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Prediction Of Stroke Length And Stroke Frequency Among Professional Middle Distance Swimmers

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INTRODUCTION

Prediction of different components of motor behaviors is one method tests are being used more and more frequently. For a long time, exams that forecast athletes' performance in their sport have piqued the interest of coaches. The outcomes of Prediction are known in advance. Typically, the expected outcomes are not random guesses, but are based on some known facts of the relationship or deliberately defined ideas. The prediction of sports performance has been a concept usually reserved for those associated with the betting culture. However, in reality, each and every person involved within sport will subconsciously process information to predict sports performance. Performance prediction could be described as the ability to draw conclusions upon the outcome of future performance based upon the combined interaction of previously gathered information, knowledge or data.
Biomechanics is a distinguished recreation technology that explains the mechanical components of human movement. Introduction to Sport Biomechanics demonstrates the essential mechanical factors associated with human overall performance in recreation. The description of gross movement styles as well the forces related to such movement will be explored with recognize to linear and angular movement. Newton's Laws of motion will also be explored with unique application to a sporting context. In addition to concepts of drag and acceleration in sports activities such as rowing, swimming and motor racing, the introduction of sports biomechanics provides a valid conceptual foundation for the entire application of sports biomechanics into the primary fluid dynamics. Stroke Length is the distance one travel between his hand entering the water at the front and leaving at the back. Stroke frequency is very much like cycling cadence (the number of times the legs turn round in a minute). Most amateur swimmers generally have a stroke rate of 40-70 strokes per minute.
An athlete needs to improve both his performance efficiency as well as readiness performance with regard to achieve optimal performance. Sport and PE are two fields that require a lot of training methods and means to gain the total performance of sports people. Swimming is a team or individual sport that involves moving through water while using one's full body. It takes place in water or pool. When compared to terrestrial sports, swimming is a special sport that is highly challenging to compete in. Water offers increased density and resistance in swimming, making it difficult for swimmers to move forward. In order to swim more effectively in the water, they must adapt the physical principles of water to their bodies. The primary objective behind the research work taken is to predict the relationship between stroke length and frequency with aqua performance among professional middle distance swimmers.

MEANS AND METHODOLOGY

The research aimed to forecast the swimming performance on stroke length and frequency among professional middle distance swimmers. 20 state level professional junior female middle distance swimmers of 15 to 25 years of age from Madhya Pradesh, Bhopal region were selected as the subjects of the study. All subjects taken for the study were well trained and practicing swimming regularly under various clubs and state swimming association. Stroke length ad frequency was taken into consideration as predictor variables on the basis of available literatures and conformity of professional experts. 400 Meters Free Style was chosen as swimming performance in criterion variable. The repeated measures design was implemented which made up of standardized tests for criterion and predictor variables. The subjects (N=20) were randomly selected and asked to participate in all the tests. To collect the data, tests were taken on stroke length and frequency.
This study was organized to predict the swimming performance on stroke length and frequency among state level professional middle distance swimmers. The investigator selected the succeeding tests to gather the data on the chosen criterion and predictor variables. Stroke length was measured through 50 Meters Swim Test and scores was recorded in meters. Stroke frequency was measured by 50 meters Swim Test and score was recorded in counts/ minute. The test-retest procedure was employed to discover the data's dependability. Ten individuals were

chosen from Madhya Pradesh Swimming Association and they underwent tests twice by the same tester in similar administrative conditions on predictor and criterion's variable.

Carl Pearson Product Moment Correlation was administered to ascertain the association among the criterion and predictor variables. Multiple regressions were employed to predict the criterion variable from a set of predictors. In this study, the predictor variable with the highest correlation to the criterion variable was identified using the backward selection method of multiple regressions. By cause of each predictor's contribution, the remaining variables were added to the equation. Significance value was set at 0.05% level.

ANALYSIS OF DATA

Prediction is a disclosure of an event or a program which will happen in time to come based on scientific facts. Predictive models are the essential component of all the systematic sports analytics program because these models can change the gained data into useful information.

Table - 1
Descriptive Statistics on Stroke Length and Stroke Frequency

Sl. No	Variable	N	Mean	SD
1.	Stroke Length	20	137.47	6.94
2.	Stroke Frequency	20	46.67	1.58

Table No. 01 descriptive analysis of stroke length and stroke frequency stated that, the mean value of stroke length and stroke frequency was 137.47 and 46.67, and Standard deviation value of stroke length and stroke frequency was 6.94 and 1.58.

Table - 2
Co-efficient Correlation among Swimming Efficiency and Chosen Variables

Sl. No.	Swimming Efficiency	Correlation
1.	Stroke Length	-.853*
2.	Stroke Volume	-.781*

*Tabulated value of r was 0.254

Table No. 2 Co-efficient Correlation among Swimming Efficiency and Chosen Variables stated that the results ascertained that stroke length and stroke frequency were remarkably correlated with the swimming efficiency as the obtained 'r' values 0.853 and 0.781 were greater than the tabulated table 'r' value of 0.254.

Table - 3
Backward Multiple Regression Method

Variables Entered/ Removed [b]			
Model	**Variable Entered**	**Variable Removed**	**Method**
01	Stroke Length and Stroke Frequency		Enter
02		Stroke Length	Backward
03		Stroke Frequency	Backward

Table No. 03 Backward Multiple Regression Method stated that, backward regression method of removal of non-significant variables connected with the criteria set for F to remove the predictor variables was P > 0.100. The succeeding predictor variables like stroke length and stroke frequency were removed connected with the above criteria.

Table – 4
Backward Regression Method with Beta and' t ' Values

Model	Variable	Beta In	T	Significant	Partial Correlation	Collinearity Statistics
						Tolerance
2.	Stroke Length	-.089[d]	-1.008	.319	-.144	.086
3.	Stroke Length and	.004[e]	.065	.949	.009	.187
	Stroke Frequency	.052[e]	1.014	.315	.143	.253

a. **Dependent Variable:** 400 meters free style swimming
b. **Predictors' in the Model 2:** (Constant) Stroke Volume
c. **Predictors' in the Model 3:** (Constant), Stroke Length, and Stroke Frequency

Table No. 4 Backward Regression Method with Beta't' Value stated that the beta, 't' value and its significance (P> 0.100), partial correlation and collinearity statistical tolerance of both excluded variable stroke length, and stroke frequency.

Table - 5
Predictor Variables' Model Summary Connected with R-Square, R-Square Change among F-Change Values

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	f Change	df1	df2	Sig. F Change
1.	.984[a]	.968	.959	.00978	.968	106.60	18	19	.000
2.	.984[b]	.968	.960	.00968	.001	.069	1	19	.749

Predictor Model - 1 (Stroke Length and Stroke Frequency): In model 1, a sig. F-change of probability less than 0.000 was acquired with the succeeding predictor parameters namely stroke length and stroke frequency.
Predictor Model - 2 (Stroke Length and Stroke Frequency): In model 2, a sig. F-change of probability less than 0.894 was acquired with the succeeding predictor parameters namely stroke length and stroke frequency.

Table – 5
ANOVA for Model 1 Stroke Length and Stroke Frequency

Variance	SOS	DF	MS	F
Regression	.133	**18**	**.010**	**106.60***
Residual	.004	**1**	**.000**	
Total	.137	**19**		

*Significant at 0.05 level with 18, 1 df = (2.19)
Table No. 5, ANOVA for Model Stroke Length and Stroke Frequency stated that, the gained F-value 106.60 of Model 1 certain predictor parameters namely stroke length and stroke frequency was larger than the t-F value of 2.19. Accordingly, there was a remarkable association between swimming ability and chosen predictor parameters namely stroke length and stroke frequency.

Results

As the multiple correlations on swimming performance with the integrated effect of the predictor variables were greatly remarkable, it was precisely confirmed that the regression equation has a great predictive validity. According to the outcomes, this equation may be positively applied in elite swimmers. The outcomes also exposed that the chosen biomechanical variables namely stroke length and stroke frequency were remarkably associated with the performance of swimming as the acquired 'r' values -0.853 and -0.781 respectively.
The outcomes revealed that there was a remarkable association among performance of swimming and stroke length and stroke frequency. Hence, the forth hypothesis was agreed on the above said variables.

Conclusion

Based on these results, the regression equation was acquired for predicting the swimming performance of professional female middle distance swimmers. The variables, such as, stroke length and stroke frequency was considered as best predictors from swimming performance of professional female middle distance swimmers. It is further concluded that swimming performance can be enhanced or assessed through stroke length and stroke frequency.

Bibliography

1. Astrand, Perolof. (1977), Text Book of Work physiology, New York: McGraw Hill Book Company, P.398.
2. Hughes, Mike and Ian M Franks (2015), Essentials of Performance Analysis in Sport: second edition, Oxon and New York: Routledge, Pp. 73-78.
3. Johnson B L., Nelson J K., (1982), "Practical Measurement for Evaluation",Delhi: Surjeet Publications, Pp. 1-48.
4. Matveyer (1981), "Fundamentals of Sports Training", Moscow: Progress Publishers, P.11.
5. Singh S. P., Malhotra, P. (1989), "Kinanthropometry", Patiala: Lunar Publications, pp. 14-18.
6. Sutcliffe and Ganham (1981), "Heights and Weights of Boys and Girls", London: Butter and Tanner, Pp. 1-23.
7. Wuest, Deboran A, Bucher Charles A. (1992), Foundations of Physical Education and Sport, New Delhi: B.I.Publications Pvt Ltd., P.160-288.

8. Yobu A., (2010), "Test, Measurement and Evaluation in Physical Education and Sports", New Delhi: Friends Publications, Pp.197-450.
9. Girard O., Millet G P., (2009), "Physical Determinants of Tennis Performance in Competitive Teenage Players", Journal of Strength and Conditioning Research, 23(6): Pp.1867-1872.
10. Jeyaraman P., (2011), "Predominance of selected Anthropometric and Physical Fitness Parameters on Performance among University Badminton Players", Emerging Trends in Physical Education and Sports Sciences-Publication Division, Bharathidasan University, Tiruchirapalli, Pp. 29-35.
11. Justin W.L. Keogh., Clare L. Weber., Carl T. Dalton., (2003), "Evaluation of Anthropometric, Physiological and Skill-related Tests for Talent Identification in Female Field Hockey, Canadian Journal of Applied Physiology, 28(3): Pp. 397-409.
12. Kaplan T., Erkmen N., Taskin H., (2009), "The Evaluation of the Running Speed and Agility Performance in Professional and Amateur Soccer Players", Journal of Strength and Conditioning Research, 23(3): Pp.774-778.
13. Khanna G L., Majunda P., Malik V., Vrinde T., Madal M., (1996), " A Study of Physiological Responses during Match Play in Indian National Kabaddi Players", British Journal of Sports Medicine, 30(3): Pp. 232-235.
14. Sudha Singh., (2009), "Relationship of Selected Anthropometric Measurements and Physical Variables to the Performance of Jumpers", Unpublished Doctoral Dissertation, Suresh Gyan Vihar University, Jaipur, Rajasthan.
15. Vartika Katiyar, (2018), Prediction of Performance Ability of Swimmers in Relation to selected Anthropometric, Physiological and Psychological Variables, Unpublished Doctoral Dissertation, Shri Jagdishprasad Jhabarmal Tibrewala University, Vidyanagari, Jhunjhunu, Rajasthan.