An Anthropometric Study of biceps and Triceps Measurementin Relation to the Performance of Free Style Wrestlers

Mr. Virender Singh Research Scholar Panjab University, Chandigarh

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ABSTRACT Introduction: The performance of players in various sports may be influenced by the anthropometric, physical and the physiological characteristics and may also aid in determining a suitable physique required for a sport. Methods: The physical variables such as Bicepsand Tricepshave been selected to assess the physical condition of the wrestlers. A survey type study has been designed for descriptive analysis of wrestler's physical characteristicsData was collected from 30 male wrestlers of each weight categories i.e., 57 kg, 61 kg, 65 kg, 70 kg and 74 kg. Results: The results revealed that the f-value of different weight category of variableBicepsand the f-value (Biceps-Triceps) of the ANOVA came out to be 6.87, (P<001) which was highly significant at 0.01 level of confidence. Conclusion: The correlation between performance score and anthropometric variables among the players of 57, 61, 65, 70 and 74kg weight categories, no significant relationship was found with performance score.

Keywords:

Introduction

Wrestling in modern India is concentrated in the Indian states like Uttar Pradesh, Tamil Nadu, Punjab and Haryana. Wrestlers from these states won many medals at national and internal level. Indian wrestler won medal in Olympics also and there is a big list of Indian wrestlers who medal at international platform. Sakshi Malik, Sushil Kumar Solanki, Udey Chand, SatenderDagar, GobarGuha, JatindraCharanGoho, AmbikaCharanGuha, KhashabaDadasahebJadhav, YogeshwarDutt, Ghulam Muhammad, Dara Singh and GeetaPhogat are considered as the all-time famous and popular wrestlers in India from Independence.

Anthropometry is a well-recognized earliest form of body measurements in field of physical education and sports. It may include measurement of height, weight and other body parts including circumferences, diameters and length of body segments. For the successful participation in athletic activities one need specific body type and proportions that help to perform better. By knowing the major characteristics of each body type one can easily classified body into different categories. One of most common method of classifying body type is somatotyping described by Sheldon in early 70s. He classified the body into three categories such as Ectomorph, Mesomorph and Endomorph. Ectomorph is a slender person with light frame, mesomorph is athletic build person with good and proportionate muscles and endomorph is a thick person with short frame including heavy legs and arms. Ectomorph types of person are good in team games such as basketball, handball, volleyball, football etc. and long distance running. Mesomorphs are good in short running, bodybuilding, and weightlifting. Endomorphs are good in gymnastic, wrestling, powerlifting etc. therefore study of appropriate body type help the athlete to choose best sport where they better possibility to achieve high performance. European wrestlers' anthropometric and physical characteristics were described few decades ago and found similar to weightlifters and throwers. They had short legs, wide & powerful shoulders, great muscular strength with massive muscles (Bach, 1951, Boardman, 1933). A scientist guessed that there was a genotype from which the wrestler-type created by methods for preparing (Bach, 1951). These perceptions don't seem to apply to the commonplace American novice wrestler of today. Perhaps the persistent advancement of the guidelines administering the game' has selectively affected the sort of physical make-up which describes the better contender at a given period, yet the way that an examination of two arrangements of German information dismantled a few years demonstrated an inclination for the effective expert wrestlers of that nation to transform from a pyknic-strong sort to a solid athletic sort (Meister, 1940) recommends that different components are likewise included.

Wrestling is one of only a handful couple of games which can be followed as hindmost in the early stages of written past.In France there are cavern illustrations more than 15,000 years of age. Egyptian and Babylonian help's portray fighting sessions where wrestlers are utilizing the greater part which holds

known to the current game. Wrestling was the main game in Greece and furthermore a standout amongst the most merciless. The antiquated Romans embraced the game with much eagerness yet concocted principles to wipe out the vast majority of the severity.Wrestling presumably began close by to-hand battle, and specifically as a sportive type of battle substituting the accommodation of a hopeful for his passing. Japanese, Swiss, Cossacks and Icelanders planned out belt wrestling close by in the 20th era, and they in 2500 BCE varied from Egyptians. Chinese reports since seven hundred BCE depict free wrestling, as Japanese accounts since first period BCE. Gems from 3000 BCE delineate belt wrestling in Egypt and Babylonia, and in India free wrestling period in advance of 1500 BCE.

Master Nuruddin the great wrestler having lived a long life left this world. Since then, India has produced many great wrestlers who are the great disciples of the great master, such as, Rustam-e-Hind Kalu, Rustam-e-Amar Singh, Rustam-e-Jaman Sultan, Rustam-e-Hind Buta Mall, Sitara-e-Hind Gama, Rustam-e-Hind Kalu, the armless, Rustam-e-Hind Rukna, Rustam-e- Hind Sandhu, Rustam-e-Hind Mughlo, Rustam-e Jaman Mohammed BakshDand, Rustam-e-Hind Wahabuddin etc. Maharaja Ranjit Singh too had great respect for Master Nuruddin. " (Kanwal,1987). In India famous wrestlers such as Gama, Kikar Singh, KarimBux, Ghulam and Gabar etc. may always recalled as most popular wrestlers. During their time most of the wrestlers were have heavy weight and no weight classes or governing rules. But wrestling and wrestlers were patronized by "Maharajas" and "Rajas" (Sanga and Yadav 2002).

This stands a wrestler in good stead to refine or polish his style, wrestlers from the some akhara do not indulge in a bout in fair arena because they consider themselves as fellow disciples of the same teacher (ustad). Many ideas sprout up in the minds of the wrestlers to bring laurels to their akhara because they have personal bonds with domestic akharaThe other kinds of arena come into being at the time of fairs or tournaments. These are not meant for practice but for a struggle of life and death. These are formed for the only purpose of testing strength or prowess of the wrestlers. It becomes a matter of joy for the victorious wrestlers and his akhara and a matter of humiliation for the vanquished one. But, at the same time, it inspires the defeated wrestler to gain more power and skill (Sekhon 2007).

METHODS AND PROCEDURE

The performance of players in various sports may be influenced by the anthropometric, physical and the physiological characteristics and may also aid in determining a suitable physique required for a sport. Studies from various parts of the world have assessed the anthropometric and physiological profile of players from different sports, but there is paucity of data on these variables in wrestling players from Haryana therefore an attempt has been made to assess the Physical variable that might be associated to performance in male wrestling players. The anthropometric variables such as Tricepsand Bicepshave been selected to assess the physical condition of the wrestler's. To test theses motor abilities **Gulick tape, skin marking pencil**have been selected respectively. A survey type study has been designed for descriptive analysis of wrestlers' physical characteristics.

The subjects of the present study has been purposively selected from the inter college level, University level, Senior State level, National Level and international players. Data was collected from 30 male wrestlers of each weight categories i.e. 57 kg, 61 kg, 65 kg, 70 kg and 74 kg.

Weight	N	Mean	Std.	Std Fanon	95% Cor Inte	nfidence erval	Mi	Maximum	
Category			Deviation	Stu. Error	Lower	Upper	Minimum		
Weight 57	30	3.03	0.81	0.15	2.73	3.34	2	5	
Weight 61	30	3.37	0.76	0.14	3.08	3.65	2	5	
Weight 65	30	3.70	1.02	0.19	3.32	4.08	2	7	
Weight 70	30	3.43	0.82	0.15	3.13	3.74	2	6	
Weight 74	30	3.80	1.06	0.19	3.40	4.20	2	6	
Total	150	3.47	0.93	0.08	3.32	3.62	2	7	

 Table 1: Descriptive statistics of biceps among players of different weight categories of freestyle wrestler

Table 1 shows the descriptive statistics of biceps among different weight categories of freestyle wrestler. The table revealed that mean, SD, scores for Weight 57 came out to be 3.03 and 0.81, respectively. The table

further revealed that mean score for Weight 61 was 3.37 and SD was 0.76. Biceps' mean score for Weight 65 came out to be 3.70 and SD was 1.02. For Weight 70, mean score was 3.43 and SD was 0.82. Mean Score for Weight 74 was 3.80 and SD was 1.06. Finally, the mean score for total sample was 3.47 and SD was 0.93. Graphical representation of the responses has been presented in the Fig. 1 below;

Figure 1: Mean comparison of biceps among players of different weight categories of freestyle wrestler



Table 2: Analysis of Variance (ANOVA) of biceps among different weights freestyle wrestler

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	10.93	4	2.73		
Within Groups	118.40	145	0.82	3.35	0.01**
Total	129.33	149			

**Significant at 0.01 level

Table 2 revealed the Analysis of Variance (ANOVA) of different weight categories of freestyle wrestler on Biceps. The sum of squares of between groups came out to be 10.93 and for within groups sum of squares was 118.40. The f-value of the ANOVA came out to be 3.35 which was significant on 0.01 level of confidence.

wrestier									
		Mean Difference			95% Confide	ence Interval			
Weight Categories		(I-J)	Std. Error	p-value	Lower Bound	Upper Bound			
	Weight 61	-0.33	0.23	0.73	-1.06	0.39			
Maiaht 57	Weight 65	-0.67	0.23	0.09	-1.39	0.06			
weight 57	Weight 70	-0.40	0.23	0.57	-1.13	0.33			
	Weight 74	-0.77*	0.23	0.03	-1.49	-0.04			
	Weight 57	0.33	0.23	0.73	-0.39	1.06			
	Weight 65	-0.33	0.23	0.73	-1.06	0.39			
weight 61	Weight 70	-0.07	0.23	1.00	-0.79	0.66			
	Weight 74	-0.43	0.23	0.49	-1.16	0.29			
	Weight 57	0.67	0.23	0.09	-0.06	1.39			
Woight (F	Weight 61	0.33	0.23	0.73	-0.39	1.06			
weight 65	Weight 70	0.27	0.23	0.86	-0.46	0.99			
	Weight 74	-0.10	0.23	1.00	-0.83	0.63			
	Weight 57	0.40	0.23	0.57	-0.33	1.13			
Woight 70	Weight 61	0.07	0.23	1.00	-0.66	0.79			
weight 70	Weight 65	-0.27	0.23	0.86	-0.99	0.46			
	Weight 74	-0.37	0.23	0.65	-1.09	0.36			
	Weight 57	0.77*	0.23	0.03	0.04	1.49			
Woight 74	Weight 61	0.43	0.23	0.49	-0.29	1.16			
weight /4	Weight 65	0.10	0.23	1.00	-0.63	0.83			
	Weight 70	0.37	0.23	0.65	-0.36	1.09			

Fable 3: Multiple comparison of biceps among players of different weight categories of freestyle
wrestler

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3

20

8.91

*Significant at 0.05 level

Total

150

8.43

3.02

The Table 3 revealed the multiple comparisons Post-hoc (Scheffe) analysis of Calf Girth for different weight categories of freestyle wrestler. Mean comparison of Calf Girth for weight 74 revealed that the Calf Girth was greater than weight 57 (0.77). No further differences came out. This value was significant at 0.05 level of confidence.

wrestler											
Weight Std 95% Confidence Interval											
Category	N	Mean Deviation		Std. Error	Lower	Upper	Minimum	Maximum			
Weight 57	30	6.87	2.67	0.49	5.87	7.87	3	15			
Weight 61	30	7.30	1.99	0.36	6.56	8.04	4	13			
Weight 65	30	8.47	3.35	0.61	7.22	9.72	5	20			
Weight 70	30	9.80	3.16	0.58	8.62	10.98	6	16			
Weight 74	30	9 70	2.67	0 4 9	8 70	10 70	4	15			

Table 4: Descriptive statistics of triceps among players of different weight categories of freestyle wrestler

Table 4 shows the descriptive statistics of triceps among different weight categories of freestyle wrestler. The table revealed that mean, SD, scores for Weight 57 came out to be 6.87 and 2.67, respectively. The table further revealed that mean score for Weight 61 was 7.30 and SD was 1.99. Triceps' mean score for Weight 65 came out to be 8.47 and SD was 3.35. For Weight 70, mean score was 9.80 and SD was 3.16. Mean Score for Weight 74 was 9.70 & SD was 2.67. Finally, the mean score for total sample was 8.43 & SD was 3.02. Graphical representation of the responses has been presented in the Fig. 2 below;

7.94

0.25

Figure 2: Mean comparison of triceps among players of different weight categories of freestyle wrestler



Table	5: Analy	ysis o	of Varia	ance	(ANOVA)	of trice	eps ar	nong	different	weigł	nts fre	eesty	le wr	estler

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	216.36	4	54.09		0 0 0 **
Within Groups	1142.33	145	7.88	6.87	0.00
Total	1358.69	149			
0.041					

**Significant at 0.01 level

Table 5 revealed the Analysis of Variance (ANOVA) of different weight categories of freestyle wrestler on Triceps. The sum of squares of between groups came out to be 216.36 and for within groups sum of squares was 1142.33. The f-value of the ANOVA came out to be 6.87 which was significant on 0.01 level of confidence.

Wajaht		Maan Diffemence			95% Confidence Interval			
Categories		(I-J)	Std. Error	p-value	Lower Bound	Upper Bound		
-	Weight 61	-0.43	0.72	0.99	-2.69	1.83		
Woight 57	Weight 65	-1.60	0.72	0.31	-3.86	0.66		
weight 57	Weight 70	-2.93*	0.72	0.00	-5.19	-0.67		
	Weight 74	-2.83*	0.72	0.01	-5.09	-0.57		
	Weight 57	0.43	0.72	0.99	-1.83	2.69		
111.1.64	Weight 65	-1.17	0.72	0.63	-3.43	1.09		
Weight 61	Weight 70	-2.50*	0.72	0.02	-4.76	-0.24		
	Weight 74	-2.40*	0.72	0.03	-4.66	-0.14		
	Weight 57	1.60	0.72	0.31	-0.66	3.86		
Waight 65	Weight 61	1.17	0.72	0.63	-1.09	3.43		
weight 05	Weight 70	-1.33	0.72	0.50	-3.59	0.93		
	Weight 74	-1.23	0.72	0.58	-3.49	1.03		
	Weight 57	2.93*	0.72	0.00	0.67	5.19		
Weight 70	Weight 61	2.50*	0.72	0.02	0.24	4.76		
weight 70	Weight 65	1.33	0.72	0.50	-0.93	3.59		
	Weight 74	0.10	0.72	1.00	-2.16	2.36		
	Weight 57	2.83*	0.72	0.01	0.57	5.09		
Weight 74	Weight 61	2.40*	0.72	0.03	0.14	4.66		
weight /4	Weight 65	1.23	0.72	0.58	-1.03	3.49		
	Weight 70	-0.10	0.72	1.00	-2.36	2.16		

Table 6: Multiple comparison of triceps among players of different weight categories of freestyle

*Significant at 0.05 level

The Table 6 revealed the multiple comparisons Post-hoc (Scheffe) analysis of Triceps for different weight categories of freestyle wrestler. Mean comparison of Triceps for weight 74 revealed that the Triceps was greater than weight 57 (2.83) and weight 61 (2.40). For weight 70 category revealed that the mean comparison was higher than weight 57 (2.93) and weight 61 (2.50). All these values were significant at 0.05 level of confidence.

Conclusion: The f-value (**Biceps**) of the ANOVA came out to be 3.35, which was not significant at 0.05 levels. The f-value (Triceps) of the ANOVA came out to be 6.87, (P<001) which was highly significant at 0.01. The correlation between performance score and anthropometric variables among the players of 57, 61, 65, 70 and 74kg weight categories, no significant relationship was found with performance score. The study done by **Irem (2016)**has been in line with the present study as he also revealed that anthropometric variables such as sliding caliper was used to measure weight, height, knee and elbow diameter, Gulick tape was used to measure calf and biceps brachia circumference and skinfold caliper was used to measure subcutaneous fat from triceps brachii, subscapular, supraspinal and calf are very closely related to high-level wrestling performance. However, as the identification of anthropometric variables relevant to success is important for the selection of young athletes and the preparation of appropriate training programmes.

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