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A Study to Predict the Volleyball Playing Ability on Basis of Physical and Psychological Variables

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Abstract

Purpose of the present study was to identify the physical and psychological variables who can best predict the volleyball playing ability. For the purpose of study fifty male Volleyball players was selected purposely from different sports hostels and colleges of UP i.e. Lucknow and Gorakhpur Sports College, Allahabad and Dewaria Sports Hostel. The age of subjects was 16 to 22 years. To predict the playing ability, leg explosive strength, shoulder explosive strength, abdominal strength endurance, flexibility and agility were selected as physical variables while sports achievement motivation and sports aggression were selected as psychological variables. To measure the selected predictor variables standard test was used while playing ability was measured by panel of three experts on ten point rating scale. Data was collected from respective sports hostels and colleges from prior permission of incharges/coaches by proper explained and demonstrated of test to the subjects and required trial was provided before final effort/attempt. Descriptive statistics, Pearson product moment correlation and linear regression (step method) was used at 0.05 level of significance. Findings revealed that all the selected physical variables are significantly correlated with playing ability while both selected psychological variables are not significantly correlated with volleyball playing ability. Where regression model suggest that only abdominal strength endurance and flexibility are appropriate to cause maximal variance in volleyball playing ability

Key Words: Regression, Step method and Volleying.

1. Introduction:

Sports performance is the sum of numerous factors which can vary from individual to individual, even if ultimately they achieve similar results in competition. Deficient person can be compensated for being superior technique, inadequate sprinting speed by superior endurance or inferior technique by aggressiveness. A few centimeters and fraction of seconds decide between record performances, victory or defeat in tough international competitions; for this reason it is very important to identify and fully realize each individuals potential.

Dirix and Knuttgen (1988) advocated that it has become a necessity to identify and select a future elite athlete right in childhood or early adolescence. It takes many years of intensive and regular training till an international sports performance level is achieved. The children who are selected for elite sports activities require suitable conditions, sports facilities, equipment of high quality, rational life style, the guidance of expert sports physicians and well educated and experienced coaches. Such conditions can be created for selected children at the right age to get the quality of performance. Therefore, the correct identification of selection and placement of young talent is becoming an important and challenging task everywhere in the modern competitive sports world.

It has become a necessity to identify and select a future elite athlete right in childhood or adolescence. It makes many years of intensive regular training till an international sports performance level is achieved. The children, who are selected for elite sports activities require suitable conditions and sports facilities equipment of high quality, a rational style of life and the service of experts including a sports physician, a well educated and experienced coach etc. Such conditions can be created for selected children only. Therefore, the correct identification, selection and placement of young talents are becoming important every where.

On the basis of above mentioned facts, it is considered worthwhile to investigate the appropriate physical and psychological variable as predictors for performance of volleyball young guns. Moreover, the present study would high light some of the important skills which may have to bear in mind while looking for the selection of talented volleyball players and also to develop these components through the systematic training program.

1.1 Objective of the Study:

- To find out the status of players in relation to physical and psychological fitness.
- To find out the relation of physical variables and psychological variables with volleyball playing ability
- To identify the effect of selected physical and psychological variables on Volleyball playing ability

2. Methodology:

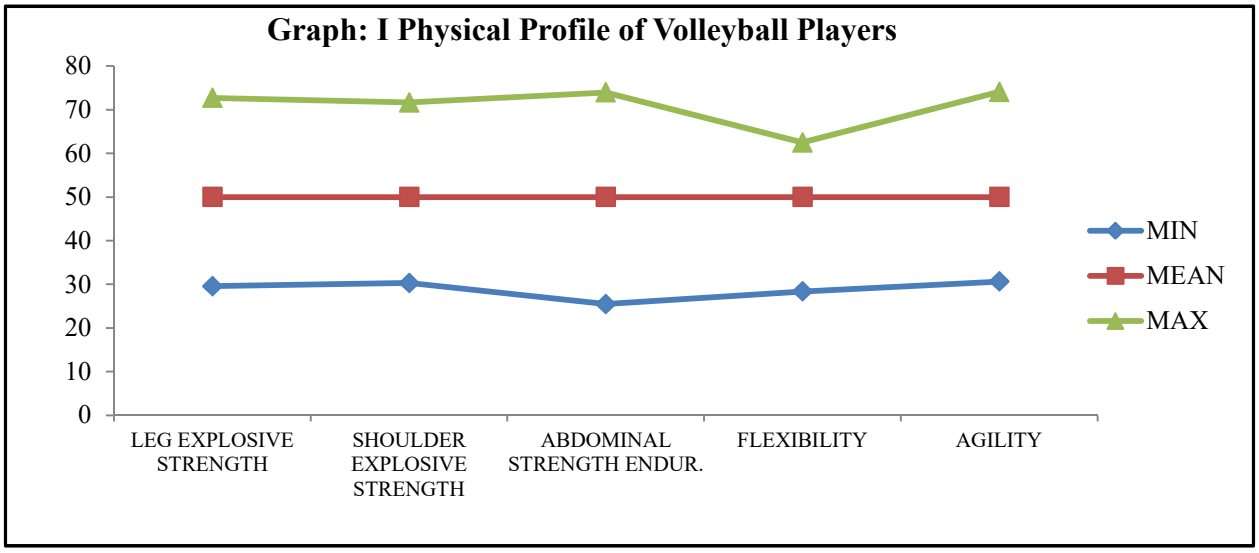
To achieve the purpose of present study fifty male Volleyball players was selected purposely from different sports hostels and colleges of UP i.e. Lucknow and Gorakhpur Sports College, Allahabad and Dewaria Sports Hostel. The age of subjects was 16 to 22 years. To predict the playing ability, leg explosive strength, shoulder explosive strength, abdominal strength endurance, flexibility and agility were selected as physical variables while sports achievement motivation and sports aggression were selected as psychological variables. To measure the selected predictor variables standard test was used while playing ability was measured by panel of three experts on ten point rating scale. Data was collected from respective sports hostels and colleges from prior permission of incharges/coaches. Purpose of test was explained and test was demonstrated to the subjects and required trial was provided before final effort/attempt. Descriptive statistics was used to determine the characteristics of data and to know the status of players. Pearson product moment correlation was used to find out the relationship of selected physical and psychological variables with Volleyball playing ability, while to identify the suitable skill that effect more to Volleyball playing ability linear regression (step method) was used at 0.05 level of significance.

3. Findings:

Table: I
Status of Volleyball Players in relation to selected Physical Variables

Statistics	Leg Explosive Strength	Shoulders Explosive Strength	Abdominal Strength Endurance	Flexibility	Agility
Mean	2.534	5.543	29.564	21.264	7.192
Median	2.530	5.410	30.000	22.000	7.300
Mode	2.710	5.310	30.000	25.000	7.300
Std. Deviation	.183	.631	2.268	5.387	.502
Coeff. of Variance	7.232%	11.391%	7.673%	25.338%	6.986%
Skewness	-.042	.108	-.109	-.658	.222
Std. Error of Skewness	.378	.378	.378	.378	.378
Kurtosis	-.674	-.628	.818	-.467	-.099
Std. Error of Kurtosis	.741	.741	.741	.741	.741
Range	.790	2.610	11.000	18.400	2.180
Minimum	2.160	4.300	24.000	9.600	6.220
Maximum	2.950	6.910	35.000	28.000	8.400

Table: 1 reveals that the mean and median for all the variables are nearly equal. Where coefficient of variance for agility is 6.986%, which is least among the physical variables so that agility is having least variation in compared to other variables. Whereas it is highest in flexibility (25.338%) thus flexibility is variable in which Volleyball players are most heterogeneous. In respect to skewness, leg explosive strength (-.042), abdominal strength endurance (-.109) and flexibility (-.658) is negatively skewed, $S_K < 0$, which means most of the scores of leg explosive strength, abdominal strength endurance and flexibility are more than its mean value. While shoulder explosive strength (.108) and agility (.222) is positively skewed, where $S_K > 0$, it means most of the scores of shoulder explosive strength and agility is less than its mean value. In terms of kurtosis, abdominal strength endurance of Volleyball players has positive value of kurtosis, which indicates that the scores cluster more around its mean value whereas leg explosive strength, shoulder explosive strength, flexibility and agility has negative value of kurtosis, which indicates that the scores cluster less around its mean value.



Graph: I reveal that value of all the selected variables are within the acceptable range.

Table: II
Status of Volleyball Players in relation to selected Psychological Variables and Volleyball Playing Ability

Statistics	Sports Achievement Motivation	Sports Aggression	Volleyball Playing Ability
Mean	10.794	32.051	6.397
Median	10.000	34.000	6.500
Mode	10.000	34.00	6.00
Std. Deviation	2.469	5.794	1.225
Skewness	.327	-1.430	-.190
Std. Error of Skewness	.378	.378	.378
Kurtosis	1.171	1.704	-.380
Std. Error of Kurtosis	.741	.741	.741
Range	12.000	24.000	5.000
Minimum	5.000	16.000	4.000
Maximum	17.000	40.000	9.000

Table: 2 reveal that the mean and median for all the variables are nearly equal. In respect to skewness, sports achievement motivation (-1.430) and volleyball playing ability (-.190) is negatively skewed, where $S_K < 0$, which means most of the scores of sports achievement motivation are more than its mean value, while sports aggression (.327) is

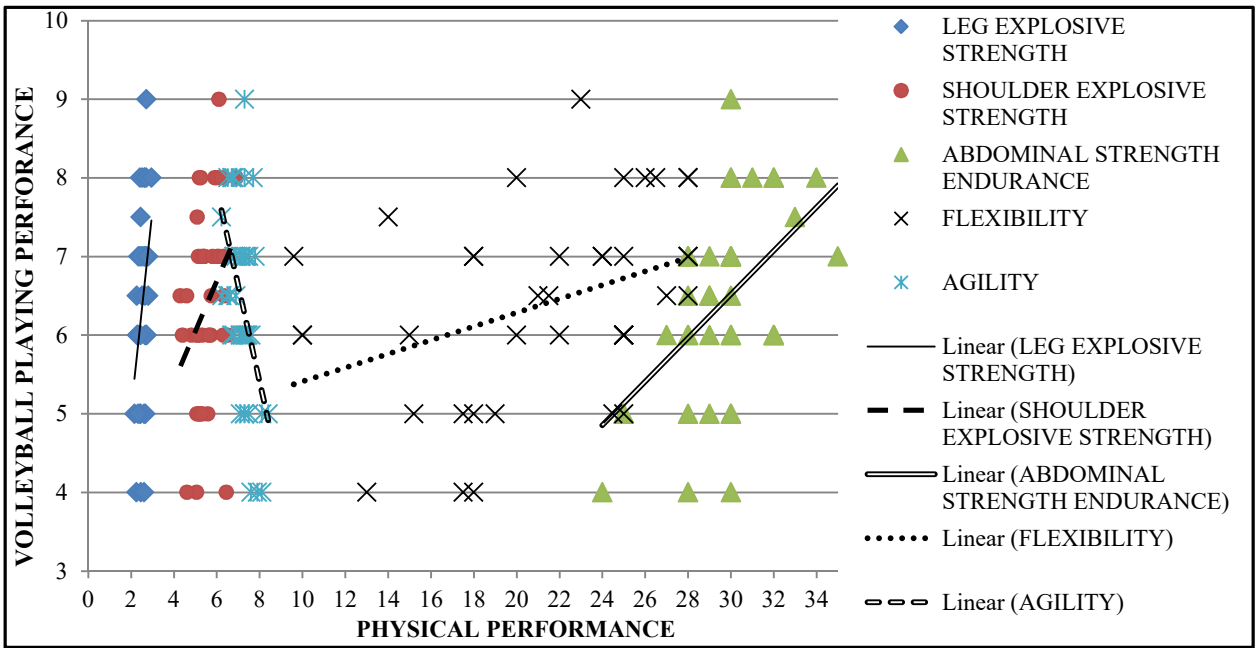
positively skewed, where $S_K > 0$, it means most of the scores of sports aggression is less than their mean value. In terms of kurtosis both psychological variables of Volleyball players has positive value of kurtosis, which indicates that the scores cluster more around its mean value. In terms of kurtosis, playing ability of Volleyball players has negative value of kurtosis, which indicates that the scores cluster less around its mean value.

Table: III
Relationship of Volleyball Playing Ability with Physical Variables

S. No.	Independent Variable	Dependent Variable	Coefficient	Sig.
1.	Leg Explosive Strength	Volleyball Playing Ability	.381	**.017**
2.	Shoulders Explosive Strength		.328	**.042**
3.	Abdominal Strength Endurance		.513	**.001**
4.	Flexibility		.385	**.016**
5.	Agility		-.502	**.001**

Table: 3 reveal that all physical variables are significantly correlated with Volleyball playing ability, where obtained correlation coefficient values of these physical variables, 0.381, 0.328, .513, .385 and -0.502 is significant at 0.05 level of significance.

GRAPH: II



Relationship of Volleyball Playing Ability with Selected Physical Variables

Table: IV
Regression Model Summery of Physical Variables in Relation to Volleyball Playing Ability

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	F-ratio	Sig.
	.593	.352	.316	1.014	9.758	**.000**

Predictors: (Constant), Abdominal Strength Endurance & Flexibility

This regression model reveals that the selected predictor variables are significantly related with Volleyball playing ability where R represents the multiple correlation between all the predictor variables and the criterion variable. Thus the obtained multiple correlation value is found significant, where obtained R (0.593) is significant at 0.05 level of

significance. R^2 represent the total amount of variance accounted for in the criterion variable by the predictor variables. Thus, the amount of variance is 35.2 % in Volleyball playing ability by abdominal strength endurance and flexibility. Adjusted R^2 is a reduced value for R square which represent the actual variance in criterion variables due to predictors. Therefore the actual variance is 31.6 % in Volleyball playing ability. Obtained F value reveals that regression model is significant or not for prediction. Obtained F value 9.758 is significant at 0.00 level, which means that regression model cause variance in criterion variable and significant for prediction.

Table: V
Standardized Coefficient Table for Predictor Variables (Physical) of Volleyball Playing Ability

Model	Unstandardized Coefficients		Standardized Coefficients	t.	Sig.
	B	Std. Error	Beta		
Constant	-2.388	2.166		-1.103	.278
Abdominal Strength Endurance	.248	.074	.459	3.361	.002
Flexibility	.069	.031	.302	2.209	.034

Equation to Estimate the Volleyball Playing Ability = -2.388 + Abdominal Strength Endurance (0.248) + Flexibility (0.069)

Table reveals that values of regression coefficients is positively affecting the dependent variable, means increase in value of abdominal strength endurance and flexibility lead to increase in Volleyball performance at rate of respected coefficient value. Beta value reflects the relative importance of predictor variable and from table it is clearly evident that abdominal strength endurance has more effect in comparison to flexibility on Volleyball performance. t value indicates the significance of predictor variable in model and t value of both the predictor variable is significant at 0.05 level hence both variables are contributing to increase the performance.

Table: VI
Relationship of Volleyball Playing Ability with Selected Psychological Variables

S. No.	Independent Variable	Dependent Variable	Coefficient	Sig.
1.	Sports Aggression	**Volleyball Playing Ability**	-.121	.465
2.	Sports Achievement Motivation		-.099	.548

Table: 6 reveals that selected psychological variables are not significantly correlated with Volleyball playing ability, where correlation coefficient of sports aggression and sports achievement motivation with Volleyball playing performance is -.121 and -.099. Correlation coefficient of both psychological variables is not significant at 0.05 level of significance

4. Conclusion & Discussion:

Results of the study revealed that psychological variables (sports achievement motivation and sports aggression) are not linearly correlated with Volleyball playing ability. All selected physical variables (shoulder explosive strength, leg explosive strength, abdominal strength endurance, flexibility and agility) are significantly correlated with Volleyball playing ability.

Physical variables of the volleyball players i.e. leg explosive strength, shoulder explosive strength, abdominal strength endurance, flexibility (lower back & hamstring) and agility are the suited most to the nature of the Volleyball game. As it is well evident from various literatures that shoulder and leg explosive strength is most dominating variables either it is related to accurate and deadly spiking, or it is related to perfect blocking with precision and ease, in all these events leg and shoulder explosive strengths play a vital role. As Kasabalis A. et al have found a significant correlation between anaerobic power and jumping performance in Volleyball players and they have suggested that vertical jump may predict maximum anaerobic power and could be used by the coaches as a practical and easy to apply field screening test for evaluation in Volleyball training. The research by Japan Volleyball Association demonstrated the significant correlation between the vertical jumping index and the competitive ability of the Volleyball players. It was found that the

jumping ability had a positive correlation with the number of spiking, and the total success rates of spiking, blocking and serving in a game.

Volleyball has been described as Interval sport with both anaerobic as well as aerobic component. In long matches or tournament play, the players have to bend, jump and move thousands of times which need good muscular endurance. It is one of the required qualities for excelling in Volleyball. Technically like many other games; Volleyball is also a kind of game in which waist and abdomen muscles play an important role in agility, swiftness and jumping. Especially in jumping, waist and abdomen muscle strength can improve the starting speed of a jump and is vital not only for the hanging ability, but also for the speed and the power of a spike. Therefore, the training of the muscles on waist and abdomen is usually emphasized in the physical training of Volleyball players.

Flexibility is the next who found significantly correlated with Volleyball playing performance of players. As we know Flexibility provides another dimension in performance that allows a higher degree of freedom and ease of movement coupled with some important implications for greater safety from injury. In Volleyball, the players have to move suddenly in forward direction, sideways or downward directions, so flexibility of hip and back is of utmost importance. As in study of Lee E.J. et al have found significant correlation between vertical jump and hip flexion. His findings have supported the assumption that greater flexibility is related to greater skilled performance. Thus, he has concluded that greater hip flexibility may benefit the jumping ability.

The physical variable, agility is also found significantly correlated with performance of Volleyball players. As literatures revealed, in a Volleyball game, players should try their best to prevent the ball from touching the ground, and this requires players to be quick in reaction and swift in movements, and a player's moving speed is affected by many factors, including his/her reaction speed, the lower limbs' strength, explosive force and agility. According to Zhang player's ability to stopping and turning in movement is a necessary skill for Volleyball players and for that various training methods has been adopted by coaches such as: T-route movement which is an often adopted training for the improvement of moving speed and agility.

In respect to psychological variables results revealed that selected psychological variables are not significantly related with Volleyball playing performance. Sami and Hassan have compared the psychological skill in elite and non elite Australian Volleyball players, where they have considered motivation, as of the most important mental skills and they revealed that elite Volleyball players, compared with non-elite ones, recorded higher scores. They have suggested that psychological skills (Motivation, Concentration, Self-confidence, Mental energy, Imagery, Goal-orientation) play a more important role in reaching the peak fitness in Volleyball players and they deserve to receive more attention from coaches and athletes. They suggest when athletes have a correct understanding of their duties and position as a premier player, there would be a stronger relationship and they will be more motivated to continue their sport activity for excellence.

As it is well known to us the average age of a champion team is usually in the range of 23 to 28 years. It normally needs 8 to 10 years to build up a champion team or to cultivate a champion athlete. Therefore, the best age for recruitment is around 13 years for female athletes and 15 years for male athletes. An important issue in the recruitment is the prediction of the fitness, and the reliability of the prediction. So far the recruitment of Volleyball athletes have been mainly based on personal experience of the coaches, and this, to some extent, restricts the improvement of Volleyball sport

5. Discussion of findings:

Naik, S. (2012) conducted a study on the topic "Effect of psychophysical training on the mental toughness of Judokas and Wrestlers. Result was found that both groups improved in their physical and mental abilities through 3 months imagery & plyometric combined with physical training improve in motivation & confidence of Judokas and Wrestlers. In the present study also, significant effect of Mental Training Group & Ideo-Motor Training Group was found on learning "O Goshi" in Judo. The important part of the finding is that 88.6 % if the total variance can be explained by treatment effect and remaining 11.4 % is unexplained.

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