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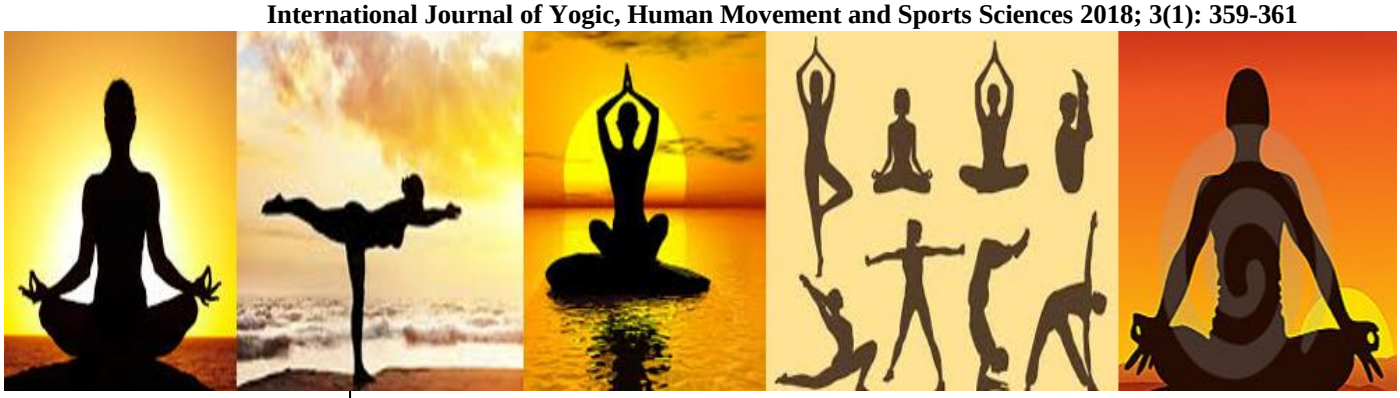

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Physiological variables as determinant of national level judokas

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Abstract
The purpose of the study was to determine the physiological variables as determinants of judokas at national level. The study was delimited to 50 national level male judo players between the age group of 18-27 years. The study was further delimited to the following variables, Physiological variables: Fat Percentage, Aerobic Capacity, Anaerobic Capacity and Vital Capacity. After selecting the following variables, the data were collected with the help of sophisticated instruments under the expert's supervision. The instruments like, stop watch, and score sheets were used to measure the physical variables. Bio-electric impedance analyzer, Spiro meter, score sheets and stop watch were used to measure the physiological variables of the subjects. For the purpose of data analysis, researcher has used the statistical software known as SPSS version 20 and to find out the variables which are responsible for the performance of the judokas factor analysis was used to understand the structure of variables. The mean and standard deviation of all the variables were found for the selected test i.e. Fat percentage (13.94 $\pm$ 2.51), Aerobic capacity test (2715.68 $\pm$ 208.46), Anaerobic capacity test (4.53 $\pm$ 0.35), Vital capacity test (5.78 $\pm$ 0.84), After applying factor analysis the test items contributing most in particular factors were selected and four factors were derived with their highest factor loading of the test items in each factor. Thus, the factor together explained 72.77% of the total variance of the model. The two factors were Aerobic capacity confidence with factor loading 0.778, and Anaerobic Capacity confidence with factor loading 0.926. Hence from the above findings we can conclude that the four factors extracted can be considered as the determinants of judokas performance at national level.

Keywords: physiological variables, judokas, vital capacity, fat percentages, aerobic capacity, anaerobic capacity and bio-electric impedance, factor analysis

Introduction
Among contact games judo has become a very popular game in the world. Almost all the nations play the game both for enjoyment and competition. First it was formulated by Dr. Jigaro Kano in Japan. Although he had adapted it from Japanese forms of self defence, such as ju-jutsu, he saw it more as a discipline and certainly not as a sport. Judo was looking for some way of improving the physical fitness of school children Kano suggested judo, not just from the point of view of bodily health but also because it was seen as producing spiritual and mental fitness. From that point, judo spread rapidly but, by the very nature of its technique, it also becomes a competitive sport, which became the main reason for injuries among judokas. They play Judo more aggressively to overcome their opponents and judo became a profession for Judokas. Every judoka has to express a large number of actions during one match, so physiological demands of every match are very high. A judoka tries to recognize the right moment for using the opponent's weakness and reacts quickly, powerfully and explosively. Judo is a dynamic, high-intensity intermittent sport that requires complex skills and tactical excellence for success. As judo athletes have to perform a great number of actions during each match, the physical demand of a single match is high.

The physiological demands of this format tax both the aerobic and the anaerobic systems. The anaerobic system provides the short, quick, all out bursts of maximal power during the match, while the aerobic system contributes to the athlete's ability to sustain effort for the duration of the combat and to recover during the brief periods of rest or reduced effort. Upper limb strength is another important aspect considered in judo performance, mainly during grip combat (kumi-kata) to attack, defend and maintain balance.

The constant dynamic changes of combat require athletes to use a combination of maximal strength and endurance during kumi-kata, mostly to control the distance between a judoka and his/her opponent. In addition, the ability to produce maximal strength or the rate of force development is another fundamental action during grip combat, as well as the ability to maintain strength for long periods of time, since the duration of any given match can be up to 5 min or more (golden score) and that is why the need of enhance the physiological variable for the judo player for their better performance.

Methodology

To achieve the purpose 50 Judoka were selected through random sampling from National Level and the age of subjects ranged between 18 to 27 years. the present investigation the following Physiological variables were selected such as Fat Percentage, Aerobic Capacity, Anaerobic Capacity and Vital Capacity. The bioelectric impedance device measures the resistance of body tissues to the flow of a small electrical signal, the person being measured should not be in contact with any other non conducting surface, with legs apart and arms away from the body. Some devices require a pair of electrodes are placed on the hand and wrist, and another pair placed on the ankle and foot (usually opposite sides of the body), while other devices simply require you to stand on two foot plates. Follow the instructions of your particular device. On the other hand to measure the Aerobic capacity, Subjects were asked to stand at starting line and to take start at signal/clap. The subjects were asked to complete the 12 minute Run or Walk in maximum distance cover in meter as much as they can and to measure the anaerobic capacity Subjects were asked to stand at starting line and to take start at signal/clap. The subjects were asked to complete the 30 meter dash in minimum time as much as they can. To measure the vital capacity subject's age and gender was recorded, height and weight was measured before the procedures begins and feed the data in Spirometry test.

Result of the study

Table 1: Descriptive statistics of physiological variables

Variables	Mean	Std. Deviation	Analysis N
Fat percentage	13.94	2.51	50.00
Aerobic capacity 12mnt run or walk test	2715.68	208.46	50.00
Anaerobic capacity 30mtr dash run	4.53	.35	50.00
Vital capacity	5.78	.84	50.00

Table-1 reveals that mean $\pm$ Standard Deviation of the respective values of the selected test i.e. Fat percentage (13.94 $\pm$ 2.51), Aerobic capacity test (2715.68 $\pm$ 208.46), Anaerobic capacity test (4.53 $\pm$ 0.35), Vital capacity test (5.78 $\pm$ 0.84).

Table 2: KMO and Bartlett's Test

Kaiser-meyer-olkin measure of sampling adequacy.		.623
Bartlett's test of sphericity	Approx. Chi-Square	646.769
	Df	325
	Sig.	.000

Table-2 reveals the Kaiser- Meyer- Olk in (KMO) and Bartlett's test. The KMO test measures the sampling adequacy. The sample size is considered to be sufficient if the value of KMO is greater than 0.05. In the present study the value of KMO is .623, which is greater than 0.05, hence from the above table, it may be concluded that the sample was sufficient for applying the factor analysis. Further, Bartlett's test of sphericity was used to test as to whether the correlation matrix is an Identity matrix or not. From the same table, we can see that the Bartlett's test of sphericity is significant. That is, its associated probability is less than 0.05. In fact, it is actually 0.000. This means that the correlation matrix is not an identity matrix.

Table 3: Rotated component matrix varimax rotated solution (Final factor) rotated component matrix[a]

	Component							
	1	2	3	4	5	6	7	8
Fat percentage	.044	.132	-.070	-.301	.615	.007	.201	.318
Aerobic capacity 12mnt run walk test	-.024	-.152	-.043	.075	.131	-.778	.191	-.099
Anaerobic capacity 30mtr dash run	-.023	-.097	.042	.016	.068	.150	.084	.791
Vital capacity	.074	-.207	.737	.020	.033	-.199	.032	.253

Extraction Method: Principal Component Analysis. **Rotation Method:** Varimax with Kaiser Normalization. a. Rotation converged in 9 iterations. The final solution of the factor analysis after the varimax rotation has been shown in this table 3.Clear picture emerges in this final solution about the variables explaining the factors correctly. Thus, the factors have non- overlapping variables in this final solution. If the variables have factor loading more than 0.6, it indicate that the factor extracts sufficient variance from the variables. Thus, all those variables having loading more than 0.6 or more on a particular factor is identified in that factor. Owing to this criterion, the following variables have been grouped in each of the eight factors.

Table 4: Factor 5 rotated factor loadings (Varimax rotation)

Fat percentage	0.615

Table-4 shows that Fat percentage test item depicts the factor loading (0.615) which indicates that much of variability is explained by this test items in the fifth factor.

Table 5: Factor 6rotated factor loadings (Varimax rotation)

Aerobic capacity	0.778

Table-5 reveals that, in this factor, Aerobic capacity test item was identified as the highest factor loading (0.778) which indicates that much of variability is explained by this test items in a particular factor.

Table 6: Factor 8 rotated factor loadings (Varimax rotation)

Anaerobic capacity	0.791

Table-6 reveals that, in this factor, anaerobic capacity test

item was identified as the highest factor loading 0.791 which Indicates that much of variability is explained by this test items in a particular factor and only a single item was identified which have the factor loading more than 0.6.

Table 7: Model for national level judokas

Factor Measured	Test Items	Factor Loading
Factor one	Vital capacity	0.737
Factor two	Fat percentage	0.615
Factor three	Aerobic capacity	0.778
Factor four	Anaerobic capacity	0.791

Table-7 depicts that, a variables determinant of national level judo players (male) and physical education universities and physical education institutes judo players (male). There are four factors were retained from all the four test items. The variables (test items) having higher loading was identified from each of the retained factors for construction of test.

Conclusion

From the above findings, we can find that a test items determinant of national level judo players (male) and physical education universities and physical education institutes judo players (male). Four factors were retained from all the four test items. The variables (test items) having higher loading was identified from each of the retained factors for construction of test. The authenticity of the results of research depends on a no. Of factors, instances, selection of variables, selection of subjects etc. In the process of conducting a research authenticity of the instruments or tests used is a determining factor in credibility of results. After applying factor analysis the test items contributing most in particular factors were selected and four factors were derived with their highest factor loading of the test items in each factor. Thus, the factor together explained 72.77% of the total variance of the model. Factor three, aerobic capacity confidence test item was identified as the highest factor loading (0.778) which indicates that much of variability is explained by this test items in a particular factor and in this test a subjects were asked to stand at starting line and to take start at signal/clap. Factor four, anaerobic capacity confidence test item was identified as the highest factor loading (0.926) which indicates that much of variability is explained by this test items in a particular factor and in this test subjects were asked to stand at starting line and to take start at signal/clap.

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