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Estimation of Weight Lifters Performance on the basis of Anaerobic Power and Balance Abilities: Belonging to 94 Kg. Weight Category

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Abstract

The objective of the study was to estimate of 94 kilogram weight category of Weight lifters performance on the basis of Anaerobic Power and Balance Abilities. In this study, fifteen male University level Weight lifters who performed 94 kilogram weight category were selected. All the Weight lifters age were ranging from 18 to 26 years. In this study, Weight lifters performance was selected as dependent variable and Anaerobic Power & Balance Abilities as independent variables. For the estimating dependent variable (94 kilogram Weight Category of Weight lifters performance) on the basis of independent variables (Anaerobic Power and Balance Abilities), Multiple regression analysis was used. Weight Lifters performance (94 kilogram) = -26.385 + .325 × Anaerobic Power.

Key words: Weight Lifters Performance, Anaerobic power and Balance abilities.

1. Introduction

In simple terms, balance can be described as the foundation from which all movements originate. It is perhaps the most important component of athleticism. At all times, your body is subjected to a force that cannot be seen by the naked eye. This force is, of course, called gravity, and your ability to control your centre of gravity determines your sense of balance. Dynamic balance is the ability to control your centre of gravity during angular and unstable body movements. It determines whether you perform with power and grace or become drained and risk getting thrown to the ground. Without balance, even your strongest muscles become useless and unable to exert force on another body. Thus poor balance often results in weak skill development in terms of speed, power and strength: it increases one's risk of injury. As a training activity, rope jumping draws effect on nearly every muscle in your body. In addition to the major muscle groups already discussed, rope jumping also draws effect upon stabilizing muscles and muscles fibers. These are the muscle systems that contribute to your overall sense of balance. As you increase in proficiency and become able to sustain rope jumping for as long as 5 minutes at a time, you will get a feel for the stabilizer muscles, located near the joint, that complement the support of ligaments and tendon. During sports play, athletes constantly lose their centre of gravity and regain it in order to maintain balance. Rope jumping forces you to lose and regain your balance several times per second. It forces you to alternate balancing on one leg and then on the other while your upper body coordinates the rope swing with each jump. It also requires proper timing and coordination (Lee, B., 2010).

1.1 Objective of the study:

The objective of the study was to estimate of 94 kilogram weight category of Weight lifters performance on the basis of Anaerobic Power and Balance Abilities.

2. Methodology

2.1 Selection of subjects:

In this study, fifteen male University level Weight lifters who performed 94 kilogram weight category were selected. All the Weight lifters age were ranging from 18 to 26 years.

2.2 Selection of Variables:

In this study, Weight lifters performance was selected as dependent variable and Anaerobic Power & Balance Abilities as independent variables.

2.3 Criterion Measure:

Variable	Test used	Unit of measurement
Anaerobic power	Lewis Nomogram	Kg-m/sec
Static balance	Stork Stand Test	Seconds
Dynamic balance	Modified Bass Test	Points

2.4 Statistical Analysis:

For the estimating dependent variable (94 kilogram Weight Category of Weight lifters performance) on the basis of independent variables (Anaerobic Power and Balance Abilities), Multiple regression analysis was used.

3. Findings and Establishment of regression Model

Table- 1
Descriptive statistics of Weight Lifters belonging to 94 kilogram Weight Category

Measures	Weight Lifters and all selected variable's Performance			
	Weight Lifters Performance (in points)	Static Balance (in seconds)	Dynamic Balance (in Points)	Anaerobic Power (in kg.-m/sec)
Mean	23.20	10.03	57.26	152.73
Standard Deviation	2.56	4.21	8.55	7.86
Skewness	-.81	.64	.19	-.97
Standard Error of Skewness	.58	.58	.58	.58
Kurtosis	-.31	-.59	-.96	.26
Standard Error of Kurtosis	1.12	1.12	1.12	1.12

Table-1 shows the descriptive statistics of 94 kilogram Weight category Weight Lifters in relation to all selected variables.

The obtained descriptive measures related to Weight Lifters Performance of 94 kilogram Weight category are mean = 23.20; standard deviation = 2.56; Skewness = -.81; standard error of Skewness = .58; kurtosis = -.31; and standard error of kurtosis =1.12.

The obtained descriptive measures related to Static Balance of 94 kilogram Weight category are mean = 10.03; standard deviation = 4.21; Skewness = .64; standard error of Skewness = .58; kurtosis = -.59; and standard error of kurtosis =1.12.

The obtained descriptive measures related to Dynamic Balance of 94 kilogram Weight category are mean = 57.26; standard deviation = 8.55; Skewness = .19; standard error of Skewness = .58; kurtosis = -.96; and standard error of kurtosis =1.12.

The obtained descriptive measures related to Anaerobic Power of 94 kilogram Weight category are mean = 152.73; standard deviation = 7.86; Skewness = -.97; standard error of Skewness = .58; kurtosis = .26; and standard error of kurtosis =1.12.

In case of Weight Lifters performance and all the selected variables, the value of Skewness and kurtosis lies in the negative to positive range which is obtained by multiplying the standard error of Skewness and standard error of kurtosis by two.

In case of Weight Lifters performance, obtained range of Skewness from negative to positive side is -1.16 to 1.16, the value of Skewness (-.81) lie in this range. In case of Weight Lifters performance, obtained range of kurtosis from negative to positive side is -2.24 to 2.24. The value of kurtosis (-.31) lie in this range.

In case of Static Balance obtained range of Skewness from negative to positive side is -1.16 to 1.16, the value of Skewness (.64) lie in this range. In case of Static Balance obtained range of kurtosis from negative to positive side is -2.24 to 2.24. The value of kurtosis (-.59) lie in this range.

In case of Dynamic balance obtained range of Skewness from negative to positive side is -1.16 to 1.16, the value of Skewness (.19) lie in this range. In case of Dynamic Balance obtained range of kurtosis from negative to positive side is -2.24 to 2.24. The value of kurtosis (-.96) lie in this range.

In case of Anaerobic Power obtained range of Skewness from negative to positive side is -1.16 to 1.16, the value of Skewness (-.97) lie in this range.

In case of Anaerobic Power obtained range of kurtosis from negative to positive side is -2.24 to 2.24. The value of kurtosis (.26) lie in this range.

From the above mentioned observations the data possesses normality.

Figure- 1

Histogram with normal curve in relation to Performance of 94 kilogram Weight category Weight Lifters

Figure- 2

Histogram with normal curve in relation to Static Balance of 94 kilogram Weight category Weight Lifters

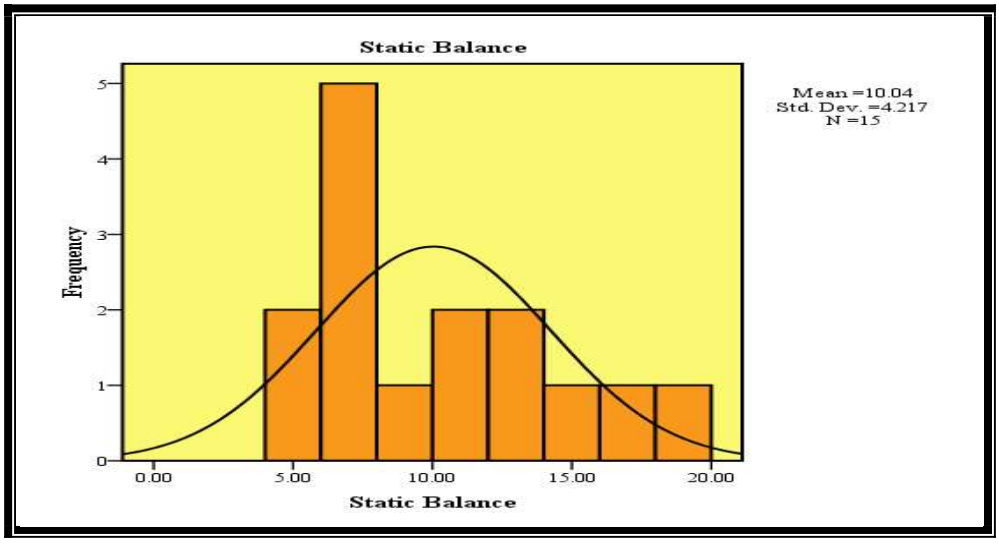


Figure- 3

Histogram with normal curve in relation to Dynamic Balance of 94 kilogram Weight category Weight Lifters

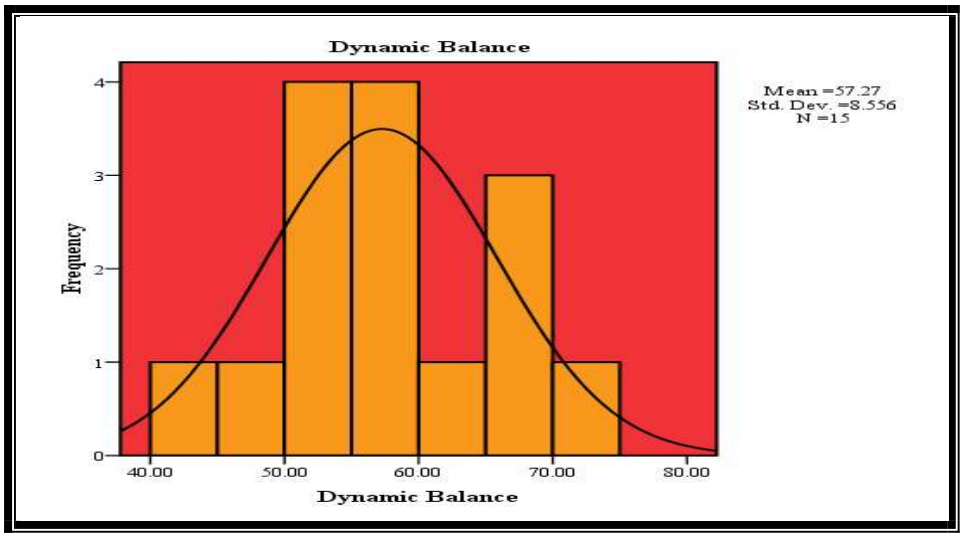
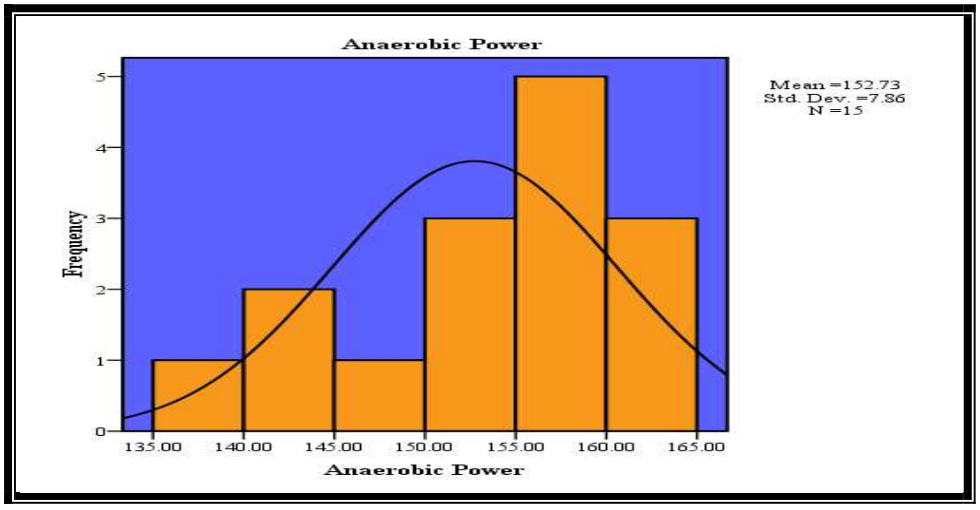


Figure- 4

Histogram with normal curve in relation to Anaerobic Power of 94 kilogram Weight category Weight Lifters



Descriptive statistics as well as histogram with normal curve belonging to Weight Lifters performance and selected variables of 94 kilogram Weight category satisfies the normal distribution of data. So multiple linear regression analysis was applied to estimate the performance of 94 kilogram Weight Lifters on the basis of Balance abilities and Anaerobic Power.

Multiple Linear Regression Analysis related to 94 kilogram Weight category of Weight Lifters on the basis of Balance Abilities and Anaerobic Power

Table- 2

Model summary of 94 kilogram Weight category for the estimation of Weight Lifters performance on the basis of Balance Abilities and Anaerobic Power

Model	R	R Square	Adjusted R Square	Standard Error of the Estimate	Durbin-Watson
1	.993[a]	.987	.986	.30865	1.279

a. Predictors: (Constant), Anaerobic Power

b. Dependent Variable: Weight Lifters Performance

Model summary in table- 2 reveal the relationship of independent (predictors) and dependent variables (Weight Lifters performance) of given regression model by stepwise method of linear regression. In this model summary, two values are important i.e. R and R Square. Value of R (.99) shows the relationship of Weight Lifters performance and Anaerobic Power. Value of R Square (.987) shows that 98% performance of Weight Lifters is explained by Anaerobic Power.

Table- 3
ANOVA table of 94 kilogram Weight category Weight Lifters

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	**Regression**	91.162	1	91.162		
	Residual	1.238	13	.095	956.901	.000[a]
	Total	92.400	14			

a. Predictors: (Constant), Anaerobic Power

b. Dependent Variable: Weight Lifters Performance

Table- 3 of ANOVA tells about the utility of established regression model for estimating Weight Lifters performance on the basis of Anaerobic Power (only one model was established). F-value of 956.901 was found significant at .05 level. This shows that established equation is useful.

Table- 4
Coefficients of multiple linear regression analysis of 94 kilogram Weight category Weight Lifters for estimation of performance on the basis of Balance Abilities and Anaerobic Power

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Standard Error	Beta	T	Sig.
1	**(Constant)**	-26.385	1.605		-16.440	.000
	Anaerobic Power	.325	.010	.993	30.934	.000

a. Dependent Variable: Weight Lifters Performance

Table- 4 reveal that Unstandardized coefficients for constant (B = -26.385) was found to be significant at .05 level. Unstandardized coefficients for Anaerobic Power (B = .325) was also found significant at .05 level.

Table- 5
Coefficients of excluded variables of multiple linear regression analysis of 94 kilogram Weight category Weight Lifters for estimation of performance on the basis of Balance Abilities and Anaerobic Power

					Partial	Collinearity Statistics
Model		Beta In	T	Sig.	Correlation	Tolerance
1	**Static Balance**	.018[a]	.362	.724	.104	.465
	Dynamic Balance	-.041[a]	-1.000	.337	-.277	.610

a. Predictors in the Model: (Constant), Anaerobic Power

b. Dependent Variable: Weight Lifters Performance

Table- 5 shows the excluded variables after applying stepwise method to estimate Weight Lifters performance of 94 kilogram Weight category on the basis of Balance Abilities and Anaerobic Power.

The excluded variables are Static Balance and Dynamic Balance.

The established regression equation to estimate Weight Lifters performance on the basis of Balance Abilities and Anaerobic Power belonging to 94 kilogram Weight category.

Model- I

Weight Lifters performance (94 kilogram) = -26.385 + .325 × Anaerobic Power.

Testing assumptions to apply multiple linear regression analysis to verify the generalization of established equation related to 94 kilogram Weight category of Weight Lifters.

Four assumptions were tested to apply multiple linear regression analysis for the generalization of the results of estimation Weight Lifters performance on the basis of Balance Abilities and Anaerobic Power in relation to 94 kilogram Weight category. These assumptions are related to outliers, independence of data points, constant variance and normality of residuals.

Table- 6
Table showing residual statistics in relation to 94 kilogram Weight category

	Minimum	Maximum	Mean	Standard Deviation	N
Predicted Value	17.442	25.883	23.200	2.551	15
Residual	-.390	.557	.000	.297	15
Standardized Predicted Value	-2.256	1.052	.000	1.000	15
Standardized Residual	-1.266	1.805	.000	.964	15

a. Dependent Variable: Weight Lifters Performance

Table- 6 of standardized residual shows the minimum (-1.266) and maximum (1.80) score. This lie in the acceptable range. The assumption of outlier is fulfilled.

Figure- 5
Histogram with normal curve related to 94 kilogram Weight category

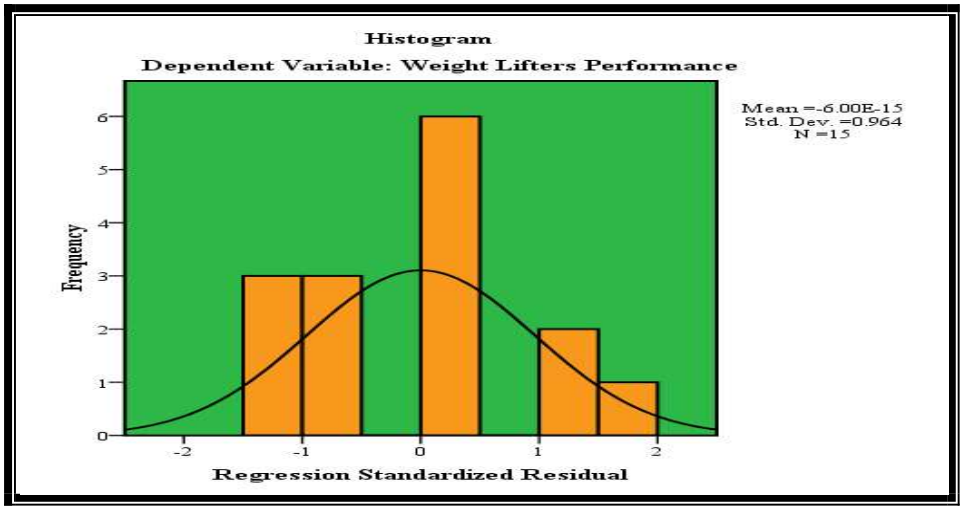


Figure- 6
Q.Q. Plots related to the residuals of 94 kilogram Weight category

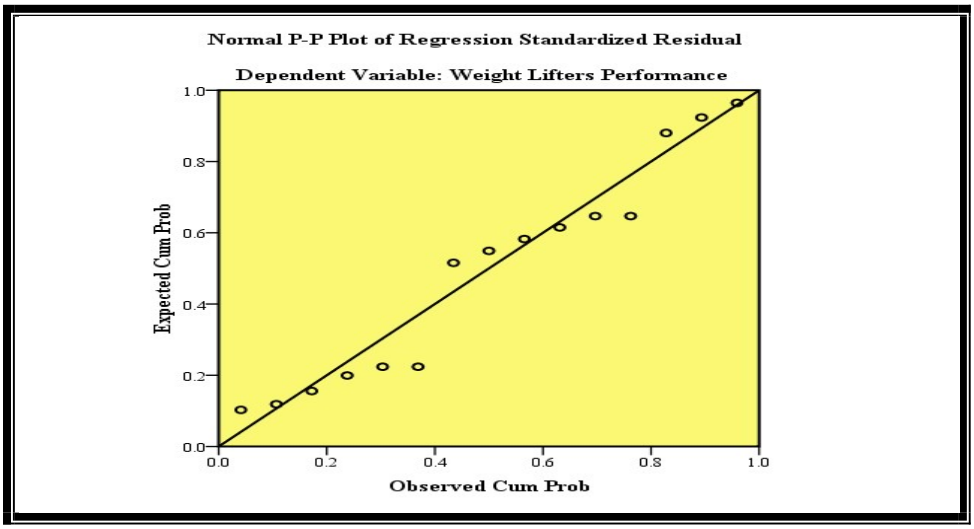


Figure 5 and 6 shows the histogram with normal curve and Q.Q. Plots related to 94 kilogram Weight category. This shows that distribution of residuals related to 94 kilogram category is normal in nature.

Figure- 7
Scatter Plot showing constant variance related to the residuals of 94 kilogram Weight category

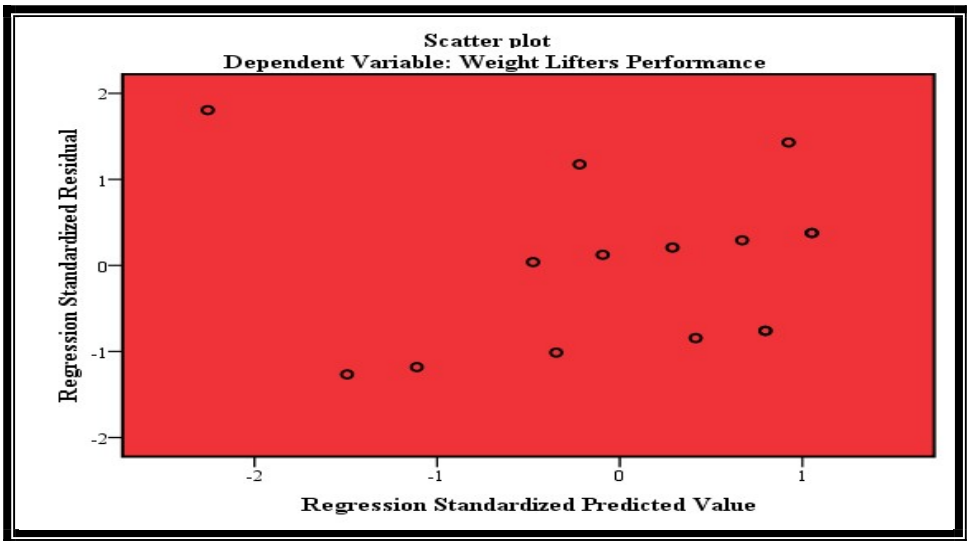


Figure- 7 of scatter plot shows that in 94 kilogram Weight category constant variance is found is relation to residuals. Last and fourth assumption of independent of data point is tested by Durbin-Watson test (given in table 2). The value of 1.279 shows that neither strong negative nor strong positive correlation was found.

Since all the assumptions are fulfilled, results of the study may be generalized.

4. Discussion of Findings

Anaerobic power was found the main predictor for Weight liftingperformance. Singh, R. (2014) conducted a study to predict Weight lifting performance on the basis of anthropometric characteristics. In the study, height and left arm length were found best predictors to predict Weight lifting performance. In the present study, the best predictor was found Anaerobic power. This might be due to the reason that Anaerobic power may have positive relationship with height and left arm length.

5. Conclusion

- In 94 kilogram weight category, 98% performance of Weight Lifters is explained by Anaerobic Power.
- The established regression equation to estimate Weight Lifters performance on the basis of Balance Abilities and Anaerobic Power belonging to 94 kg. Weight category:

Weight Lifters performance (94 kilogram) = -26.385 + .325 × Anaerobic Power.

6. References

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