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A Study on Selected Physiological and Anthropometric Variables among All Indian Inter-University Men Power lifters at Active Competition State

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***Abstract*---**In this study, the researcher examined the selected physiological and anthropometric dimensions of twenty-four male power lifters participated and won positions at all India interuniversity power lifters championship. The data for the study were assessed on physiological and 6 anthropometric dimensions. To identify the present physiological and anthropometric state among the selected power lifters the data was collected right after their category competition ends. It was found that the anthropometric characteristics were more pronounced in heavyweights (above 90 kg) categories, who were found to be heavier, taller, more fat percentage, and had high blood pressure, and resting heart rate when compared to the lower category.

***Keywords*---**anthropometry, physiological, power lifter, weight class.

Introduction

In powerlifting, lifters compete in various divisions based on body weight, and gender to lift the greatest possible loads for one repetition (one-repetition maximum, 1-RM). Powerlifting competition includes 3 major events namely the squat, bench press, and deadlift exercises. The squat is performed with a loaded barbell on the shoulders and requires the lifter to flex knee joints and the hip until the superior surface of the thigh at the hip joint is lower than the knee joint. From this position, the knee and hip joints are extended so that the lifter is again standing upright (Marchocka & Smuk, 1984). The bench press is performed with

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the lifter lying supine on a flat bench and involves the barbell being lowered to the chest (where it is paused momentarily) and then pressed upwards so that the bar finishes above the shoulders. When performing the deadlift, the lifter is initially crouched over the barbell, and via knee and hip extension the bar is pulled (with straight arms) off the ground without bending elbows so that the lifter is standing upright with the bar resting across the upper thighs (Johnson et al., 1990; Mayhew et al., 1993).

The current IPF (International Powerlifting Federation) world records reveal that male powerlifters in the lighter bodyweight (body mass) classes can lift over five times their body mass in the squat and deadlift and over three times their body mass in the bench press. Although such impressive displays of strength may be multi-factorial, it has been proposed that powerlifters have specific anthropometric characteristics that are advantageous to the expression of maximal strength (Bale & Williams, 1987; Brechue & Abe, 2002; Mayhew et al., 1993). Specifically, powerlifters are generally of average to below average height, possess high body and fat-free mass per unit height, and have a large trunk and limb girths (Bale & Williams, 1987; Brechue & Abe, 2002; Fort et al., 1996; Johnson et al., 1990; Katch et al., 1980; Mayhew et al., 1993). A summary of the physiological and anthropometric characteristics of male powerlifters is presented in Tables1 and 2 respectively.

Method

24 male powerlifters participated in the All-Indian Inter-University Championship and won medals in their respective categories were selected for the study. The age of the subject ranged between 19 to 23 years. All the selected powerlifters were measured on physiological and anthropometric parameters (Chiari, et al., 2002). The selected physiological variables selected for the study were systolic blood pressure, diastolic blood pressure, and resting heart rate and selected anthropometric variables were height, weight, BMI, lean body mass, body density, and body fat (Lemon et al., 2009; Peter & Raza, 2019). All the participants willingly participated in the research work. Further, the data were divided into 4 groups based on participants into 5 categories namely PLM1 including the winners of 56 and 60 kg category, PLM2 including the winners of 67.5 and 75 kg category, PLM3 including the winners of 82 and 90 kg category, and PLM4 including the winners of 100 and 110 kg category respectively. After the data was collected descriptive statistics were applied (Vargas & Winter, 2021; Staron et al., 1981).

Discussion

Based on the data collection, the result for the study is presented in the tables below, the powerlifters were divided into four groups based on their weight category are as follows:

- Powerlifter men 56 and 60kg category = PLM1
- Powerlifter men 67.5 to 75kg category = PLM2
- Powerlifter men 82 and 90kg category = PLM3
- Powerlifter men 100 to 110kg category = PLM4

Table 1
Selected physiological variables among different male powerlifting categories

Group	PLM1 (56-60)	PLM2(67.5-75)	PLM3(82-90)	PLM4(100-110)
Systolic Blood Pressure	125.5	128.8	130.2	133.3
Diastolic Blood Pressure	78.6	76.5	81.8	86.2
Resting Heart Rate	17.2	19.2	20.5	21.8

Table 1 presents the mean score of systolic blood pressureamong different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be125.5, PLM2 was 128.8, PLM3 was 130.2 and PLM4 was 133.3 respectively. PLM4 (100-110) had the highest systolic blood pressure (Kanca et al., 2017). Also, table 1presents the mean score of diastolicblood pressureamong different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be78.6, PLM2 was 76.5, PLM3 was 81.8and PLM4 was 86.2 respectively.PLM2 (67.5-75) had the lowest diastolic blood pressure and table 1presents the mean score of resting heart rateamong different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be17.2, PLM2 was 19.2, PLM3 was 20.5 and MP4 was 21.8 respectively.PLM1 (56-60) had the lowest resting heart rate (Wiltbank et al., 2002; Niedermeyer, 1997).

Table 2
Selected Anthropometric Variables among Male Powerlifting Categories

Group	PLM1 (56-60)	PLM2(67.5-75)	PLM3(82.5-90)	PLM4(100-110)
Height	162.42	163.58	168.83	172.5
Weight	57.78	70.7	83.95	102.3
BMI	24.82	28.27	29.59	32.72
Body fat	04.67	07.52	06.25	20.39
Body density	0.93	01.08	01.22	01.07

Table 2 presents the mean score of standing heightamong different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be163.58cm, PLM3 was 168.83cm and PLM4 was 172.50cm respectively. The group PLM4 (100-110) was found to be taller than the remaining groups. Also, table 2presents the mean score of weight among different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be57.78kg, PLM2 was 70.7kg, PLM3 was 83.95kg and PLM4 was 102.3kg respectively. The group PLM4 (100-110) was found to be Heavier than the remaining groups and Table 2presents the mean score of body mass index (BMI) among different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be24.82 kg/m2, PLM2 was 28.27 kg/m2, PLM3 was 29.59 kg/m2 and PLM4 was 32.72 kg/m2 respectively. Only group PLM1 (56-60kg) was found to in a normal Body mass range (Klamklay et al., 2008; Faust et al., 2018).

Table 2 presents the mean score of body fat percentage among different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to be4.67%, MP2 was 7.52%, MP3 was 6.25% and MP4 was 20.39% respectively. The group MP4 (100-110) was found to be fatter than the remaining groups and Table 2 also

presents the mean score of bone density among different powerlifting groups (PLM1, PLM2, PLM3, and PLM4) which was found to befor the MP1 group was 0.93gm/cc, MP2 was 1.09 gm/cc, MP3 was 1.22 gm/cc and PLM4 was 1.07 gm/cc respectively. The group PLM3 (82.5-90) was found to be more body density than the remaining groups (Jones & Rioux, 1997; Gouvali & Boudolos, 2006).

Conclusion

Based on results and discussion it was clear that the powerlifter from 90kg, 95kg, 100kg, and 110kg category is superior to the lower category in terms of selected physiological and anthropometrical variables like systolic blood pressure, diastolic blood pressure, resting heart rate, height, weight, BMI, body fat percentage and body density (Keogh et al., 2007). Based on the finding we can say that the above factors (physiological and anthropometrical) contribute to the powerlifter's heavy weightlifting capabilities, when compared to light and middleweight categories powerlifters (Brechue & Abe, 2002).

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