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### Physical activity of anthropometric factors in woman employees of the Islamic Azad University of Lahijan

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### Abstract

Activity and mobility are integral parts of human life which have been raised in a specific way at any period. In today's industrialized and civilized societies, in which the mobility of humans is restricting day by day, physical activity has found a special position.

Key words: anthropometric factors, age, gender, race

### Introduction:

Activity and mobility are integral parts of human life which have been raised in a specific way at any period. In today's industrialized and civilized societies, in which the mobility of humans is restricting day by day, physical activity has found a special position. The mechanical life of today's people has caused them to be away from activity and this poverty of mobility has decreased their body's joy and happiness and exposed them to the hazardous factor of obesity. Studies conducted in the past decade have shown that obesity and body fat distribution, especially in the middle of body is a good predictor of chronic diseases in the future. Today, in most countries including Iran, with the transition from the traditional style to modern one, lifestyle-related diseases such as diabetes, hypertension, overweight, and obesity are growing, as nutrition and medical experts have predicted that the number of obese people in the world will exceeds 3.2 billion people by 2015 (20). Hence, body composition assessment in order to determine its optimal value for a healthy life and happiness is of great importance.Experts use body mass index (BMI) to determine the physical characteristics of body. BMI has a direct relationship with body fat and is one of the best and most popular health indices in healthy non-athlete individuals, varying with variables such as gender, age, and lifestyle (1, 2). According to extensive epidemiological studies, one billion people in the world are overweight (25<BMI<30). Another way to evaluate the health is the measure of waist circumference (WC) and the ratio of waist circumference to pelvis circumference (WHR). This index is known as an indication of diseases associated with excess body fat distribution. There is a significant relationship between the upper body and abdominal fat with the risk of illness or death. The importance of this index is due to its high relationship with internal offal fat and it seems to be an acceptable index for intra-abdominal fat (4). By average, WHR in mature women is less than in men, because at sexual maturity, due to the increased width of pelvis, higher accumulation of fat in pelvis, and less changes in waist, pelvis circumference has a more increase than the waist circumference (5). This ratio, like other body composition variables, is also influenced by many factors including age, gender, race, and other body tissue (6). Abdominal obesity, measured with increased WHR and WC, has been known as a strong risk factor for cardiovascular diseases (7, 8, 9, 22).

### MATERIALS AND METHODS

As mentioned before, the objective of the present study is to evaluate the relationship between the fat percentage of body mass index and the ratio of waist circumference to pelvis circumference and also the level of physical activity of the respondents. All woman employees of the Islamic Azad University of Lahijan (n=60) aging from 20 to 60 years old were studied in terms of physical activity, height, weight, BMI, and WHR. The questionnaire of rapid assessment of physical activity (Stefanie, 2011) was used in this study to collect data. This questionnaire consists of two parts; the first part is related to aerobic activities and the second part deals with strength trainings and stretching activities (Yoga). It also includes 9 questions, 7 of them are related to aerobic activities which are rated by the type of activity (inactive=1, under active= 2 & 3, regularly under active= 4 & 5, and active= 6 & 7), the next 2 questions are related to strength trainings with the rating of 1, and the last question is about stretching activities (Yoga) that is rated 2. The rating for the use of any type of physical activity is 3. After measuring the height and weight of the respondents using a digital scales made in Germany by Soka company, the obtained values were put in the formula Weight (kg)/height (m)<sup>2</sup> in order to determine the mass index (BMI). The ratio of waist circumference to pelvis circumference was determined by measuring the maximum size of the hips from slightly above the navel and using the equation waist circumference/pelvis circumference. It is noteworthy to say that personal information including education, being athlete or not, being single or married, and so on were also collected. Physical activity level and personal information of the respondents were reported using descriptive statistics. After performing the necessary measurements and data collection, Spearman and Pearson correlation coefficients were used to evaluate the relationships of above-mentioned factors. Chi-2 test was also used to show the relationship between qualitative variables. All statistical analyses were done by SPSS software.

#### Results

The analysis of data showed that the norms of WHR, BMI, and WC among woman employees are considered as predictor indices in epidemiological and metabolism studies and also for the outbreak of diseases related to obesity. These differences are probably due to a series of cultural, social, and economic differences, eating disorders, little regular exercise, and lack of awareness of risks resulting from obesity and sedentary lifestyle

Mean age, height, and weight of the respondents were 39.75±9.05 years, 160.63±4.74 cm, and 65.57±10.63 kg, respectively. Mean of BMI, WHR, and WC were also 25.43±4.72 kg/m<sup>2</sup>, 0.89±0.06 cm, and 95.05±11.5 cm, respectively (Table 1).

WC	BMI	WHR	Weight	Height
(cm)	(kg/m <sup>2</sup> )		(kg)	(cm)
95/05±11/5	25/43±4/72	0/89±0/06	65/57±10/63	160/63±4/74

1000010000000000000000000000000000000	Table 1: D	escription of	general	characteristics	of the r	espondents (	$X \pm SD_{\lambda}$
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Among the respondents, 1.66% (1 person) had a below normal weight, 51% (31 people) had a normal weight, and 46.66% (28 people) were overweight (25-30) or obese (30-35) (Table 2).

#### Table 2: Information about body mass index (BMI) of the respondents

Percentage	Range	BMI
1/66	<18/5	Lightweight
51/68	18/5-25	Normal
46/66	>25	Overweight

According to the final standardization (Table 3), about half of the woman employees were in the range of 18.5-25 (kg/m<sup>2</sup>) of BMI and about 47% were in the range of obese. Obtaining a mean BMI of 28.30 kg/m<sup>2</sup> in the age group above 51 years indicates that these people have a more inconsistent body composition than other age groups. In this age group, which is the onset of old age, the highest percentage of malnutrition in terms of obesity was observed among the respondents and the prevalence of obesity was increased in higher ages (Table 3).

Mean WHR	Mean BMI (kg/m <sup>2</sup> )	Mean height (cm)	Mean weight (kg)	Number	Age group
0/87	25/26	157/8	66/18	5	20-30
0/89	24/79	161/95	65/19	24	30-40
0/89	25/46	160/40	65/04	22	40-50
0/9	28/30	159/22	66/55	9	50-60

Table 3. Descri	ntive information	about the rest	ondents at di	ifferent age (	Troung
Table 5. Desch	puve mioi mation	about the resp	Jonuents at u	merent age ş	groups

The results show that mean WHR of the respondent was 0.89±0.06 (Table 1). Among them, 1.66% (1 person) were under normal, 81.68% (49 people) had WHR, and 16.66% (10 people) had a high WHR, who are susceptible to imaginary diseases such as heart disease (Table 4).

Although this ratio is more or less equal in different age groups of the study population, what that has been obtained from the results is that the mean WHR was increased with aging in age groups, as the minimum mean of WHR (0.87) was observed in the age group 20-30 years and its maximum (0.9) belonged to the age group above 51 years (Table 1).

# Table 4: Information about WHR index (the ratio of waist circumference to pelvis circumference) of the respondents

Percentage	Range	WHR
1/66	<0/75	Under normal
16/66	0/75-0/85	Normal
81/68	>0/85	Obese

Another finding of the present study is an average positive significant relationship between BMI and WHR (p≤0.05) (Table 5). The relationship between the studied physical indices (BMI and WHR) and physical activity of woman employees was also examined and a negative significant relationship was observed between them, as the increased physical activity of these women was followed by a reduction in these indices (Figure 1).

# Table 5: The correlation coefficient between BMI and WHR in woman employees of the Islamic Azad University of Lahijan

	Likelihood	r value	Index	
			(BMI) Body mass index	
Significant	0/05	0/29	(WHR) the ratio of waist circumference to pelvis circumference	
Significant	0/05	0/65	waist circumference	
			(WC)	

The respondents were also divided in two groups in term of education. These two groups included below the bachelor and above the bachelor, but there was no significant difference between them in terms of BMI and WHR.

# Table 6: The correlation coefficient between anthropometric indices and physical activity in woman employees of the Islamic Azad University of Lahijan

	Act	Likelihood
WHR	-0/3	0/8
BMI	-0/43	0/01



The values of waist circumference (WC) showed that 83.33% of the respondents are exposed to high risk of diseases related to health. The World Health Organization (WHO) has recommended the WHR to be 0.8 for women (11). Higher values can lead to abdominal obesity and increased risk of cardiovascular diseases in women.

Therefore, 86.66% of the respondents in the present study are susceptible to cardiovascular diseases

## Table 7. Correlation between BMI and WC in these women (r=0.65) is significant (p≤0.05) (Table 6).Table 7: The relationship between Anthropometric indices and risk of cardiovascular diseases

<b>Obesity index</b>		N (%)
WC (cm)		
NO Risk (<88cm)		1610/66
At Risk (>88cm)	50	83/33
WHR (cm)		
NO Risk (< 0/85)		8 13/33
At Risk $(> 0/85)$	52	86/66

### DISCUSSION

As previously mentioned, the value of BMI in 60 woman employees with a mean age of 39 years old was 25.43±4.72 kg/m<sup>2</sup> (Table 1), while BMI was obtained 26.6±4.2 kg/m<sup>2</sup> for the faculty members of Tarbiat Moaalem University of Sabzevar in a study conducted by Hamedinia (1383).

Previous studies also show that a BMI more than 25 is the obesity indicator for women that puts a person at risk of disease. So, 46.6% of the respondents in the present study are in this range (Table 3) and it can be inferred that about the half of the respondents are overweight or obese. Mean BMI and WHR in the age groups 20-30 years, 30-40 years, 40-50 years, and 50-60 years were determined 25.26 and 0.87, 24.79 and 0.89, 25.46 and 0.89, and 28.30

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and 0.9, respectively. These results are consistent, to some extent, with findings of Gaeeni et al (1382) in which mean BMI and WHR for women over fifteen years old in Tehran in the age groups 36-40 years and above 51 years were obtained 26.38 and 0.9 and 25.68 and 0.9, respectively (14). In a study entitled "Evaluation of obesity and underweight of the elderly using BMI and WHR indices in Isfahan" by Naini et al (1383), the highest prevalence of obesity (According to BMI) was observed in the age group 60-69 years (15)

The results show that the mean WHR of the respondents is 0.89 (Table 1). Although this ratio is more or less equal in different age groups of the study population, what that has been obtained from the results is that the mean WHR was increased with aging in age groups, as the minimum mean of WHR (0.87) was observed in the age group 20-30 years and its maximum (0.9) belonged to the age group above 51 years (Table 2). According to another classification of obesity in women based on WHR index, women with a WHR more than 0.8 are classified as obese individuals (11).

The findings of the present study also indicate that 86.66% of the respondents are at risk of cardiovascular diseases. Josephine (2010), in a study on factors threatening the health of new students entering the University of Santo Tomas, showed that 4.47% of students were at risk and this low figure was mainly due to this that the studied students were young and had a suitable BMI and body composition (16). One of the findings of the present study was the positive relationship between BMI and WHR in woman employees of the Islamic Azad University of Lahijan (r=0.29) (Table 5), which is consistent with the findings of most researchers. This correlation was reported 0.374 in the study of Gaeeni et al (1382) (14). Josephine (2010) also obtained a correlation of 0.14 in a study on anthropometric characteristics (BMI and WHR) of first-year students (16). In the present study, the BMI of those who had a physical activity score above 5 was 24.06±2.52 (Table 7), while in the study of Stephanie (2010) on physical activity and endogenous sex hormones changes in postmenopausal women, BMI was obtained 25.8 in

those who had a physical activity score above 5 (10).

### Table 7: Selective characteristics of the respondents by physical activity levels

	Level of sport activity				
	1(0.0)	2(0/1-2/9)	3(3/00-6/9)	4(7.0-9/9)	
	$\overline{x} \pm SD$	$\overline{x} \pm SD$	$\overline{x} \pm SD$	$\overline{\mathbf{x}} \pm \mathbf{SD}$	
BMI(kg/m2) WHR F%	-	28/17±5/93 0/92±0/3 38/33%	24/06±2/52 0/98±0/56 55/01%	23/29±0/73 0/85±0/04 6/66%	

In a study by RGupta (2007) on body mass index (BMI), ratio of waist circumference to pelvis circumference (WHR), and cardiovascular risk factors, a negative correlation was observed between physical activity and BMI (r=-0.22) (17). As expected, these findings are in line with the results of the present study.

In the present study, the relationship between anthropometric indices, which are known markers for cardiovascular diseases, was also evaluated

The correlation between BMI and WHR in woman employees of the Islamic Azad University of Lahijan was obtained 0.65. This correlation was reported 0.84 in a study by Mildred (2009) on correlates of body image satisfaction among economically depressed urban Filipino women (18).

Similar studies by Janssen et al (2002) have shown that the combination of BMI and WHR can be the best predictor of metabolic risk factors rather than WC alone (19). In the present study, 83.33% of women whose WC was above 88 cm were at the risk of heart diseases and they mostly had big and abnormal abdomens. Low levels of physical activity and poor nutrition are the possible reasons for the high WC in the studied woman employees. In the study of Josephine (2010), about 59% of people whose WC was above 88 cm were at the risk of heart diseases (16). This is, to some extent, less than WC in woman employees in the present study which can be attributed to empty place of regular physical activity in daily schedule because of their businesses and economic condition of society.

#### Conclusion

Given the inverse relationship between physical activity and body mass index (BMI), effective weight control should be one of the components of interventive programs of university staff. Since the results of the present study show a gradual increase in overweight and obesity and given their many risks such as cardiovascular diseases, strokes, diabetes, and even death, specific interventions aimed at regulating body mass index (BMI) should be taken into account more than before by the university officials. Hereof, the role of physical education instructors and observational education in relation to physical activity seem to be important and should be considered.

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