



Comparative analysis of body resting metabolic rate, lean %, water % in sports and non-sports women of Kurukshetra university

Krishan Kumar¹, Usha Sharma²

¹ Ph.D., Research Scholar, Department of Physical Education, Kurukshetra University, Kurukshetra, Haryana, India

² Vocational teacher of Physical Education, Govt. Senior, Sec., School, Baldev Nagar, Ambala, Haryana, India

Abstract

The purpose of the study was to analyze the body Resting Metabolic Rate (RMR), lean percentage (LEAN %), water percentage (WATER %) in university sports women and non-sports women. Data was collected from 100 women (50-sports women & 50-non-sports women) of Kurukshetra University and ages of the subjects were from 18-25 years. Body composition parameters were assessed using "Maltron Model BF-907" body composition analyzer made by U.K. The result of the study revealed that level of Resting Metabolic Rate (RMR Kcal) present in the sports women ($M - 1392.04 \pm 87.92$) and Non-sports women ($M - 128.26 \pm 60.51$) differ significantly at $P < 0.01$ (t value - 7.41). Similarly, a significant difference was found in the lean percentage (LEAN %) present in the sports women ($M - 76.8 \pm 3.29$) and non-sports women ($M - 67.9 \pm 4.51$) at $P < 0.01$ (t - 14.13). Similarly, a significant difference was found in Water Percentage (WATER %) present in the sports women ($M - 55.69 \pm 4.51$) and non-sports women ($M - 49.67 \pm 3.31$) at $P < 0.01$ (t value 7.62). Conclusion: A significant difference was found in the Resting Metabolic Rate (RMR Kcal), Lean percentage (LEAN %) and water percentage (WATER %).

Keywords: resting metabolic rate, lean percentage, water percentage

Introduction

A low resting metabolic rate (RMR) for a given body size and composition is partly genetically determined and has been suggested to be a risk factor for weight gain. According to the World Health Organization, obesity and its complications are the leading health threat globally (Obesity-preventing and managing the global epidemic Report of WHO, 1998) In the United States, obesity and its major complications (e.g., diabetes, ischemic heart disease, stroke, certain cancers, and disability) may account for $\approx 7\%$ of all health care costs (Wolf AM, Colditz GA, 1994)^[3]. Obesity seems to be caused mainly by a combination of a genetic predisposition and a lifestyle characterized by physical inactivity and excessive intake of energy-dense, high-fat foods (preventing and managing the global epidemic Report of WHO 1998). Resting metabolic rate (RMR) is the component of energy expenditure that explains the largest proportion of total daily energy needs in individuals, but the contribution of a low RMR to the etiology of obesity is controversial. Several studies have shown that RMR has a strong genetic component and a prospective study in Pima Indians showed that the RMR for a given body composition, i.e., RMR adjusted for fat-free mass (FFM) and fat mass (FM), is a predictor of subsequent weight change (Ravussin E, Lillioja S, Knowler WC, *et al.* 1988)^[6]. The Asia Pacific Cohort Studies Collaboration reports prevalence rates ranging from less than 1% to higher than 20% for countries in the Asia-Pacific region (Asia Pacific Cohort Studies Collaboration, 2007). According to National Health and Nutrition Examination Survey of the United States, the prevalence of obesity in individuals aged 20-74 years was

34% in females and 31.7% in males (Ogden C L, Yanovski S Z, Carroll M D, Flegal K M. The epidemiology of obesity 2007).

Methodology

The participants in this study were 100 women aged 18-25 years divided into two groups. First group consists of 50 sports women who had at least represented Kurukshetra University in any discipline of sport/game. Second group was of non-sports women who had never ever participated in any competitive sports and pursuing their masters' degree from Kurukshetra University. The selected variables for the study were Resting Metabolic Rate (RMR Kcal), Lean Percentage (LEAN %), Water Percentage (WATER %).

These variables were measured with "Maltron Model BF-907" body composition analyser (U.K.). Height was measured with standard stedio- meter. The measurement was taken with the individual standing straight against the bar of stedio- meter, touching it with heels, buttocks and back.

Body weight was measured of electrical weighing machine. Bioelectrical impedance analysis (BIA) method was used to find out the data of the selected variables. It is a method of measuring body fat % by sending a low level safe electrical current through the body. The current travels at a different rate through the various body tissues, which then allows a calculation of fat mass and fat free mass. The current passes easily through muscle tissues which contain a large amount of fluid, but it travels slowly as it passes through fat tissue. The resistance encountered as current hits the fat tissue is called.

Bioelectrical impedance.

Electrode placement

The subjects were asked to lie flat on your back completely relaxed. Legs and hands should not be bent on crossed. Place your hands, palms flat on the side away your body, legs flat and apart. The surface should not be conductive. There should no contact between the thighs, arms and trunk. Then place the ME 4000 electrode pad on the third knuckle of the middle finger. The second electrode pad on the crease of the wrist. It

is also put on the foot and should be applied centrally directly where the second and third toe meet the foot. Place the second electrode pad at the crease of the ankle in line with shin bone.

Statistical analysis

Descriptive statistics mean & standard deviation and independent t-test was applied to analyse of body composition of sports and non-sports women. The level of significance was set at 0.01($p < 0.01$)

Results

Table 1: Comparative status of RMR Kcal in the sports and non-sports women.

Sr.No.	Category	Mean	S.D.	Mean difference	S.E.D.	t- value
1.	Sports women	1392.04	87.92	111.8	15.09	7.41**(0.01)
2.	Non-sports women	1280.26	60.51			

** - Significant at 0.01 level. (df - 98, Table value of 0.01- 2.63)

It is evident from table-1 that significant difference existed between the mean scores of sports women (1392.04 ± 87.92) and non-sports women (1280.26 ± 60.51) in relation to RMR

Kcal since t-ratio was 7.41 which is a higher value than the required value at 0.01 level of significance.

Table 2: Comparative status of body lean percentage (LEAN %) in the sports and non-sports women.

Sr. No.	Category	Mean	S.D.	Mean difference	S.E.D.	t- value
1.	Sports women	76.8	3.29	8.9	0.63	14.13**(0.01)
2.	Non-sports women	67.9	4.51			

** - Significant at 0.01 level. (df - 98, Table value of 0.01- 2.63)

It is evident from table-2 that significant difference existed between the mean scores of sports women (76.8 ± 3.29) and non-sports women (67.9 ± 4.51) in relation to body lean %

since t-ratio was 14.13 which is a higher value than the required value at 0.01 level of significance.

Table 3: Comparative status of body water percentage (Water %) in the sports and non-sports women.

Sr. No.	Category	Mean	S.D.	Mean difference	S.E.D.	t- value
1.	Sports women	55.69	4.51	6.02	0.79	7.62**(0.01)
2.	Non-sports women	49.67	3.31			

** - Significant at 0.01 level. (df - 98, Table value of 0.01- 2.63)

It is evident from table-2 that significant difference existed between the mean scores of sports women (55.69 ± 4.51) and non-sports women (49.67 ± 3.31) in relation to body water % since t-ratio was 7.62 which is a higher value than the required value at 0.01 level of significance.

percentage (water %) than non- sports women.

Discussion and findings

The results of the study have revealed significant difference between the body composition variables between university sports women and non-sports women. Significant difference was found on selected body composition variables (Resting Metabolic Rate (RMR Kcal), Lean percentage (lean %) and water percentage (water %), of sports and non- sports women of kurukshetra university.

Conclusion

It was concluded that the sports and non-sports women were significantly different in RMR Kcal, lean %, water%. Further, the sports women are found significantly possessing higher degree of RMR Kcal, lean percentage (lean %), water

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