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STUDIES ON COMPARISON OF ANTHROPOMETRY AND BODY COMPOSITION OF PUNJABI ADULT MALES ENGAGED IN VARIED OCCUPATIONS

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ABSTRACT

Occupational level greatly influences the physical activity which in turn has significant effect on body composition and overall health. The present study was conducted to compare the anthropometric profile, physical activity level and body composition of adult males engaged in varied occupations .Thirty adult male subjects in the age group of 40 to 50 years from each category i.e. field workers, laboratory workers and office workers were selected from Punjab Agricultural University. Anthropometric measurements and body composition parameters were determined using standardized methods. Overweight prevalence was highest in office workers (80%) followed by lab workers (53%)-, and field workers, (20%). The Fat Mass was maximum in office workers (25.8%) followed by lab workers (22.6%). The least fat mass was found in field workers (18.2%). The Fat Mass Index of field workers was lesser (4.01) while that of lab (5.8) and office (7.4) workers was higher than the reference value. The Fat Free Mass of field workers was maximum (81.2%) followed by lab workers (78.1%) and office workers (73.7%). Higher physical activity by the field workers contributed to lesser Fat Mass and more Fat Free Mass which is considered desirable for optimum health. Hence, it is recommended that awareness of adequate physical activity to maintain optimum weight needs to be promoted.

Key Words: Field workers, Laboratory workers, Office workers, Body composition, Body mass, Anthropometric measurements

INTRODUCTION

The recent worldwide increase in the prevalence of obesity complicates the relationship between weightgain, muscle mass and decreasing strength with increased age. In aging men and women, the percentage of fat mass increases, such change has been attributed to accelerated decrease in lean mass. Asian Indian phenotypes have high body fat with relatively less Body Mass Index (BMI), less lean body mass and marked abdominal obesity. Multivariate analysis suggested that the association between lean mass and fat mass was attributed to hereditary, dietary factors and physical activity level (Visser*et al* 200; Nazni,2011). Healthy individuals can take several measures to preserve and improve their health. Even if past nutritional and lifestyle practices were not optimal, much can be done to reduce the risk of chronic disease and disability in future years. To avoid excess weight gain, one must make major restrictions in caloric intake and increase their energy expenditure. Exercise improves body composition among healthy individuals, both by reducing fat mass and by increasing bone and muscle mass, thereby helping to restore higher metabolic rates (Richard 2007). Occupational level greatly influences the physical activity which in turn has significant effect on body composition and overall health. Adult males engaged in varied occupations may have different body compositions. Their body composition might be strongly influenced by their activity level. The present scenario of high prevalence of life style diseases is a serious threat to health and wellbeing of Punjabi community, the males being more prone due to their genetic pre-disposition. Therefore, the present study was conducted to compare the anthropometric profile, physical activity level and body composition of adult males engaged in varied occupations.

MATERIALS AND METHODS

The three occupational categories namely field workers, lab workers and office workers were chosen for the study. Thirty adult male subjects in the age group of 40-50 years from each category were selected. The subjects were working in different departments of Punjab Agricultural University, Ludhiana. A questionnaire was developed to collect general information, anthropometric profile and type and duration of activities carried out by the subjects. The anthropometric measurements viz. height, weight, waist circumference, hip circumference, was taken using standard methods given by Jelliffe (1966). The derived anthropometric measurements such as BMI,

Waist Hip ratio was calculated using basic measurements. A cut off point of 102 cm for Waist and Hip Ratio was taken as reference value (Ghafoorunissa and Krishnanurthy 2000). The body composition parameters namely fat mass; muscle mass, fat free mass, total body water and bone mass were determined by bioelectrical impedance method

RESULTS AND DISCUSSION

TYPE AND DURATION OF PHYSICAL ACTIVITIES

Type and duration of strenuous physical activities and leisure activities carried out by the subjects is shown in Table 1. The strenuous physical activities such as bicycling, walk, agricultural activities, cattle care and home gardening were carried out by all the field workers, 94% of the lab workers and 83% of the office workers for 7 days a week. All the field workers were involved in agricultural activities as part of their occupation while a small number i.e. 7 and 3 % of lab and office workers also performed agricultural activities. Similarly, 17 % of lab workers and 7 % of office workers were engaged in cattle care activities. None of the field workers used to involve themselves in cattle care or home gardening. On the other hand, 17 and 10 % of lab and office workers spent time in home gardening. Bicycling was most common physical activity among the field workers (80%), followed by lab (20%) and office workers (17%). Walk was most common activity by the office workers (46%) followed by lab workers (33%) and field workers (23%). The field workers, lab and office workers who engaged themselves in walk used to spend 30.0, 47.5 and 40.3 minutes walking/day, respectively. On the other hand, more bicycling duration was observed in the field workers (107.5min/day) followed by lab workers (53.3 min/ day) and office workers (40.0 min/ day). A very small number i.e. 17 and 7% of subjects involved in cattle care in lab and office workers categories, the time spent by the subjects in each category being 96 and 120 min/day. Duration of agricultural activities performed by the field workers was maximum (480 min/ day) followed by lab workers (135min/day) and office workers (120min/day). Time spent on home gardening by 17 and 10 % of the lab and office workers was 24.0 and 25.0 min/day. The results revealed that agricultural activities and bicycling were the prime physical activities by the field workers while walk and home gardening are main physical activities of lab and office workers. T.V viewing which was a leisure time activity and was carried out by all the lab and office workers, whereas, none of the field workers reported regular T.V viewing. The average time of T.V viewing in lab and field workers category was 95.0 and 72.0 min/day.

ANTHROPOMETRIC MEASUREMENTS

The anthropometric measurements of the subjects have been shown in Table 2. There was no significant difference in the height of field workers and lab workers, however a significantly ($p \leq 0.05$) more height were observed in office workers in comparison to lab workers and field workers. The mean weight of field workers, lab workers and office workers was found to be 57.5, 69.8 and 81.8, kg respectively. There was a significant ($p \leq 0.05$) difference in the weights of the subjects in all the categories. The body weight of field workers was 7.3% lesser whereas, that of lab and office workers was 12.6 and 31.9% higher than the reference value suggested by National Cholesterol Education Program Guidelines (NCEP 2004). The physically more active subjects in the categories of field workers had body weight lesser while the less active subjects in the category of lab and office workers had higher body weight when compared to reference value. The average body weight of 64.5 and 69.7 kg of low and middle income group men was reported by Batra (2014) whereas; Miglani*et al* (2014) found the average weight of 69.0 kg in office workers of Ludhiana city. There was a significant ($p \leq 0.05$) difference observed in waist circumference of three groups. The mean values of waist circumference were lesser then the reference value of 102cm (Ghafoorunissa and Krishnaswamy 2000; Bhuvaneswari and Nazni, 2011). The maximum waist circumference was found in the least active office workers. Miglani*et al* (2014) found the waist circumference of 100.9 cm in office workers which were more than the values of waist circumference observed in the present study. There was a significant ($p \leq 0.05$) difference in hip circumference of field workers, lab workers and office workers. The hip circumference of field workers was least followed by lab and office workers. There was a significant ($p \leq 0.05$) difference in BMI of all the three categories. Batra (2014) found that the BMI of men in low income group was 22.86 Kg/m^2 while it was 24.12 and 24.58 Kg/m^2 in middle and high income groups. Classification of the subjects on the basis of BMI (WHO, 2004) is shown in Fig.1. The results revealed that 17% of field workers were underweight. On the other hand, overweight prevalence was 20, 53 and 80% in field, lab and office workers, respectively. Three and 13% of the lab and office workers were obese. The results revealed that obesity was highly prevalent in lab and office workers which had lesser active life in comparison to field workers. Batra (2014) found that 17 and 33% of low and middle income men were overweight. On the contrary, 100% of office workers were reported to be obese grade I (47%) and obese grade II (53%) as reported by Miglani*et al* (2014). The waist and hip ratio of lab workers was significantly ($p \leq 0.05$) lower than the office workers. The waist hip ratio of low and middle income group men was 0.89 and 0.81 as reported by Batra (2014) which was lesser than the values observed in the present study. On the other hand, Miglani*et al* (2014) found closer values of 0.97 for waist and hip ratio of office workers of Ludhiana city. The same was also found by Nazni and Vimala, 2010.

Table 1: Type and duration of physical activities (minutes/day) carried out by the subjects

Parameter	Field workers		Lab workers		Office workers		Overall	
	No. (%)	Mean±SD	No. (%)	Mean±S.D	No. (%)	Mean±S.D	No. (%)	Mean±S.D
Walk	7 (23)	30±0	10 (33)	47.5 ± 35.2	14 (46)	40.3 ± 26.3	31 (34)	37.95±7.06
Bicycling	24 (80)	107.5 ± 27.8	6 (20)	53.3 ± 36.7	5 (17)	40.0 ± 16.9	35 (39)	88.5 ± 39.6
Cattle care activities	-	0 ± 0	5 (17)	96 ± 32.8	2 (7)	120 ± 0	7 (7)	103 ± 29.3
Agricultural activities	30 (100)	480.0 ± 0	2 (7)	135.0 ± 63.6	1 (3)	120.0 ± 0	33 (37)	448.2 ± 103
Home gardening	-	0 ± 0	5 (17)	24.0 ± 8.21	3 (10)	25.0 ± 8.6	8 (9)	24.0 ± 8.2
TV viewing	-	0 ± 0	30 (100)	95.0 ± 72	30 (100)	72.0 ± 34.3	60 (67)	84.0 ± 57.5

Table: 2 Anthropometric measurements of the subjects

	Field workers (n=30)	Lab workers (n=30)	Office workers (n=30)	Overall (N=90)	Critical difference at 5%	Normal values
Anthropometric measurements						
Basic						
Height, cm	164.2±6.8	165.8±7.6	171.8±5.3	167.3±7.4	3.96	-
Weight, kg	57.5±9.5	69.8±13.6	81.8±10.2	69.7±15	6.7	62[a]
Waist circumference, cm	76.0±3.9	88.4±9.2	94.0±7.0	88.8±13.0	4.2	102[a]
Hip circumference, cm	80.2±6.4	91.6±11.9	100.0±7.2	99.1±21.3	5.3	-
Derived						
Body Mass Index kg/m²	21.29±3.18	25.31±4.03	27.63±2.52	24.74±4.19	1.41	20-25[b]
Waist Hip Ratio	1.05±0.05	1.03±1.29	1.06±0.02	1.05±0.05	0.03	<1.02[c]

Values are Mean ± S.D ,[a] NCEP(2004) , [b] WHO (2004),
[c] Ghafoorunissa and Krishnaswamy (2000)

Table: 3 Body composition parameters of the subjects

	Field workers (n=30)	Lab workers (n=30)	Office workers (n=30)	Overall (N=90)	Critical difference at 5 %	Normal values[a]
Fat mass, kg	10.9±5.1	16.1±7.2	21.8±6.5	16.3±7.7	3.8	-
Fat mass %	18.2±6.2	22.6±6.5	25.8±5.5	22.2±6.8	3.6	< 27
Fat mass index	4.01±3.18	5.8±2.4	7.4±2.1	5.7±2.5	0.22	4.8
Fat free mass, kg	46.1±5.2	53.9±7.7	59.8±5.5	53.3±8.4	3.7	-
Fat free mass, %	81.2±6.71	78.1±6.5	73.7±5.6	77.7±6.9	3.74	<73
Muscle mass, kg	43.9±4.8	51.2±7.3	56.9±5.3	50.7±8	3.5	-
Muscle mass %	77.2±6.19	74.2±6.14	70±5.3	73.8±6.5	3.52	-
Total body water, kg	33.5±3.3	38.4±5	42.5±3.3	38.2±5.4	2.4	-
Total body water, %	59.3±5.16	55.6±4.2	52.2±3.3	55.7±5.1	2.5	-
Bone mass, kg	2.41±0.23	2.7±0.34	2.9±0.25	2.7±0.4	0.17	-

Values are Mean ± S.D
[a]Schutzet al 2002

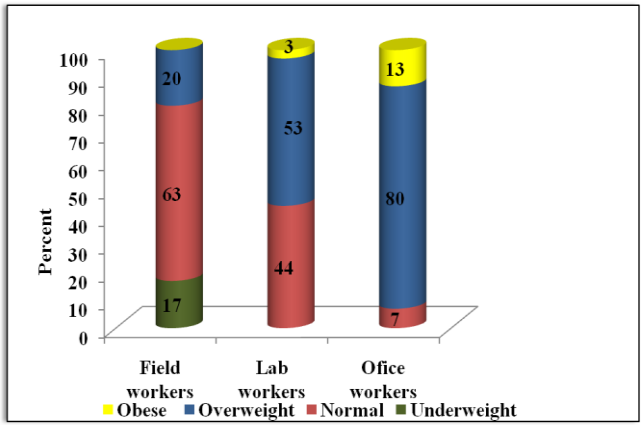

Fig 1 Distribution of the subjects on the basis of Body Mass Index

BODY COMPOSITION PARAMETERS

The values of different body composition parameters of the subjects have been shown in table 3.

The fat mass (FM) was maximum in office workers (25.8%) followed by lab workers (22.6%). The least fat mass was found in field workers (18.2%). Miglani*et al* (2014) reported a total fat mass of 24.9% in office workers which was closer to the values of FM observed in the present study.

The Fat Mass Index (FMI) of field workers was lesser (4.01) while that of lab (5.8) and office (7.4) workers was greater than the reference value of 4.8 thus, indicated that lesser physical activity contribute to higher fat mass. TheFat Free Mass (FFM) of field workers was maximum (81.2%) followed by lab workers (78.1%) and office workers (73.7%). Higher physical activity by the field workers contributed to lesser FM and more FFM which is considered desirable for optimum health. Miglani*et al* (2014) reported a total FFM of 56.9% in office workers which was lower than the values of FFM observed in the present study.

The study concluded that overweight prevalence was highest in office workers followed by lab workers. Field workers had reported maximum physical activity in the form of agricultural work as a part of their occupation and bicycling. T.V viewing which was a leisure time activity was carried out by all the lab and office workers and none of the field workers reported regular T.V viewing. The fat mass was maximum in office workers followed by lab workers and field workers. The results indicated that active lifestyle helps to prevent obesity and improve fat free mass. The results showed that physical activity was the leading factor that has a positive influence on anthropometry and body composition. Out of various activities, bicycling and agricultural activities were related to lesser body weight, body mass index, waist circumference and fat mass and higher fat free mass.

Hence, it is recommended that awareness of adequate physical activity to maintain optimum weight needs to be promoted through various educational programs, so that masses especially those in jobs involving lesser physical activity should strive to achieve optimum body composition and desirable body weights in order to prevent themselves from chronic degenerative diseases.

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