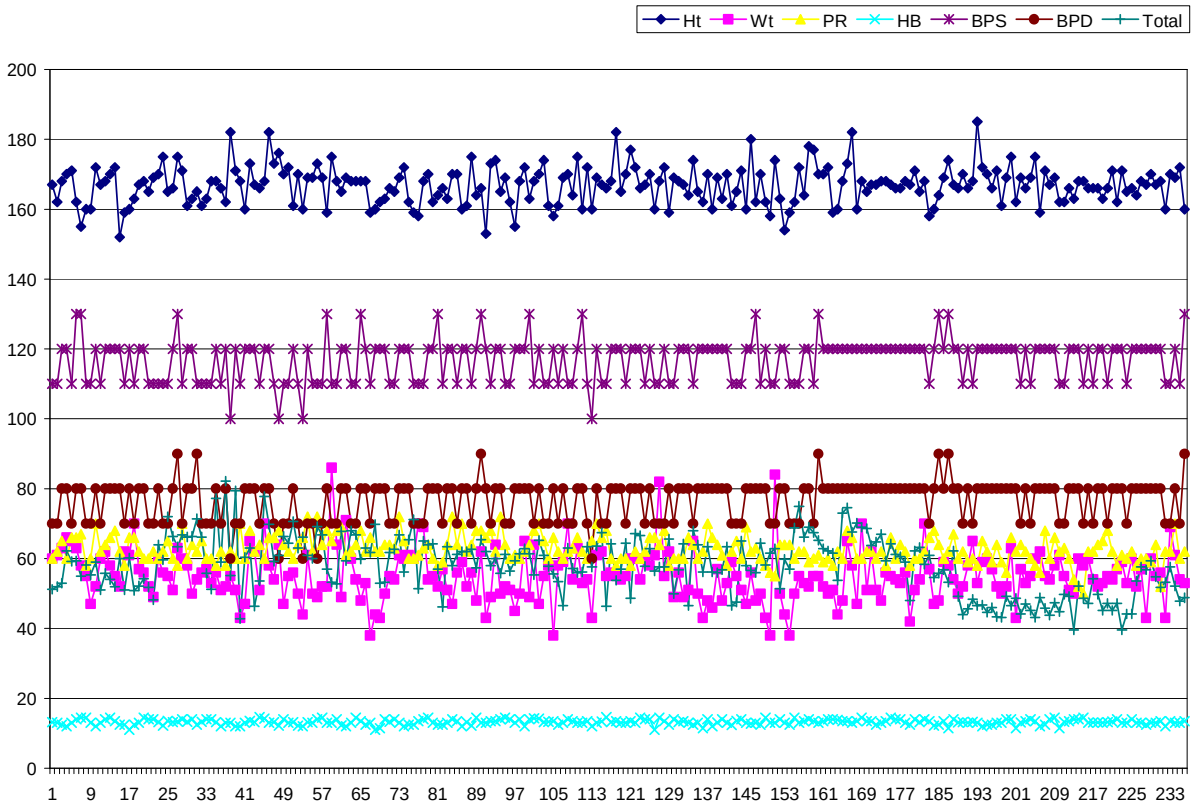

Figure No. - 1.
Showing Inter-Corelation Among Selected Physiological Variables

Testing of Hypothesis:

It is hypothesised that there would be significant relationship of the Physiological Variables with Performance of Collegiate Kho-Kho Players.

In the light of derived results, it was found that the hypothesi made by the researcher was partially correct. In beginning it was hypothesized that there might be significant relationship between the Physiological Variables and Performance of Collegiate Kho-Kho Players. It was based on the previous experience.

Conclusion:

On the basis of finding and within the limitation of present study the following conclusion has been drawn:

From Tables-1 and 2 it is seen that there is little correlation between Physiological Variables and Total Performance in Kho-Kho.

Recommendation:

The following recommendations are made based on the results from the study, which may be useful for the future research work:

1. The same study may be repeated with other Physiological and Physical Fitness and Anthropometric variables on the same subjects.
2. The same study may be repeated with other Physiological and Physical Fitness and Anthropometric variables on the female subjects.
3. The same study may be repeated with other Physiological and Physical Fitness and Anthropometric variables of other games.
4. The same study can be carried on other states and university.
5. The findings of the study may serve as a reference material for the future studies.

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