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A Comparative Study of Morphological Parameters and Body Fat of Physically Active and Inactive Women

Harmanpreet Kaur¹, Jaswinder Singh² and Gurpreet Kaur³

¹Associate Professor, Dept. of Physical Education, Lovely Professional University, Punjab. Email: harmanpreetkaur@lpu.co.in

²Sports Authority of India, NIS, Patiala (Punjab) India

³Ex-Senior Research Associate, CSIR New Delhi

ABSTRACT

The present research investigation was undertaken to study the morphological parameters and body fat of women in relation to their lifestyle. The data were collected on 162 women belonging to middle socioeconomic status from Amritsar, Ludhiana and Patiala districts of Punjab. The women ranged in age from 35 to 50 years. They were divided into two groups: Active (N=71) and Inactive (N=91). The women who regularly walked daily at least for one year were taken as active while women who did not go for a walk and do most of the sedentary jobs were taken as inactive. Their age at marriage and age at menarche was determined by recall method. Various anthropometric measurements like height, weight, skin folds at various sites like Biceps, triceps, sub-scapular, suprailiac, abdominal, thigh and calf, Waist and hip girths were taken by using standard techniques. Their fat mass was determined by the method of Drinkwater and Ross. The results of the study reveal that active women are significantly lighter, possess lower body mass indices and lower amount of fat than inactive women. The former possesses significantly leaner skin-folds and lesser waist and hip girths than latter. This may be due to the effect of regular walk on former as compared to the latter.

Keywords: Morphological, girths, fat mass, body mass index, active, inactive.

1. INTRODUCTION

It is well known fact that with advancing age, women experience a large increase in body weight as well as fat. Various physiological events such as pregnancy, lactation and menopause increase fat storage in women. A Gynoid type of fat distribution, i.e. less amount of fat on the trunk, but a greater amount of fat on hips, gluteal and femoral region is noticed among women during reproductive years.

It is evident that physical activity is an important determinant of health point of view, including cardiovascular performance, skeletal combination and psychological well-being. Montoye (1975) and douche et. al., (2000) have demonstrated an opposite relationship involving physical activity and fatness. Physical movement is related with a lower body mass index. The effect of physical activity and exercise on body composition has been reported in several studies (Hardman et. al., 1992, Kohrt et. al., 1992, Hunter et. al., 1996, Mauriege et. al., 1997, Van pelt et. al., 1998 and Nindl et. al., 2000). Most of these studies compared the highly trained women with sedentary one. Some investigators have reported the effect of regular activity on body composition (Hardman et. al., 1992, Mauriege et. al., 1997 and Van pelt et. al., 1998). But a study on body composition of the Punjabi population with reference to their lifestyle is still lacking.

Objectives

The present investigation has been undertaken to study the morphological parameters and body fat of women in relation to their lifestyle.

2. METHODOLOGY

The sample for the present cross-sectional study has been drawn from the Punjabi population of Amritsar, Ludhiana and Patiala districts aged 35 to 50 years. A total of 162 women belonging to middle socioeconomic status was investigated. They were divided into two groups: Active (N = 71) and Inactive (N = 91). The women who regularly walked for one hour, at least for one year were taken as active while women who did not go for a walk and do most of the sedentary jobs were taken as inactive. The subjects were requested to make an appointment at their homes. Socio-demographic and gynecological data were also taken into account. Since, the age is important in the study, so the date of birth of each woman was carefully noticed. Their age at marriage and age at menarche was determined by recall method. None of the women have experienced menopause at the time of investigation. Standard anthropometric techniques as given by Lohman et. al., (1988) were used while measuring the subjects for their height, weight, circumferences of waist, hip, and skin folds at the sites of biceps, triceps, sub-scapular, supra-iliac, abdomen, thigh and calf. Using these measurements, Body mass index (BMI) and waist hip ratio (WHR) were calculated. After taking the measurements, fat mass was calculated by following the method of Drinkwater and Ross (1980). The body density has been calculated from skin folds using the equations of Durnin and Womersley (1974), which was later converted into percent body fat with the formula given by Brozek et. al., (1963). The mean and Standard deviation of various body parameters was calculated. Student's t-test was used for comparison between two groups.

3. RESULTS

Table 1 shows the mean age of both active and inactive women is approximately forty four years. The mean age at marriage in active women is 19.73 years and in inactive women is 21.12 years. The mean age at menarche is found to be 14.98 years in active women and 14.39 years in inactive women. It has been observed that physically active and inactive women do not differ in age and stature. The mean value of body weight in active women is 59.54 kg and in inactive women is 75.58 kg., thus active women are significantly

lighter (16.04 Kg) than inactive women. The mean values of skin-folds at various sites are significantly lower in active women as compared to their counterparts. The former possesses 23.30 percent fat mass, significantly lower by 4.40 kg as compared to the latter (27.70%). The body fat as calculated from body density is significantly lower by 5.05 percent in active women as compared to inactive women (Table 2). Thus, the former possesses significantly lesser fat mass than the latter. The mean value of waist girth in active women is 82.21 cm and inactive women is 94.26 cm, indicating that the former have a narrower waist than latter. The differences are found to be statistically significant ($t = 7.17$) It has also been observed that active women possess significantly narrower hips than inactive women. Table 2 shows that active women possess a significantly lower value of Body mass index, which is the main indicator of obesity than inactive women.

Table 1
Anthropometric profile of Active and Inactive women

S.No.	Parameters	Active (N = 71)		Inactive (N = 91)	
		Mean	S.D	Mean	S.D
1.	Age	44.0	4.97	44.03	3.94
2.	Age at marriage	19.73	3.23	21.12	3.58
3.	Age at menarche	14.98	1.32	14.32	1.26
4.	Height	153.31	4.58	153.35	5.68
5.	Weight	59.54	9.57	75.58	11.49
	Circumferences				
6.	Waist	82.21	11.17	94.26	9.85
7.	Hip	93.73	7.15	106.20	8.90
	Skinfolds				
8.	Biceps	9.95	4.67	16.82	5.50
9.	Triceps	19.24	9.09	29.62	7.93
10.	Subscapular	21.69	7.61	29.49	7.59
11.	Supra-iliac	20.91	9.40	30.49	8.41
12.	Abdominal	30.46	10.34	39.45	8.50
13.	Thigh	31.92	11.17	46.17	7.61
14.	Calf	17.82	7.72	28.55	8.33

*Differences are significant.

Table 2
Comparison of indicators of obesity in active and inactive women

S.No.	Parameters	Active (N = 71)		Inactive (N = 91)	
		Mean	S.D	Mean	S.D
1.	BMI	25.35	4.04	32.11	4.16
2.	WHR	0.88	0.09	0.88	0.06
3.	% fat mass	23.30	4.76	27.70	3.11
4.	%Fat	33.16	4.43	38.21	2.79

*Differences are significant.

4. DISCUSSION

The results of the study reveal that active women possess significantly lighter possess lower body mass indices and lower amount of fat than inactive women. The former possesses significantly leaner skinfolds and lesser waist and hip girths than latter. This may be due to the effect of regular walk on former as compared to the latter. Similar results were reported by (Hunter et. al., 1996 and Kanaley et. al., 2001). They found that physical exercise is negatively associated with visceral adipose tissue accumulation in postmenopausal women. Physically active women are characterized by lower BMI and visceral adipose tissue level (Hernandez-Ono, 2002 and Kanaley et. al., 2001).

Douchi et. al., (2000) investigated the effects of physical activity on body fat distribution and bone mineral thickness among 57 postmenopausal women (Mean age 60.5 ± 6.4 yrs) who had exercised regularly at least from last 2 years. Physical exercise has beneficial effects on body fat distribution and BMD in postmenopausal women. Decrease of upper body fat distribution with physical exercise was reported. Kyle et. al., (2004) determined body fat and fat free mass in 6733 healthy subjects (3549 males and 3184 females) between ages 18 to 98 years. They found physically active subjects had a lower fat mass index and thigh fat mass index than sedentary subjects. Life span athletes and physically active women have higher bone mass than non active counterparts (Beck et. al., 2001 and Greendale et. al., 1995). Stirling and colleagues (1986) reported moderately active women have higher muscle mass and mesomorphy, lower skinfold thickness, adipose tissue than controls.

5. CONCLUSION

The findings of the present research investigation highlight the importance of regular physical activity in the maintenance of body weight and its components which is the key factor in the prevention of lifestyle diseases.

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