Predicting the level and digital achievement in terms of some body measurements of 2000-meter rowing players in qualifying for the 2023 Asian Cup Championship

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Abstract

The study aimed to identify the relationship of body measurements to the level and digital achievement of 2000-meter rowing players in the 2023 Asian Cup Championship, and to identify the contribution of body measurements to the digital level of 2000-meter rowing players, and to identify the extent of the efficiency of body measurement variables in predicting the level and digital achievement of rowing players, while the research sample was represented by the players of the national rowing team participating in the Asian Cup Championship held in Iran 2023, numbering (15) players who were selected intentionally, as well as the arithmetic mean and deviation Standard, simple correlation coefficient, multiple regression coefficient by regression method, and regression coefficient by stepwise regression method, by using the statistical bag spss to reach the results, and the most important conclusions that appeared were that the body measurements have a high significant correlation with the level and digital achievement of rowers, while it appeared that the body measurements also have high contribution rates to the level and digital achievement of rowers.

Keywords: Prediction, digital achievement, digital level, body measurements, rowing.

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Introduction

The study of body measurements has great importance at the training level for all time and standard sports in terms of body shape and size with motor performance, in addition to being an important means of evaluating the individual. Thus, it can be said that the coach, through his technical expertise, must prepare sports champions based on their careful selection and according to the correct body specifications, so body measurements are important for each sporting event, as each game has a specific specificity in the type of body measurements required that must be available, so it can be practiced to achieve the best results.(Nashwan & Allawi, 2021)

"This confirms the fact of choosing the appropriate physical measurements before starting the training process, and that a wise coach will not waste his time and effort with a pattern that does not bode well for success. If the athlete participates in a competition and the anthropometric specifications are not at the required level, there will be fluctuations in the level and stability in some cases, and sometimes there will be a clear deficiency compared to his fellow players. Hence, the process of linking these measurements and identifying the relationship between them and physical performance is one of the important matters in order to reach the required level, which is what this study tried to reveal. In other words, (Kadhim et al., 2021) this study gains its importance in that it tries to determine the extent of the contribution of these physical measurements and their prediction in the digital achievement in order to reach accurate scientific results that serve the 2000-meter rowing game at the national team level to constitute a new addition for coaches in discovering the most qualified players to participate in continental championships. Some studies have addressed the importance of physical measurements, including the study (Saudi, 2009), which emphasized the "importance of physical measurements and their contribution to the level of digital achievement For rowing players. And the study (Abbas, 2008) confirmed that there is a statistically significant correlation between body measurements and skill performance and their contribution to skill performance in tennis, and the study (Hussein, 2010) "confirmed the existence of a significant correlation between some body measurements and physical abilities in performing the smash skill and their contribution to performing the smash skill in volleyball".

This study came to shed light on the specificity of this relationship and to contribute to establishing some scientific foundations that work to raise the level of the game as well as increase the theoretical knowledge of coaches and researchers in order to shorten the time and choose the appropriate player with the highest percentage of guarantee to obtain achievement in the game.(Farhan et al., 2016)

The research aims to identify the body measurements, level and digital, as well as to identify the relationship between body measurements and digital level, and to identify the contribution of body measurements to the digital level and achievement, and to identify the extent of the efficiency of body measurement variables in predicting the digital level and achievement, as well as to identify the role of body measurements in the digital achievement of 2000-meter rowers.(Nashwan, 2024)

The research hypotheses were that there is a statistically significant relationship between some body measurement variables and the digital level and achievement of 2000-meter rowers, and some body measurement variables contribute in varying proportions to the digital level and achievement of 2000-meter rowers

and the possibility of predicting the digital level and achievement in terms of some body measurements of 2000-meter rowers.

The Method and tools:

The researcher used the descriptive approach using the correlational method to suit the nature of the research problem, as the community was represented by the players of the national team participating in the 2023 Asian Cup in Iran, numbering (15) players at a rate of (100%), as they were 23 years old and above and their training age ranged between (8 to 12) years.

Identifying variables:

By reviewing some scientific sources and references, previous studies and personal interviews with some experts in the field of measurement, evaluation and rowing, some physical variables and digital achievement of 2000-meter rowing players were proposed, and after they were presented to a number of experts) as shown in Appendix 1), a number of variables were identified that will represent the research as follows:

Table (1) shows the experts' agreement rates for the research variables.

Variable	Agreement Percentage	Variable	Agreement Percentage
Upper Arm Length	%75	Total Height	%80
Leg Length	%80	Weight	%75
Forearm Length	%75	Trunk Length	%78
Leg Length	%75	Chest Circumference	%75
Thigh Length	%80	Abdominal Circumference	%80
Digital Level	%95	Arm Length	%90

Where all variables were accepted that obtained an agreement rate of (75%) or more from the experts' opinions (Latif, 2017)), as (Benjamin, 1983) indicates that "the researcher must obtain an agreement rate of 75% or more from the experts' opinions".

Measurements and tests for the research variables:

In order to determine the measurements and tests, they were presented to the experts to show the validity of the measurements and tests to measure what they were designed for and also to show the extent of their suitability for the research sample (Saba, 2018).

Measurements for physical variables:

Body length, arm length, upper arm length, forearm length, palm length, lower limb length, leg length, foot length, chest circumference, thigh circumference, calf circumference.

Test for digital achievement variables:

It is a 2000-meter rowing test to qualify for the Asia Cup Championship

The Main experiment

The researcher took all measurements for physical variables on Thursday 4/15/2023 after fixing all the numbers for the players participating in the championship and the achievement they obtained according to the activities in which they participated.

Statistical methods:

The statistical package (SPSS) was used, including the laws of the arithmetic mean, standard deviation, simple correlation coefficient, contribution ratio, and multiple regression.

Results:

Showing the results of the variables of body measurements, level and digital achievement of the 2000 m rowers.

Table (2) Between the arithmetic means and standard deviations of some body measurements and the digital level of the 2000 m rowing event.

Variables	Unit of Measurement	Mean	Standard Deviation
Total Height	Cm	183.2000	3.56526
Weight	Kg	77.5000	2.87711
Trunk Length	Cm	58.2000	1.93218
Chest Circumference	Cm	95.7000	3.09300
Abdominal Circumference	Cm	78.6000	4.55095
Arm Length	Cm	79.4000	1.34990
Upper Arm Length	Cm	31.7000	2.26323
Forearm Length	Cm	28.9000	2.33095
Leg Length	Cm	98.0000	5.65685
Legging Length	Cm	48.0000	2.16025
Thigh Length	m/s	50.6000	2.22111
Digital Level	Cm	7.40	1.46909

Table (3) shows the values of the correlation coefficient between the body measurements and the digital level of the 2000 m rowing efficiency.

Thigh Length	Leg Length	Leg Length	Forearm Length Leg	Upper Arm Length	Arm Length	Abdominal Circumference	Chest Circumference	Torso Length	Weight	Height	Variables
0,420 -	0,322 -	**0,9 -23	**0,849 -	**0,952 -	**0,978 -	0,325 -	**0,843 -	**0,923 -	0,444 -	**0,8 -29	Number level

By observing Table (3), it is clear that there is a negative significant correlation (inverse relationship) between each of (length, arm length, forearm length, upper arm length, chest circumference, and torso length) and the digital level. (Abdulhussein & Al-juboori, 2024) If this indicates anything, it indicates that the more these lengths and chest circumference increase, the less time the boat takes to cover a distance of (2000 m) and thus its speed increases. (Yasir et al., 2020) The researcher attributes this to the fact that increasing the length of the player's arm helps to take the maximum range of movement of the arm in the reciprocal rowing movement between the arms in front of the body to reach the farthest possible point at the moment the paddle is planted in the water, as both of the player's arms are holding the paddle forward and are used to pull the paddle in order to produce the maximum energy. (Abdulkareem et al., 2024)We notice through our analysis of the movement of this arm during rowing that its work begins from the moment the paddle meets the water in front at the farthest possible point, at which point the player begins to pull the paddle (paddle) from the back to the front in a direction parallel to the boat to produce the maximum possible energy. When the palm reaches the level of The knee then begins to reduce the radii of the parts of his arm to overcome the moments of inertia that act on the arm and its parts alike by forming angles at the elbow and shoulder joint.(Hammood et al., 2024) "It is noted that controlling the radii of the body (by reducing the lengths of the body parts) is inversely proportional to the linear speed and maintaining it as long as the body maintains a constant length (Al-Bayati, 2012)). These moments here are an obstacle to the rower's movement. To overcome them, (Salman et al., 2022) the rower works to bend the elbow and shoulder joints because he cannot reduce the mass of his arm. It is known that the humerus is relatively shorter than the forearm, so it is better to bend the elbow joint more than the shoulder to overcome the moments of inertia during the backward pull and increase the angular speed. "The increase and decrease in the radius play a role in achieving the angular speed and the peripheral speed of the body parts while

performing skills related to rotational movement" (Al-Bayati, 2012), and thus increasing the speed that in turn is transmitted to the rower, and then as a result of the action and reaction of hitting the water and pulling the rower, (Al-Bakri & YasirWajeehQaddoori, 2024) the boat moves forward. As for the trunk, as is known, it represents the largest muscle mass in the body that can produce force, especially in the process of pulling back to overcome the moment of inertia. "The moment of inertia is directly proportional to the body mass and the square of its length" (Al-Bayati, 2012). The force is transferred from the lower part of the body to the upper part of it, (Mahmood & Kadhim, 2023)with this force increasing in the trunk, so that this increasing force is in turn transferred to the arms and then directed to the paddle to increase the speed as a result. The same is the case with regard to the chest circumference, as the chest circumference is directly proportional to the size of the working pectoral muscles, (Kadhim, 2023)as the size of the pectoral muscles also produces energy that helps the player exert less force to overcome resistance to a large extent. "This means that exerting force is always linked to the body mass of the player who performs the movement and the speed he obtains due to exerting that force" (Al-Fadhli, 2010). Within this concept, the size of the muscles of a body part produces greater force, so that we can thus save effort and gain strength and thus gain speed.

Table (4) shows the correlation values, the contribution ratio, the independent variable, the significance levels values (T) and (F), and the parameter value for the dependent variable, the level of digital achievement.

Significance	Degree of freedom2	Degree of freedom1	F value	Partial ratio	Standard error	Adjusted ratio	Contribution ratio	Correlation	Model
.000	8	1	177.990	.957	.32317	.952	.957	.978(a)	1
			Significance Level	T Value	Beta	Standard Error	Parameter Value		
			.000	21.054		6.098	128.378	Constant	
			.000	-13.341	-.978	.080	-1.065	Arm Length	
			.000	11.544	-.847	.066	-1.042	Leg Length	

Table (4) shows that arm length and leg length are the body measurements that contribute significantly to the digital level test. The value of the contribution ratio of this body measurement reached (0.957). Thus, (AbdulsalamWaheeb et al., 2024) the equation of the predictive regression line for the dependent variable of the digital level is:

Y = Th + M S

Since Y = the variable to be predicted (the dependent variable) and represents the digital level. And Th = the fixed amount

And M S = the coefficient of the contributing variable × the degrees of the independent variable Thus, the equation of the regression line is:

Y = 128.378 + (-1.065 × arm length).

Through this predictive equation, it becomes clear that arm length and leg length are the factors that contribute to the achievement. The player whose arm length is longer and whose leg length is longer can contribute or help him excel in the races.

As for the goal of predicting the digital achievement in terms of body measurements, it can be explained as follows, as shown in Table (4) previously presented, (ZidaneHmmood et al., 2024) as the table showed that there is a clear difference in comparison with the body measurements of each player individually, (NaseemJoudah, 2024) knowing that some physical variables of strength and speed were fixed, which are likely to affect the level of achievement. It appeared that the players whose body measurements were at the level of total height, arm length, leg length, (Hammood et al., 2024) and chest circumference were the closest to the digital achievement at the personal and continental levels, and this is what was shown in the championship. As for the players who were of average height and had some advantages in body measurements, including trunk length, forearm length, (Abdalah & SalehRadhiAmesh, 2024) and chest circumference, their positions were average, ranging between second and fourth place. This is what most scientists and experts concerned with rowing activity confirm on the necessity of exploiting the physical ranges of total body length, total arm length,(Mohsen et al., 2024) and total leg length, because the more the aforementioned lengths increase, the player's ability to row longer increases in terms of the rear range of motion and the length of the forward pull. As for the shorter players at all levels, their development will be limited according to Experts' opinion, no matter how much they develop in terms of physical abilities.(Aziz et al., 2023)

And through the prediction, it becomes clear that the players' physical measurements were a contributing factor in the player's performance for the digital achievement that must be available when selecting new players.(Easa et al., 2022)

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