Floatation and Anthropometric Variables of Sinkers

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ABSTRACT

The purpose of the study was to predict buoyancy of male swimmers of inter-varsity level from certain anthropometric variables. It was hypothesized that the anthropometric variables might help in the prediction of buoyancy of male swimmers of inter-varsity level. The standardized procedure, as suggested by lane and Mitchem, to measure buoyancy was administered on the swimmers of inter-varsity level, in the age group of 16-22 years And while administering this test, all the male swimmers, whose back remained below the surface of the water, were put in the sinkers category. Fortyfour sinkers served as subjects in the study. Buoyancy was the dependent variable. The independent variables were the anthropometric measurements. To ascertain the relationship between dependent variables and independent variables a correlation matrix was prepared. Multiple correlation was computed to assess the combined effect of all the anthropometric measurement, on buoyancy. To indentify the most contributing independent variables to buoyancy, step down regression method was used. In order to predict the buoyancy on the basis of most contributing anthropometric measurement regression analysis was done. For testing the hypothesis the level of significance was set at .05.

INTRODUCTION

In modern sports the anthropometric measurements and their relationship with various motor traits are important guides for the coaches and athletes themselves, for making training schedules and for classification of students into different groups, according to their age, ability etc.

The performance of the swimmers has been all the time matter of great concern for the coaches and sports scientists, and continuous efforts have been made in this direction. Tanner, Sodhi and Siddhu have stressed that the physique and body composition, including the size, shape and form, play a significant role in the sports performance.

The buoyancy of an individual is an important inherent factor which contributes to ease and efficiency in the learning of swimming skills. Individuals with a low degree of buoyancy experience considerable amount of difficulty in keeping the body horizontal in the water.

The purpose of the study was to predict buoyancy of male swimmers, of inter-varsity level, from certain anthropometric variables. It was hypothesized that the anthropometric variables might help in the prediction of buoyancy of male swimmers of inter-varsity level.

METHODOLOGY

The standardized procedure as

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suggested by lane and Mitchem[7], to measure buoyancy, was administered on the swimmers of inter-varsity level, in the age group of 16-22 years. While administering this test, all the male swimmers whose back remained below the surface of the water were put in the sinkers category. Fortyfour sinkers served as subjects in the study.

After making sincere efforts to review the related literature and holding a series of discussions with the experts the following variables were selected, because they seemed to be directly or indirectly related to factors affecting buoyancy of a swimmers.

Buoyancy was the dependent variable. The independent variables were:-

(a) Standing and sitting height measured with the help of anthropometric kit.
(b) Body weight measured with the help of weighing machine.
(c) Upper arm girth, head and chest circumference measured with the help of gullic tape.
(d) Total arm length and total length of the upper extremity measured with the help of gellic tape.
(e) Hand length and breadth, foot length and breadth measured with the help of sliding caliper.
(f) Shoulder, chest and hip width-measured with the help of sliding caliper.
(g) Chest depth-measured with the help of spreading caliper.
(h) Breathing capacity measured with the help of spirometer.
(i) Biceps, triceps, suprailiac, subscapular skinfolds measured with the help of skinfold caliper.

Some indices were also taken for the study which acted as relative variables:- Thoracic Index , Sitting-Height Stature index, Ponderal Index , Robusticity Index, Stature – Chest Girth+ Weight, Chest Stature Index I&II, Intermemberal Index, Shoulder Stature Index, Pelvic – Stature Index, Brocca Index.

All the site of measurements were recorded as per the standardized procedure.

Statistical Procedure

To ascertain the relationship between dependent variables and independent variables, a correlation matrix was prepared. Multiple correlation was computed to assess the combined effect of all the anthropometric measurement on buoyancy.

To indentify the most contributing independent variables to buoyancy, step down regression method was used. In order to predict the buoyancy on the basis of most contributing anthropometric measurement regression analysis was done and the prediction equation was prepared. For testing the hypothesis the level of significance was set at .05.

RESULTS & DISCUSSION

To find out the relationship of buoyancy with that of independent variables, correlation matrix was prepared. The result showed that buoyancy is significantly related to head circumference, hand length, and pelvic - stature index.

In case of buoyancy of sinkers head circumference, hand length and pelvic– stature index were found to have positive significant relation with it which means that these variables are detrimental to the floatability and help an individual to sink in the water.

To examine the combined effect of anthropometric variables to buoyancy

multiple correlation was computed. Forward stepwise method was used to identify the indirect contributor to the buoyancy.

The most contributing independent variables and buoyancy, their · oefficient of determination (R^2) and multiple correlation (R) are presented in Table 1 .

Table-1: Identification of most contributing Varibales to Buoyancy for sinkers

S.no	Buoyancy	Coefficient of Determination (R^2)	Multiple correlation (R)
1	Pelvic-stature Index (X29)	0.1132	0.3365*
2	Head Circumference (X4)	0.1972	0.4441*

N=44
* Significant at .05 level of confidence
R.05 (43) = .288

Table 1 shows that these variables correlated significantly to buoyancy as the computed values 0.336 and 0.444 for the multiple correlation coefficient are more than the tabulated value of 0.288 required to be significant at .05 level of confidence with 43 degrees of freedom.

Table-2: Regression Coefficients of Physique Characteristics for Multiple Linear Equation on Buoyancy

S.No.	variable	Regression coefficient	Standard Error	t-value
1.	Head Circumference	0.842	0.407	2.07
2.	Pelvic- Stature Index	6.542	2.888	2.07

In order to predict the buoyancy from the anthropometric measurements a prediction equation was developed.

The following regression equation of the physique characteristics on the buoyancy was prepared by using the regression coefficients given in Table-2

$$Y2 = 84{,}0 + (0.842 \times 4) + (6.542 \times 29)$$

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