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A study on Pearson product moment correlation of anthropometric measurements and motor fitness components of pole vault players

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Abstract
The purpose of the study was to investigate the selected anthropometric measurements and the selected motor fitness components of pole vault players. Thirty four male pole vault players who took part in various Universities in Tamil Nadu were selected. To analyze the collected data, inter correlation matrix was employed. The finding revealed that there was no significant difference between pole vaulting performance and the selected variables include weight, waist girth, wrist girth, thigh girth, calf girth, ankle girth, foot length, coordination, leg strength.

Keywords: anthropometric measurements, motor components, pole vaulting performance

1. Introduction
Pole vaulting is vaulters at various skill levels to clear the bar, the generally accepted technical model can be broken down into several phases. They can be broken down into several phases. They are approach run, plant, take-off, swing up, extension, turn and fly-away (Mitchell, 2011) [3].
Measurements of body include height, weight, chest girth, waist girth, arm length, biceps girth, wrist girth, leg length, thigh girth, calf girth, ankle girth and foot length. There specific measurements of the segments reveal the relationship between anthropometry and performance.
Anthropometric measurements are used to determine the relationship between various body measurements such as height, weight, arm length, etc. and physical fitness tests (Silva *et al*. 2013) [5].
Motor fitness is one aspect of the multidimensional construct of physical fitness (Caspersen, 1985) [1]. It may be conceived as the capacity to perform one’s daily tasks without fatigue; motor fitness, also termed motor ability, refers to a person’s performance abilities as affected by the factors of speed, agility, explosive power, flexibility, muscular strength, coordination, arm strength and leg strength (Milanese *et al*. 2010) [2].

2. Materials and Methods
There would be significant relationship between selected anthropometric measurements (height, weight, chest girth, waist girth, arm length, biceps girth, wrist girth, leg length, thigh girth, calf girth, ankle girth and foot length) and motor fitness components (speed, agility, explosive power, flexibility, muscular strength, coordination, arm strength and leg strength) with respect to pole vaulting performance.
Thirty four male pole vault players who took part in various Universities such as Manonmaniam Sundaranar University, Tirunelveli, Annamalai University, Chidambaram, Bharathiar University, Tiruchi, Madurai Kamaraj University, Madurai and Madras University, Chennai in Tamil Nadu, India were selected. The age of the selected subjects ranged from 18 to 23 years.
Standardized tests were employed to measure the criterion and determinant variables. Stadiometer, weighing machine, measurement tape, sliding caliper, stopwatch, score sheet and a pen were used. The collected data were statistically analyzed by Pearson Product Moment Correlation.
To find out the relationship of the selected anthropometric measurements and the motor fitness of pole vault players, the level of significance was found at 0.05 level of confidence.

3. Results and Discussions
The Pearson Product Moment Correlation values between pole vaulting performance and the selected anthropometric measurements and also the inter-correlation matrix values between the criterion and the selected dependent variables have been presented in Table 1.
Table 2 shows that the coefficient of correlation values between pole vaulting performance and selected anthropometric measurements include height, weight, chest girth, waist girth, arm length, biceps girth, wrist girth, leg length, thigh girth, calf girth, ankle girth and foot length.
It reveals that the obtained correlation value between pole vaulting performance and height (0.461) was significant at 0.05 level of confidence. Since, the obtained “r” value was greater than the required “r” value of 0.33 with “df” of 1 and 32 at 0.05 level of confidence.
Table 3 shows that the coefficient of correlation values between pole vaulting performance and selected motor fitness components include speed, agility, explosive power, flexibility, muscular strength, coordination, arm strength and leg length.
It reveals that the obtained correlation value between pole vaulting performance and speed (0.738) was significant at 0.05 level of confidence. Since, the obtained “r” value was

greater than the required “r” value of 0.33 with “df” of 1 and 32 at 0.05 level of confidence.

The hypothesis was stated that there may be significant relationship between the selected anthropometric measurements and the selected motor fitness components with respect to the pole vaulting performance.

It was found that there was significant relationship between pole vaulting performance and the selected anthropometric measurements such as height, chest girth, arm length, biceps girth and leg length of the pole vaulters. Hence, the hypothesis was accepted and null hypothesis was rejected in this case.

However, there was no significant difference in weight, waist girth, wrist girth, thigh girth, calf girth, ankle girth and foot length of the pole vaulters. Hence, the hypothesis was rejected and null hypothesis was accepted in this case.

The result of the study also reveals that there was significant relationship between pole vaulting performance and the selected motor fitness components such as speed, agility, explosive power, flexibility, muscular strength and arm strength of the pole vaulters. Hence, the hypothesis was accepted and null hypothesis was rejected in this case.

Although, there was no significant difference in coordination and leg strength of the pole vaulters. Hence, the hypothesis was rejected and null hypothesis was accepted in this case.

Table 1: Inter-correlation Matrix

	C	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
C	1																				
1	.461	1																			
2	-.227	.398	1																		
3	.405	.420	.712	1																	
4	-.479	.635	.694	.608	1																
5	.413	.709	.117	.096	.412	1															
6	.356	.279	.828	.712	.530	.092	1														
7	-.225	.001	.701	.383	.416	.079	.689	1													
8	.341	.818	.448	.449	.556	.669	.374	.129	1												
9	-.524	.575	.672	.671	.674	.282	.598	.341	.571	1											
10	-.367	.406	.762	.566	.591	.050	.584	.475	.448	.636	1										
11	-.230	.656	.549	.638	.565	.430	.538	.278	.685	.609	.417	1									
12	-.152	.573	.509	.457	.457	.486	.411	.260	.587	.500	.383	.655	1								
13	.738	.340	.435	.426	.604	.151	.384	.266	.201	.388	.218	.365	.282	1							
14	.436	.038	.170	.023	.243	-.005	-.028	.061	-.116	-.031	-.075	.110	-.021	.604	1						
15	.628	-.288	-.270	-.140	-.506	-.164	-.087	.008	-.097	-.185	.007	-.242	-.151	-.679	-.821	1					
16	.513	-.148	-.096	-.083	-.210	.026	-.090	.105	-.086	-.156	.082	-.273	-.066	-.483	-.559	.657	1				
17	.247	-.123	-.335	-.255	-.393	-.105	-.284	-.228	-.123	-.146	-.072	-.323	-.110	-.663	-.620	.672	.691	1			
18	-.352	-.557	-.228	-.006	-.499	-.495	-.081	-.120	-.386	-.305	-.100	-.354	-.508	-.400	-.222	.406	.282	.251	1		
19	.574	-.199	.018	.091	-.252	-.161	.168	.213	-.061	-.057	-.062	.065	.099	-.404	-389	.493	.298	.356	.314	1	
20	-.239	.089	.626	.556	.287	.045	.722	.620	.154	.414	.461	.241	.307	.026	-.403	.296	.452	.112	.073	.267	1

C - Pole vault performance, 1 - Height, 2 - Weight, 3 - Chest girth, 4 - Waist girth, 5 - Arm length, 6 - Biceps girth, 7 - Wrist girth, 8 - Leg length, 9 - Thigh girth, 10 - Calf girth, 11 - Ankle girth, 12 - Foot length, 13 - Speed, 14 - Agility, 15 - Explosive power, 16 - Flexibility, 17 - Muscular strength, 18 - Coordination, 19 - Arm strength, 20 - Leg strength.

Table 2: Coefficient of Correlation Values between Pole Vaulting Performance and the Selected Anthropometric Measurements

Variables	**Obtained ‘r’ values**	**Required ‘r’ values**
Pole vaulting performance and Height	.461	0.33
Pole vaulting performance and Weight	-.227	0.33
Pole vaulting performance and Chest girth	.405	0.33
Pole vaulting performance and Waist girth	-.479	0.33
Pole vaulting performance and Arm length	.413	0.33
Pole vaulting performance and Biceps girth	.356	0.33
Pole vaulting performance and Wrist girth	-.225	0.33
Pole vaulting performance and Leg length	.341	0.33
Pole vaulting performance and Thigh girth	-.524	0.33
Pole vaulting performance and Calf girth	-.367	0.33
Pole vaulting performance and Angle girth	-.230	0.33
Pole vaulting performance and Foot length	-.152	0.33

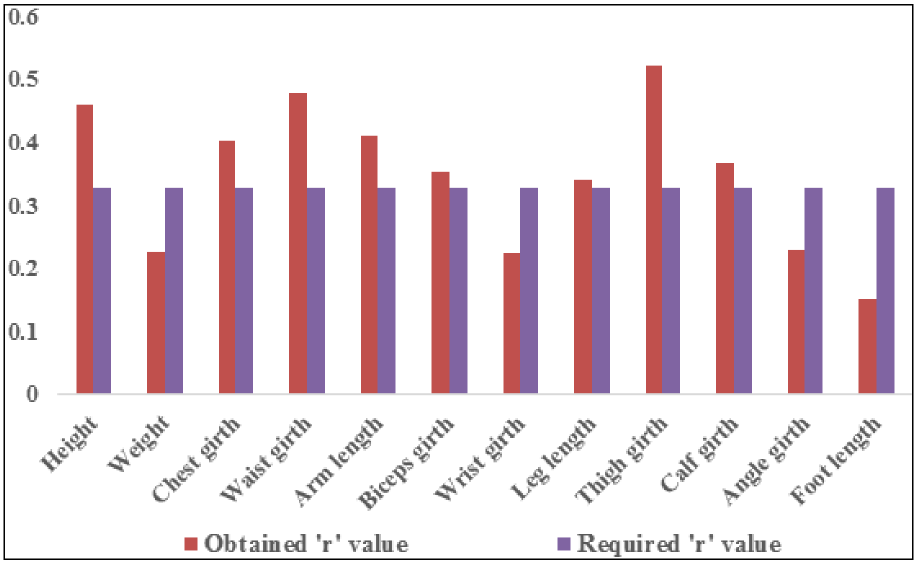

Fig 1: Graphical Representation of the Coefficient of Correlation Value between Pole Vaulting Performance and the Selected Anthropometric Measurements

Table 3: Coefficient of Correlation Values between Pole Vaulting Performance and the Selected Motor Fitness Components

Variables	Obtained 'r' values	Required 'r' values
Pole vaulting performance and Speed	.738	0.33
Pole vaulting performance and Agility	.436	0.33
Pole vaulting performance and Explosive power	.628	0.33
Pole vaulting performance and Flexibility	.513	0.33
Pole vaulting performance and Muscular strength	.247	0.33
Pole vaulting performance and Coordination	-.352	0.33
Pole vaulting performance and Arm strength	.574	0.33
Pole vaulting performance and Leg strength	-.239	0.33

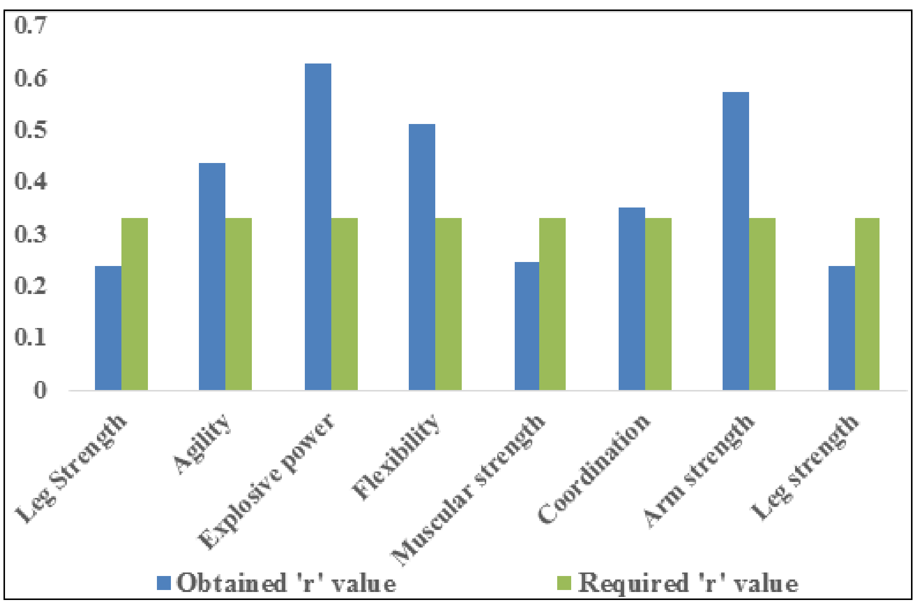

Fig 2: Graphical Representation of the Coefficient of Correlation Value between Pole Vaulting Performance and the selected Motor Fitness Components

4. Conclusions

It was concluded that there was significant relationship between the selected anthropometric measurements such as height, chest girth, arm length, biceps girth and leg length and the selected motor fitness components such as speed, agility, explosive power, flexibility, muscular strength and arm strength with respect to the pole vaulting performance of pole vaulters. The finding also revealed that there was no significant difference between pole vaulting performance and the selected variables such as weight, waist girth, wrist girth, thigh girth, calf girth, ankle girth, foot length, coordination, leg strength.

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