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Comparative analysis of body fat %, body mass index and body impedance in sports and non - sports women of Kurukshetra university

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Abstract
The purpose of the study was to analyze the body Fat Percentage (F %), Body mass index (BMI) and Body Impedance (BI) 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 in U.K. The result of the study revealed that level of Body Fat Percentage (FP) present in the sports women (M - 23.04 ± 3.38) and Non sports women (M – 32.01 ± 4.49) differ significantly at P < 0.01 (t value – 11. 26). Similarly, a significant difference was found in the Level of Body Impedance (BI) present in the sports women (M– 661.92±76.06) and Non sports women (M–739.9±79.76) at P<0.01(t - 5.00). Whereas, no significant difference was found in Body Mass Index (BMI) sports women (M – 21.26±3.178) and non sports women (M–20.04±3.172). Conclusion: A significant difference was found in the Body Fat Percentage (FP) and Body Impedance (BI) between sportswomen and non sports women.

Keywords: body fat percentage, body mass index, body impedance, body composition

Introduction
World Health Organisation (WHO) report note of 2016 defined overweight adults as a BMI at or above 25 kg/m2, obesity adults as a BMI at or above 30 kg/m2 and underweight adults as a BMI less than18.50 kg/m2 BMI range varies with the age of the adults. The International Obesity Task Force (IOTF, 2008) estimates that up to 1.7 billion people may be exposed to weight related health risks, taking into account varied Asian populations with a Body Mass Index (BMI) of 23 or more. More than 2.5 million deaths each year are attributed to higher BMI, a figure that is expected to double by 2030. For men over 25% and women over 32% fat there is a dramatic correlation with illness and disease McCarthy HD at el. (2006) [4]. According to National Family Health Survey (NFHS, 2007), the prevalence of overweight or obesity in India was 12.1 per cent in males and 16 per cent in females. Among the states of India, Punjab ranked first with the highest prevalence of overweight or obesity of about 30.3 per cent among males and 37.5 per cent among females, followed by Kerala, 24.3 per cent among males and 34 per cent among females. Goa ranked third (20.8% and 27% among males and females respectively) and Tamil Nadu ranked fourth with 19.8 per cent males and 24.4 per cent females either overweight or obese. In Northern India, obesity was most prevalent in urban populations (male 5.5%, female 12.6%), followed by the urban slums (male 1.9%, female 7.2%). Obesity rates were the lowest in rural populations (male 1.6%, female 3.8%) (Yadav and Krishnan, 2008) [11]. Hence, in India too, urbanization and modernization has been associated with obesity. In the current study an attempt has been made to measure and compare the body composition of post graduate non sportswomen and sportswomen.

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. Body fat percentage (BFP), Body Mass Index (BMI), Body Impendence (BI were measured with "Maltron Model BF-907" body composition analyzer (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 body fat % in the sports and non sports women.

S. No	Category	Mean	S.D.	Mean difference	S.E. D.	t- value
1.	Sports women	23.05	3.38	8.96	0.80	11.26**(0.01)
2.	Non-sports women	32.01	4.49			

** - 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 (23.05 ± 3.38) and non-sports women (32.01± 4.49) (in relation to body fat % since t-ratio was 11.26 which is a higher value than the required value at 0.01 level of significance.

Table 2: Comparative status of body impedance (BI) in the sports and non-sports women.

S. No	Category	Mean	S.D.	Mean difference	S.E.D.	Critical value
1.	Sports women	661.9	76.07	78	15.59	5**(0.01)
2.	Non-sports women	739.9	79.76			

** - 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 womenb (661.9± 76.07) and non-sports women(739.9± 79.76) in relation to BI since t-ratio was 5.00 which is a higher value than the required value at 0.01 level of significance.

Table 3: Comparative status of BMI in the sports and non-sports women

S. No	Category	Mean	S.D.	Mean difference	S.E.D.	t-value
1.	Sports women	21.264	3.178	1.22	0.64	1.91
2.	Non-sports women	20.044	3.172			**(0.01)

**-Not significant at 0.01 table value. (df – 98, Table value of 0.01-2.63

It is evident from table-3 that insignificant difference existed between the mean scores of sports women(21.264± 3.178) and non-sports women (20.044± 3.172) in relation to BMI since t-ratio was 1.91 which is a lower value than the required value at 0.01 level of significance. It means no significant difference was found in BMI between sports women and 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. It was found that Body fat% of sports women were less as compared to non sports women. It was discovered that there was a significance difference in BI of sports and non sports women, but there is exist no significant difference between the BMI of sports and non-sports women. The similar results was found by V. Sekar (2003), Gurjeet Kaur *et al* (2013), Jayamani *et al* (2013) in their studies conducted in India in which they concluded that urban women were more obese than rural women. Kaur *et al* (2013) found prevalence of obesity was 75.33% in urban women and that in the rural women was 67.99% in Punjab.

Conclusion

It was concluded that there were significant difference obtained between body composition of sports and non-sports women in body fat percentage, body impedance. Sports women are found significantly possessing higher degree of body impedance as compare to non-sports women. Further, non-sports women are found significantly possessing high degree of body fat percentage. However, in BMI variable of body composition there exists no significant difference between sports and non-sports women.

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