Study on Physical Fitness Variables in Relation to Skill Performance- Back Row Overhead Smash of Ball badminton Players

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Abstract

This study examined the effect of physical variables in relation to skill performance of ball badminton players of Annamalai University, Chidambaram, India. Forty-one ball badminton players were randomly selected. Physical variables such as agility, explosive power, flexibility, grip strength and skill performance variable back row overhead smashwere considered. The tests selected for the physical fitness variables for hand explosive power was explosive power push up jump; agility, 6×10 m shuttle run; flexibility, bend and reach test, grip strength, grip dynamometer andP. Raj Kumar and Kalidasan R. skill test battery in ball badminton was used to analyse the skill performance back row overhead smash the subjects were assessed in physical fitness variables in relation to back row overhead smash . Pearson product moment correlation was applied to find out the relation between physical variables and performance variable (Back row overhead smash). Mean, Standard deviation, correlation and multiple regression was with the level of significance at 0.05. Back row overhead smash was positively correlated with flexibility at (r=0.53) which shows a correlation of 53%, It was concluded that there was a significant relationship between flexibility and skill performance - 'Back row overhead smash' among the ball badminton players. Also, no other physical variable aspects have significant relationship with the skill performance- 'Back row overhead smash.'

Keyword: Ball badminton, Physical fitness, Back row overhead smash.

Introduction:

History of Ball badminton

Ball badminton originated in Thanjavur, in Tamil Nadu. It became popular, commanding the interest of the Maharaja of Thanjavur. The game has attracted many players from southern India [1].

"Ball badminton is a competition originally from India. It is a racket game played on a court of set dimensions (12 by 24 metres) separated by a net with a yellow ball made of cloth. A shuttlecock

(also called a pigeon or birdie) is a projectile with high drag that is used in badminton sport. It has an open conical shape shaped by feathers that are embedded in a rounded cork (or rubber) base. Ball badminton helps you sharpen the core analytical abilities. It involves sharp thinking, listening, and exercising sound judgment. It needs play by two players or two pairs of players" [2].

Overhead smash or smash" It is played by the player when the ball is high and above the head. It is the most powerful offensive stroke which will win a point when it is done perfectly. The correct execution of smash needs a lot of balance, coordination, accuracy, and strength. Over-head smash is the advance skill played by the elite players. It is point winning offensive stroke when executed correctly down the line or in the gap between the centre and the front players. The ball will travel with tremendous speed straight the scoring of towards the direction of the racket head at the time of impact and lands sharply into the opponent s court"

"Flexibility is defined as the range of motion of your joints or the ability of your joints to move freely. It also refers to the mobility of your muscles, which allows for more movement around the joints. Range of motion is the distance and direction your joints can move, while mobility is the ability to move without restriction" [3].Explosive power is a term derived from the word explosion (Britain) which means the eruption, and adapted into Indonesian to express about the events that are an element of an eruption or explosion of limbs such as arms, where it involves an element of strength and speed. In the field of sports explosive term is often used as a substitute for the word power. As proposed by Harsono (1988:200) as follows: Power is especially important for those sports where athletes must direct the explosive force as the numbers in the athletic throwing and pitching soft ball. Explosive power capability is also known by the term muscle power, it is worth advanced by Abdul Kadir Ateng" [4,5].

There are very few studies conducted on ball badminton so the results of the present study will supply useful data to ball badminton trainers about the importance of the physical variables about skill Back row overhead smash.

II. Methods

This study examined the physical variables-hand explosive power, agility, flexibilitygrip strength in relation to skill performance-back row overhead smash of ball badminton.Forty-one ball badminton players were randomly selected from Annamalai University, Chidambaram, India.

Variables: Independent Variables

Physical variables

- ➢ Agility,
- ➢ Hand Explosive power,
- ➢ Flexibility
- ➢ Grip Strength

Skill performance variables

Dependent Variable

> ➤ Back row overhead smash

Physical variables agility, explosive power, flexibility, grip strength was measured using the following tests "Push up Jump was to measure the explosive force of an arm muscle"[6]; agility, 6×10 m shuttle run; flexibility bend and reach test, grip dynamometer for grip strengthP. Raj Kumar and Kalidasan R. skill test battery in ball badminton was used to analyse the skill performance such asBack row overhead smash Over-arm volley [7].

Statistical Analysis

To fix the relationship between dependent variable and independent variables Pearson product moment correlation was used and multiple regressions was also used for calculation. In multiple regressions, a criterion variable was predicted from a set of forecasters. Forward selection method of multiple regressions was used in this study to find out the forecaster variable that has the highest correlation with the criterion variables and it is entered into the equation first. The rest variables are entered into the equation depending on the contribution of each forecaster. In all the cases 0.05 and 0.01 level of significance was fixed to test the hypothesis.The statistical outcome are the centres for the final elaboration of the data.

III. Result

Descriptive Statistics

The mean and Sd values on selected physical fitnessComponents and back row overhead smash of ball badminton players have been shown in table-I

Table I- Mean and Standard deviation on Physical fitness variables and Back row overhead smash variables of badminton

Descriptive Statistics			
	Mean	**Std. Deviation**	**N**
Back row overhead smash	13.78	1.2	41
Muscle Endurance	40.82	.73	41
Agility	13.45	.27	41
Explosive Power	45.12	.21	41
Flexibility	24.86	.04	41

Prediction

To fix the relationship between dependent variable and independent variables Pearson product moment correlation was used. The computation of multiple regression was also used. In multiple regression, the predicting a criterion variable from a set of predictors. Forward selection method of multiple regression was used in this study to find out the predictor variable that has the highest correlation with the criterion variables is entered into the equation first. The rest of the variables were entered into the equation depending on the contribution of each predictor. The data on selected physical fitness components and skill performance variables-back row over head smash in ball badminton were statistically analysed by using Pearson product moment correlation and the results is presented in table-III.

Table III Pearson coefficient correlation matrix between criterion (Physical fitness independent (Back row overhead smash) variables of badminton players

Correlations						
	Muscle Endurance	Agility	Explosive Power	Flexibility	Grip Strength	Back Row Overhead Smash
Muscle Endurance	1	.062	.123	-.094	-.003	-.071
Agility	.062	1	.339*	-.017	.135	-.033
Explosive Power	.123	.339*	1	.283	-.155	-.182
Flexibility	-.094	-.017	.283	1	.042	-.531**
Grip Strength	-.003	.135	-.155	.042	1	.015
Back Row overhead smash	-.071	-.033	-.182	-.531**	.015	1

*. Correlation is significant at the 0.05 level (2-tailed).
**. Correlation is significant at the 0.01 level (2-tailed

It is evident from table-III that there was significant positive relationship between and explosive power with agility 0.339P< 0.05.Back row overhead smash, grip strength, explosive power and flexibility were not corelated.There was a positive relationship between Back row overhead smash andflexibility with -.531^p<0.01. Multiple regression equation was computed because , the multiple correlation is sufficiently high to warrant prediction from it. Then, the correlation identifies the

independent variables to be included and their order in the regression equation. Multiple correlation was computed by forward selection method on data obtained and the results is presented in table-IV.

Table IV Pearson Coefficient Correlation Between Criterion Variable 'Back row overhead smash 'and Independent (Physical fitness) Variable variables of badminton

Variables (Forward Selection)	R	R Square	Adjusted R Square	R Square Change
Flexibility	0.53	0.28	0.26	1.04

a. Predictors: Explosive power

b. Dependent Variable: Back Row overhead smash

From the table-IV it was found that the multiple correlation coefficient for predictors flexibility power is 0.53 influencing the backrow overhead smash which produce average multiple correlation with Back row overhead smash ability. R square values showed that the percentage of contribution of predictors to the playing ability53% of influence is in is by flexibility towards the performance variable backrow overhead smash. Figure-I Shows the percentage of regression standardised residual. Figure-1 shows the percentage of influence of flexibility over backrow overhead smash.
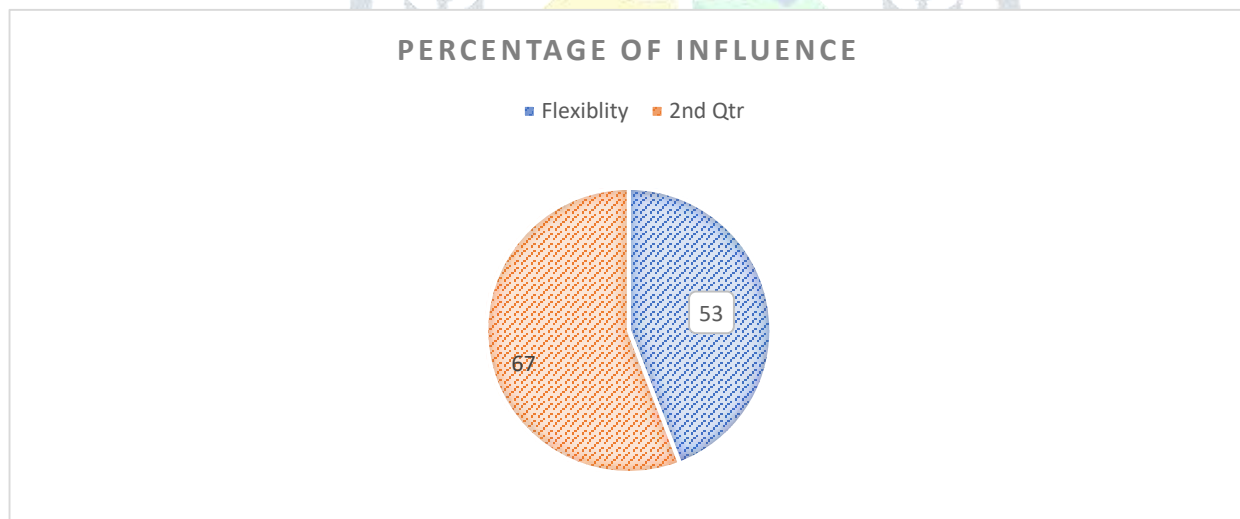

PERCENTAGE OF INFLUENCE

■ Flexiblity ■ 2nd Qtr

53

67

Figure-1 -The percentage of influence of flexibility over backrow overhead smash.

Table V Analysis of Variance between Regression and Residual between Skill Performance-Back row overhead smash and Selected Physical fitness Variables of badminton

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	16.63	1	16.63	15.30	.00
	Residual	42.39	39	1.08		
	Total	59.02	40			

a. Dependent Variable: Back Row overhead smash

b. Predictors: (Constant), Flexibility

The results presented in Table V proved that the obtained F value of 15.30 is higher value than the required table F value and the difference between regression and residual was significant. Hence, the obtained Multiple R value of 0.53 was significant at 0.05 level

Table VI

Regression Coefficients for the Predicted Variables with Playing Skill Ability of Ball badminton Players

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	349.52	85.83		4.07	.00
	Flexibility	13.50	3.45	.53	3.91	.00

*p=0.05=0.576 and **P < 0.01=0.708.

From Table VII, the analysis shows that all estimates do significantlyestimate the with higher (Flexibility) beta = **.53**, t = **3.91**, P < 0.01

From the table-IIIc, the following regression equations were derived for college Handball players with dependent variables.

1.   Regression Equation in obtained scores form $= X_C$

$$X_C = (13.50) \text{ A} + (34.52)$$

Where, X_c = Playing Ability, A= Flexibility girth

2.   Regression Equation in standard scores form $= Z_C$

$$Z_C = 13.50 \text{ } Z_1 + (34.52)$$

Where, Z_c = Playing Ability, Z_1 = Flexibility

The regression equation for the prediction of ball badminton playing ability includes flexiblity. As the multiple correlation on ball badminton positional playing ability with the combined effect of the independent variables is significant, it is apparent that the obtained regression equation has a predictive validity. Therefore this equation may be successfully utilized in selecting intercollegiate/ interuniversity ball badmintonplayers. Figure2, and 3 shows the regression standard residual.
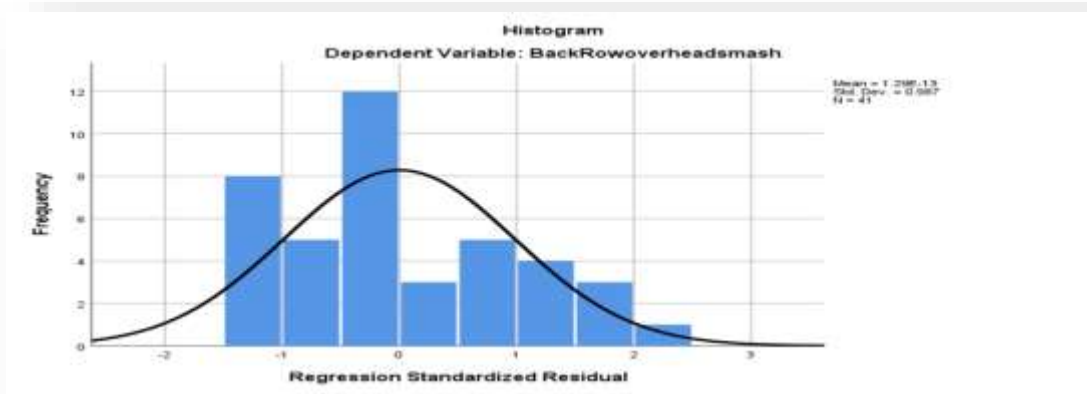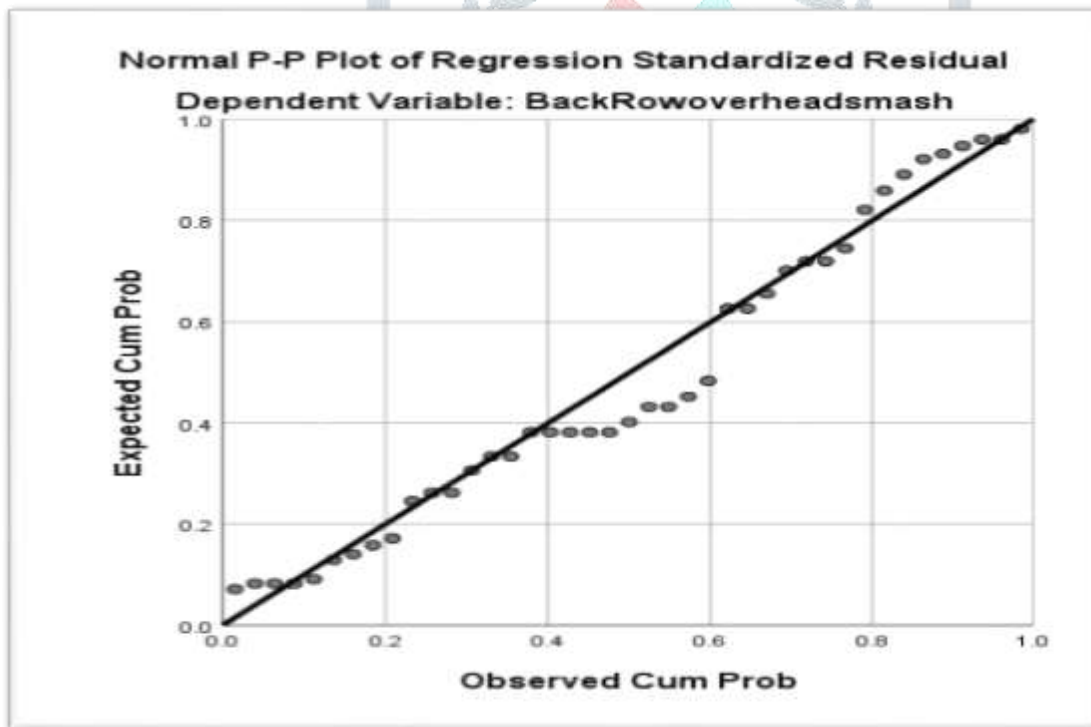

Figure-2

Figure-3

IV. Discussion

The results were consistent that flexibility would be an indicator of Back row overhead smash performance in ball badminton player." smash stroke velocity had negligible correlation with shoulder movement as compared to elbow and wrist joint. This study supports the negligible correlation of shoulder Flexibility and smash stroke performance". [8].As during smash, even normal range of motion of shoulder is sufficient to perform the

stroke, the flexibility that is, hyperextension of the joint is not needed in performance.[9].There was a positive relationship between flexibility withperformance of badminton players Performancehad significantly correlation to flexibility (r=0.41) werestatistically significant as the value obtained were much higher than the tabulated value (0.304) required, to be significant at 0.05 level with 38 degree of freedom. Performance hadsignificantly low positive relationshipto flexibility.[10]. The badminton player uses their flexibility to reach, dive and turn to cover all parts of the court. Flexibility is something that can be improved with regular stretching. The badminton player should stretch before each activity (training and competition), plus other stretches, such as pnf and active stretches, to increase the flexibility of specific muscle groups' [11].To achieve peak performance, we must use the full length of the muscle to show power and strength. If muscles are too tight, they may not be able to supply the explosiveness necessary for a particular movement. Flexibility enhances movement and mobility for the athlete [12].Empirical investigation it seems reasonably fair to conclude that there is significant relationship between the wrist flexibility and agility to badminton performance therefore these variables are most trustworthy for the better performance in Badminton [13].

V. Conclusion:

The performance of Back row overhead smash skill is dependent up the range of flexibility of the player, so the performance is interrelated with the physical ability of the sports man.It was concluded that there was a significant relationship between flexibility and skill performance - 'Back row overhead smash' among the ball badminton players. Also, no other physical variable aspects have significant relationship with the skill performance- 'Back row overhead smash.'

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