A Comprehensive Analysis of the Body Composition and Dimensions of Competitive Swimmers in Pune City

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ABSTRACT

The body composition and size of state-level swimmers significantly affects their skill performance. This study aimed to comprehensively analyse the body composition and dimensions of competitive swimmers in Pune City. (n - 24) state-level competitive male swimmers between the ages of 16 and 21 were selected in the state-level competition held at Deccan Gymkhana (swimming pool) in Pune city. Competitive swimmers were selected from the total population using a non-probability purposive sampling technique. An analytical research method was used to develop a profile of body composition and size of state-level competitive swimmers. Body Composition - Height, Weight, BMI and Anthropometric measurements of Arm Length, Leg Length, Arm Circumference and Leg Circumference data were collected using standard tools and techniques. For data analysis, the mean, standard deviation, and independent sample t-test were used to compare the results of state-level competitive swimmers. The data were collected using standard tools and techniques, and further analysed using SPSS software. The Mean of the Weight, Height & BMI was (66.74 ± 175.01 ± 21.72). The Mean of the Right Arm Length & Left Arm Length was (59.54 ± 59.34) and the Mean of Right Leg Length & Left Leg Length was (92.66 ± 92.92). The Mean of the Right Arm Circumference & Left Arm Circumference was (27.80 ± 27.77) and the Mean of Right Leg Circumference & Left Leg Circumference was (50.87 ± 50.87). Further, the data for inferential statistics were compared between the anthropometric measurements of state-level swimmers using the independent sample t-test. The Calculated Independent sample t-test of correlation value was Right Arm Length & Left Arm Length (0.184), Right Leg Length & Left Leg Length (-0.179), Right Arm Circumference & Left Arm Circumference (0.022), and Right Leg Circumference & Left Leg Circumference (0.015). Hence, it can be concluded that there were no significant differences in the anthropometric measurements of

state-level swimmers from a Pune city.

Keywords : Competitive Swimmers, State level Competition, Body composition and size, Anthropometric Measurement

Introduction

The study of body measurements and proportions using anthropometry is important for the identification of young talents during swimming. (William G. Thorland, 1983) Swimming technique is controlled by many factors including age, sex, physical fitness, and years of training. Anthropometric variables such as hand and foot length, pelvis width, and trunk length and width were also associated with swimmer performance. (Putra et al. Rahayu T, 2020) Anthropometric characteristics are widely considered as important factors affecting sports performance. (Barbosa TM, 2010) Anthropometrics that matches the characteristics of a sport helps to master the movement techniques, shorten training time, and plan targeted exercise program to achieve peak performance. In swimming, arm length and girth, or the ratios (e.g. hand-length/forearm-length and forearm-girth/wrist-girth) were found to be significantly associated with breaststroke performance. (Sammoud S, 2018) The body composition and size of state-level competitive swimmers make a difference in their skill and techniques? Does the body composition and size of state-swimmers affect their performance? For this purpose, A Comprehensive Analysis of the Body Composition and Dimensions of Competitive Swimmers in Pune City was conducted. Anthropometric measurements are needed to understand the body composition and size of swimmers and thus study the variables of state-level swimmers' competitions. Develop a profile of body composition and size of state-level competitive swimmers.

METHOD

In this study, an analytical research method was used to develop a profile of body composition and size of competitive swimmers in a pune city. Sampling: Male swimmers between the ages of 16 and 21 for the state-level swimming competition in the year 2022-23 were selected using a purposive sampling technique. (n = 24) Data Collection Tools – 1) Body Composition – Weight, Height, BMI. 2) Anthropometric measurements - Arm Length, Leg Length, Arm Circumference, Leg Circumference.

RESULT

Data were analysed using descriptive and inferential statistics using SPSS software.

Descriptive Statistical Analysis

Mean, SD of State Level Swimmers were calculated under Descriptive Statistical Analysis as shown in below Weight, Height & BMI Test (n = 24) **Table 1.**

Tool	Mean	Std. Dev
Weight	66.74	10.37
Height	175.01	7.10
BMI	21.72	2.63

Descriptive Statistical Analysis

Mean, Std. Deviation, Std. The error of state-level swimmers was calculated using Descriptive Statistical Analysis, as shown in the Right- & Left-Arm Length Test (n = 24) **Table 2.**

Tool	Mean	Std. Dev	Std. Error
Right Arm Length	59.54	3.84	0.78
Left Arm Length	59.34	3.70	0.75

To compare the right- and left-arm lengths of state-level swimmers from Pune city. An independent sample t-test was used, as shown in **Table 3.**

Tool	t	df	Sig. (2-tailed)	Std. Error Diff	95% CI of the Difference	
					Lower	Upper
Right Arm Length	0.184	46	0.85	1.08	-1.99	2.39
Left Arm Length	0.184	45.9	0.85	1.08	-1.99	2.39

As shown in **Table 3**, the t-test revealed that a significant difference between the right- and left- arm lengths t (46) = 0.184 is not significant at $p < 0.01$.

Descriptive Statistical Analysis

Mean, Std. Deviation, Std. The error for state-level swimmers was calculated using Descriptive Statistical Analysis, as shown in the right and left leg length tests (n = 24) (Table 3).

Tool	Mean	Std. Dev	Std. Error
Right Leg Length	92.66	4.97	1.01
Left Leg Length	92.92	5.16	1.05

To compare the right- and left-leg lengths of state-level swimmers from Pune city. An independent sample t-test was used, as shown in **Table 4.**

Tool	t	df	Sig. (2-tailed)	Std. Error Diff	95% CI of the Difference	
					Lower	Upper
Right Leg Length	- 0.179	46	0.85	1.46	-3.20	2.68
Left Leg Length	- 0.179	45.9	0.85	1.46	-3.20	2.68

As shown in **Table 5**, the t-test revealed that a significant difference between the right- and left-leg length t (46) = - 0.179 is not significant at p< 0.01.

Descriptive Statistical Analysis

Mean, Std. Deviation, Std. The error of state-level swimmers was calculated using Descriptive Statistical Analysis, as shown in the right- and left-arm circumference tests (n = 24) **Table 6.**

Tool	Mean	Std. Dev	Std. Error
Right Arm Circumference	27.80	4.27	0.87
Left Arm Circumference	27.77	4.33	0.88

To compare the right- and left-arm circumferences of state-level swimmers from Pune city. An independent sample t-test was used, as shown in **Table 7**.

Tool	t	df	Sig. (2-tailed)	Std. Error Diff	95% CI of the Difference	
					Lower	Upper
Right Arm Circumference	0.022	46	0.983	1.24	-2.47	2.52
Left Arm Circumference	0.022	45.9	0.983	1.24	-2.47	2.52

As shown in Table 7, the t-test revealed that a significant difference between the right- and left-arm circumference t (46) = 0.022 is not significant at p< 0.01.

Descriptive Statistical Analysis

Mean, Std. Deviation, Std. The error of state-level swimmers was calculated using Descriptive Statistical Analysis, as shown in the right- and left-leg circumference tests (n = 24) **Table 8**.

Tool	Mean	Std. Dev	Std. Error
Right Leg Circumference	50.87	4.97	1.01
Left Leg Circumference	50.85	4.73	0.96

To compare the right- and left-leg circumferences of state-level swimmers from Pune city. An independent sample t-test was used, as shown in **Table 9**.

Test	t	df	Sig. (2-tailed)	Std. Error Diff	95% CI of the Difference	
					Lower	Upper
Right Hand Circumference	0.015	46	0.98	1.40	-2.80	2.84
Left Hand Circumference	0.015	45.8	0.98	1.40	-2.80	2.84

As shown in Table 9, the t-test revealed that a significant difference between the right- and left-leg circumferences t (46) = 0.015 is not significant at $p < 0.01$.

DISCUSSION

The primary purpose of this study was to conduct A Comprehensive Analysis of the Body Composition and Dimensions of Competitive Swimmers in Pune City Hence, it can be concluded that there were no significant differences in the anthropometric measurements of state-level swimmers from Pune City. i) Significant differences were found between the circumference measurements of the right and left arm and circumference of the right and left leg of competitive swimmers. ii) The circumference of the right leg and right arm of competitive swimmers was much larger than that of the left leg and left arm. iii) In the regular practice of competitive swimmers, the muscles on the right side of the body are used more than those on the left side of the body. iv) Competitive swimmers apply more force to the right side of their bodies to increase their speed through water.

CONCLUSION

The study's conclusion that there were no significant differences in anthropometric measurements among state-level swimmers from Pune city suggests a homogeneous physical profile within this specific group of athletes. This finding implies that at the state level of competition in Pune, swimmers may have similar body compositions, heights, weights, and other physical characteristics typically measured in anthropometric assessments.

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