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A Study of Arm Girth Relaxed and Arm Girth Flexed in Relation to the Performance of Free Style Wrestlers

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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 Arm Girth Relaxed and Arm Girth Flexed have been selected to assess the physical condition of the wrestlers. A survey type study has been designed for descriptive analysis of wrestler's physical characteristics Data 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 variable Arm Girth Relaxed and the f-value (Arm Girth Relaxed- Arm Girth flexed) of the ANOVA came out to be 28.37, (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.

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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, Satender Dagar, Gobar Guha, Jatindra Charan Goho, Ambika Charan Guha, Khashaba Dadasaheb Jadhav, Yogeshwar Dutt, Ghulam Muhammad, Dara Singh and Geeta Phogat 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.

Wlodzimierz and Andrzej (2017) directed the investigation to investigate the determination and planning of wrestlers. This investigation was directed with the accompanying purposes:

a. condense the output gathered in the criteria of choice of possibility for wrestling.

b. introduction of the consequences of an educational test went for deciding the objectivity of tests in the determination of possibility for wrestling.

c. demonstration of possess set of hopeful determination tests for wrestling. Finding of this study stated that a. The presence of an enormous number of recommendations from different writers was found but none of them was checked for their consistency.

d. A yearly educational examination was held on 121 subjects, including 96 wrestlers and 25 youngsters and utilizing 13 anthropometric dimensions and 7 fitness tests. Those wrestlers qualified for further preparing accomplished higher scores in all tests utilized. In light of the outcomes attained, a lot of fitness tests for the choice of subjects for wrestling were proposed.

e. In light of the 21-year long research under taken on wrestlers of the Polish national team in classic and freestyle wrestling, a set of twenty two tools having high consistency of the most significant movement abilities important to accomplish high games results was created. T scoring test was created to combine the outcomes of various units and for the evaluation of performance of wrestlers.

f. The proposed set incorporates tests to assess uniformly the degree of fitness required to be effective in all weight divisions of wrestlers. Contemporary high prerequisites in this control with respect to the coordination capacities required and their right association to physical capacities were considered.

g. The table records seven sets of trial of execution for the assessment of possibility for wrestling, including three claims, which aggregate up the elaborations by outside and Polish writers.

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 physical variables such as Arm Girth Flexed and Arm Girth Relaxed have 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.

Table 1: Descriptive statistics of Arm Girth Relaxed among players of different weight categories of freestyle wrestler

Weight Category	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval		Minimum	Maximum
					Lower	Upper		
Weight 57	30	11.91	0.58	0.11	11.69	12.13	11	13
Weight 61	30	12.33	0.60	0.11	12.11	12.55	11	14
Weight 65	30	12.64	0.73	0.13	12.37	12.91	11	14
Weight 70	30	12.91	0.46	0.08	12.74	13.08	12	14
Weight 74	30	13.26	0.56	0.10	13.05	13.47	12	14
Total	150	12.61	0.74	0.06	12.49	12.73	11	14

Table 1 shows the descriptive statistics of Arm Girth Relaxed among different weight categories of freestyle wrestler. The table revealed that mean, SD, scores for Weight 57 came out to be 11.91 and 0.58, respectively. The table further revealed that mean score for Weight 61 was 12.33 and SD was 0.60. Arm Girth Relaxed mean score for Weight 65 came out to be 12.64 and SD was 0.73. For Weight 70, mean score was 12.91 and SD was 0.46. Mean Score for Weight 74 was 13.26 and SD was 0.56. Finally, the mean score for total sample was 12.61 and SD was 0.74. The graphical representation of the responses has been presented in the Figure 4.2 below;

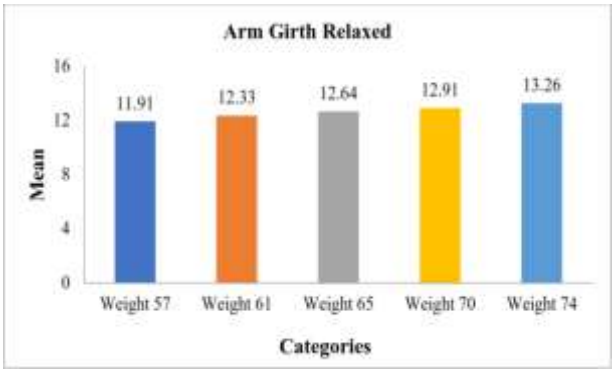

Figure 1: Mean comparison of Arm Girth Relaxed among players of different weight categories of freestyle wrestler

Table 2: Analysis of Variance (ANOVA) of Arm Girth Relaxed among players of different weight categories of freestyle wrestler

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	32.58	4	8.15	23.35	0.00**
Within Groups	50.51	145	0.35		
Total	83.16	149			

**Significant at 0.01 level

Table 2 revealed the Analysis of Variance (ANOVA) of different weight categories of freestyle wrestler on Arm Girth Relaxed. The sum of squares of between groups came out to be 32.58 and for within groups sum of squares was 50.51. The f-value of the ANOVA came out to be 23.35 which was significant on 0.01 level of confidence.

Table 3: Multiple comparison of Arm Girth Relaxed among players of different weight categories of freestyle wrestler

Weight Categories	Weightage	Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Weight 57	Weight 61	-0.42	0.15	0.11	-0.90	0.06
	Weight 65	-0.73*	0.15	0.00	-1.21	-0.25
	Weight 70	-1.00*	0.15	0.00	-1.48	-0.52
	Weight 74	-1.35*	0.15	0.00	-1.83	-0.88
Weight 61	Weight 57	0.42	0.15	0.11	-0.06	0.90
	Weight 65	-0.31	0.15	0.39	-0.79	0.17
	Weight 70	-0.58*	0.15	0.01	-1.06	-0.10
	Weight 74	-0.93*	0.15	0.00	-1.41	-0.46
Weight 65	Weight 57	0.73*	0.15	0.00	0.25	1.21
	Weight 61	0.31	0.15	0.39	-0.17	0.79
	Weight 70	-0.27	0.15	0.54	-0.74	0.21
	Weight 74	-0.62*	0.15	0.00	-1.10	-0.15
Weight 70	Weight 57	1.00*	0.15	0.00	0.52	1.48
	Weight 61	0.58*	0.15	0.01	0.10	1.06
	Weight 65	0.27	0.15	0.54	-0.21	0.74
	Weight 74	-0.35	0.15	0.26	-0.83	0.12
Weight 74	Weight 57	1.35*	0.15	0.00	0.88	1.83
	Weight 61	0.93*	0.15	0.00	0.46	1.41
	Weight 65	0.62*	0.15	0.00	0.15	1.10
	Weight 70	0.35	0.15	0.26	-0.12	0.83

*Significant at 0.05 level

The table 3 revealed the multiple comparisons Post-hoc (Scheffe) analysis of Arm Girth Relaxed for different weight categories of freestyle wrestler. Mean comparison of Arm Girth Relaxed for weight 74 revealed that the Arm Girth Relaxed was higher than weight 57 (1.35), weight 61 (0.93) and weight 65 (0.62). For weight 70 category revealed that the mean comparison was higher than weight 57 (1.00) and weight 61 (0.58). Finally for weight 65, mean comparison was higher than weight 57 (0.73). All these values were significant at 0.05 level of confidence.

Table 4: Descriptive statistics of Arm Girth Flexed among players of different weight categories of freestyle wrestler

Weight Category	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval		Minimum	Maximum
					Lower	Upper		
Weight 57	30	12.67	0.55	0.10	12.46	12.88	12	14
Weight 61	30	13.06	0.77	0.14	12.77	13.35	11	14
Weight 65	30	13.57	0.66	0.12	13.33	13.82	12	15
Weight 70	30	13.89	0.54	0.10	13.69	14.09	13	15
Weight 74	30	14.15	0.56	0.10	13.95	14.36	13	16
Total	150	13.47	0.82	0.07	13.34	13.60	11	16

Table 4 shows the descriptive statistics of Arm Girth Flexed among different weight categories of freestyle wrestler. The table revealed that mean, SD, scores for Weight 57 came out to be 12.67 and 0.55, respectively. The table further revealed that mean score for Weight 61 was 13.06 and SD was 0.77. Arm Girth Flexed mean score for Weight 65 came out to be 13.57 and SD was 0.66. For Weight 70, mean score was 13.89 and SD was 0.54. Mean Score for Weight 74 was 14.15 and SD was 0.56. Finally, the mean score for total sample was 13.47 and SD was 0.82. The graphical representation of the responses has been presented in the Figure 2 below;

Figure 2: Mean comparison of Arm Girth Flexed among players of different weight categories of freestyle wrestler

Table 5: Analysis of Variance (ANOVA) of Arm Girth Flexed among different weight categories of freestyle wrestler

Source of Variance	Sum of Squares	df	Mean Square	F-value	p-value
Between Groups	43.95	4	10.99	28.37	0.00**
Within Groups	56.15	145	0.39		
Total	100.10	149			

Table 5 revealed the Analysis of Variance (ANOVA) of different weight categories of freestyle wrestler on Arm Girth Flexed. The sum of squares of between groups came out to be 43.95 and for within groups sum of squares was 56.15. The f-value of the ANOVA came out to be 28.37 which was significant on 0.01 level of confidence.

Table 6: Multiple comparison of Arm Girth Flexed among players of different weight categories of freestyle wrestler

Weight Categories	Weightage	Mean Difference (I-J)	Std. Error	p-value	95% Confidence Interval	
					Lower Bound	Upper Bound
Weight 57	Weight 61	-0.39	0.16	0.21	-0.89	0.11
	Weight 65	-0.90*	0.16	0.00	-1.40	-0.40
	Weight 70	-1.22*	0.16	0.00	-1.72	-0.72
	Weight 74	-1.48*	0.16	0.00	-1.98	-0.98
Weight 61	Weight 57	0.39	0.16	0.21	-0.11	0.89
	Weight 65	-0.51*	0.16	0.04	-1.01	-0.01
	Weight 70	-0.83*	0.16	0.00	-1.33	-0.33
	Weight 74	-1.09*	0.16	0.00	-1.59	-0.59
Weight 65	Weight 57	0.90*	0.16	0.00	0.40	1.40
	Weight 61	0.51*	0.16	0.04	0.01	1.01
	Weight 70	-0.32	0.16	0.41	-0.82	0.18
	Weight 74	-0.58*	0.16	0.01	-1.08	-0.08
Weight 70	Weight 57	1.22*	0.16	0.00	0.72	1.72
	Weight 61	0.83*	0.16	0.00	0.33	1.33
	Weight 65	0.32	0.16	0.41	-0.18	0.82
	Weight 74	-0.26	0.16	0.62	-0.76	0.24
Weight 74	Weight 57	1.48*	0.16	0.00	0.98	1.98
	Weight 61	1.09*	0.16	0.00	0.59	1.59
	Weight 65	0.58*	0.16	0.01	0.08	1.08
	Weight 70	0.26	0.16	0.62	-0.24	0.76

*Significant at 0.05 level

The Table 6 revealed the multiple comparisons Post-hoc (Scheffe) analysis of Arm Girth Flexed for different weight categories of freestyle wrestler. Mean comparison of Arm Girth Flexed for weight 74 revealed that the Arm Girth Flexed was higher than weight 57 (1.48), weight 61 (1.09) and weight 65 (0.58). For weight 70 category revealed that the mean comparison was higher than weight 57 (1.22) and weight 61 (0.83). Finally for weight 65, mean comparison was higher than weight 57 (0.90) and weight 61 (0.51). All these values were significant at 0.05 level of confidence.

CONCLUSION:

The f-value (**Arm Girth Relaxed**) of the ANOVA came out to be 23.35, which was not significant at 0.05 levels. The f-value (Arm Girth Flexed) of the ANOVA came out to be 28.37, (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 anthropomteric variables such as sliding caliper was used to measure weight, height, knee and elbow diameter, Gulick tape was used to measure calf and biceps brachi circumference and skinfold caliper was used to measure subcutaneous fat from triceps brachii, subscapular, supraspinale and calf are very closely related to high-level wrestling performance. However, as the identification of anthrompometric variables relevant to success is important for the selection of young athletes and the preparation of appropriate training programmes.

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