Original article

The impact of the nutrition situations and physical activities of academicians on anthropometric measurements and blood parameters

Nildem Kizilaslan

Tokat Gaziosmanpasa University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Turkey

Abstract: *Background:* This study was planned and carried out to determine the influence of nutrition situations and physical activity levels of individuals working as academicians at the university on their anthropometric measurements, blood glucose, and blood lipid. *Materials and Methods:* 47 volunteers participated in the research, and their height, waist circumference (WC), and weight was measured. The blood samples of the volunteers was taken after 12 hours of fasting, their preprandial blood glucose (PrBG), postprandial blood glucose (PoBG), total cholesterol, triglyceride, HDL-cholesterol, and LDL-cholesterol levels were measured. Nutritional consumption measurements were taken with 24-hour recall method, and, after having the volunteer subjects make nutritional changes, daily consumption quantities were determined. *Results:* The body mass index (BMI) was 24.34±4.73kg/m^2 in the women and 27.90±3.97 kg/m^2 in men. The mean WC was 84.15±15.89 cm for women and 98.18±10.89 for men. A statistically significant difference was found between the BMI of the women and their WC, total cholesterol level, HDL-cholesterol, LDL-cholesterol, and triglyceride averages. According to the BMI of the men, a statistically significant difference was found with their WC, PoBG, and triglyceride averages. In both women and men, it was observed that as their physical activity increased, their levels of BMI, WC, PoBG level, and triglyceride level were reduced. *Conclusions:* We conclude from this study that academicians who are overweight and who suffer from impaired glucose intolerance and dyslipidemia have balanced nutrition and to do physical activities to become healthy.

Key words: nutrition, anthropometry, blood glucose, blood lipids, body mass index, physical activity.

Introduction

Balanced and regular nutrition is one of the most important requirements for a long, healthy life; otherwise, we can be confronted with problems related to malnutrition. One of these problems is obesity. Obesity is defined by the World Health Organization (WHO) as "the accumulation of too much fat in the body at a level that could disrupt health." It is a health problem which is very widely observed in all communities, and it takes the form of a global epidemy at this time (1).

Obesity has a negative effect on blood pressure, and it increases the possibility of cardiovascular problems (2). Among obesity indices, WC which evaluates abdominal or central obesity is accepted as risk factor for Metabolic Syndrome (MetS) (3). When compared to general obesity, which is evaluated with BMI, it is clear that abdominal obesity is strongly correlated with cardiovascular diseases (4). Obesity, which increases due to unhealthy life styles, is also related to various chronic health risks such as cancer and type 2 diabetics in the advanced periods of life (5,6). Avoiding an unhealthy life style can prevent 80 % of health problems, paralysis, type 2 diabetics, and 40 % of cancers (7).

When the data of the Turkey Diabetes, Obesity and Hypertension Epidemiology Study (TURDEP-I)

(8) is investigated, it is seen that around 40 % of adult Turks conformed to the norms specified by WHO and that more than half of the community had a problem with overweight (35 % were overweight and 22 % were obese). When the definition of WHO for WC is considered with respect to mean obesity levels (≥88 cm for women and ≥102 cm for men), it was determined that the general obesity prevalence of obesity is 34.3 % (48.4 % for women and 16.9 % for men). The fact that the mean obesity level is so high in Turkish women indicates the serious problems that the female population may face in the near future, mainly being related to cardiovascular diseases and type 2 diabetics.

As specified in the TURDEP-II study, (9) the obesity frequency level in women was at a ratio of 44 %, 60 % higher than for men (27 %). In the last 12 years, obesity has increased by a ratio of 34 % in women and 107 % in men. According to the study, the mean obesity frequency level in Turkey with respect to WC was found to be 52.6%, and two-thirds of women and one third of men were found to be obese. It is worth noting that the highest percentage of men fall into the overweight category and the highest percentage of women fall into the obesity category. In general, two thirds of the elderly Turkish community is overweight or obese. One of the leading factors leading to a more sedentary life style in the workplace has been the replacement of physical effort with technology. With the passage to modern life, workers are less physically active, expend less energy, and tend to work at a desk and spend a lot of time in front of a computer; this causes unused energy to be stored in the body as fat which leads to obesity and various chronic complications with it (10,11,12).

When the data of WHO and scientific researches are investigated, it is seen that having balanced nutrition and regular physical activity are two of the most important measures that can be taken for avoiding overweight and obesity (13,14). Research shows that physical activities that are done regularly lower the risk cardiovascular diseases and cancer and contributes positively to mental and emotional health (15).

It is known that those who spend their working lives at a desk move less due to their professional duties, that they used their muscles and joints less during their daily lives in an effective way, and that they are seldom able to do activities with the intensity that could increases heart-respiration speed. As a result, they are at risk of obesity (16,17,18). In addition, obese employees are at a higher risk of diseases and thus are not as efficient as the employees who are not obese (19). Those who work as academicians at the university are, by definition, desk workers since they deal with long, complex research activities that are necessary for a successful academic career; they use computers and spend their work time at their desk. This research has been planned and carried out to determine the impact of nutrition and physical activity levels on anthropometric measurement of blood glucose and blood lipids on academicians who at risk of obesity due to their sedentary life style.

Methods

Research time and sample

This research has been carried out on volunteers who worked as academic personnel at the university between March-April 2019. 47 volunteers participated in the research, 20 female (42.55 %) and 27 male (57.45 %) individuals.

Data collection

The body weight (kg) and height (cm) of the volunteer subjects were measured by the researcher. For measuring the height, a portable stadiometer device was used. Measurement of body weight was done with a +/- 100 g sensitive electronic scale device. The BMI of the subjects was measured with the formula below.

$$BMI(kg/m^2) = \text{Body Weight (kg)} / (\text{height (m)})^2$$

After 12 hours of fasting, each subject's LDL-c, HDL-c, triglyceride, total cholesterol, and PrBG levels were determined by tests performed by family physicians. Two hours after these tests were made and breakfasts were consumed, a test for PoBG detection was completed. The nutrition consumption of the subjects were taken by the researcher by using the 24 hour recall

method. By transforming the information on the nutrition consumption records into nutrition changes, quantity of the nutrition being consumed by the subjects was determined as changes, and they were processed on the prepared form. By integrating the amounts of these changes into nutrition groups, they were compared with the nutrition amounts required an adult as per the nutrition guide specifically prepared for Turkey, and it was determined whether the subjects were getting healthy nutrition or not. In the evaluation of the required nutrition groups, the levels of low consumption, normal consumption, and over-consumption are shown in Table 1 (20,21). Besides as per the WHO criteria, the physical activity level (PAL) of the subjects was as low (<150 min), normal (150 min), or heavy (>150) (22). According to this classification, the PAL of the subjects was determined by questions. Before data collection, the purpose and procedures of the study were explained to the participants. Data were subsequently collected from the participants, who gave informed consent. Guidelines of Helsinki declaration for the use of human participants in research was observed.

Statistical method applied in data analysis

In the statistical analysis of the research, a SPSS 20.0 package program was used. In statistical analysis, data are defined as descriptive values, arithmetic average ± standard deviation, minimum, maximum, frequency, and in percentage (%). In the analysis of data, with the aim to determine whether a series is in conformity with normal distribution or not, the Shapiro-Wilk test is applied (23, 24). This test determines whether a series shows normal distribution or not. In the analysis of two independent groups revealing normal distribution, an unpaired t test is used, and, in the series showing distributions that are not normal, the Mann-Whitney U test was applied. For the comparison of three or more groups, regarding the series revealing normal distribution, a one way ANOVA test is used, and for the series showing distribution that is not normal, the Kruskal-Wallis H test applied. A correlation analysis is performed to determine whether there is a linear relationship between two numeric measurements and to determine the direction and intensity of a linear relationship, if it existed. In correlation analysis, in a case where the data has normal distribution, the Pearson correlation coefficient is preferred, and, in the case where the data did not have normal distribution, the Spearman Rank correlation coefficient is preferred. The analysis results obtained were interpreted by being evaluated within a reliance interval of 95% and a statistically significance level of $p<0.05$.

Table 1. Consumption Amounts of Nutrition Groups According to Nutrition Guide that is Unique for Turkey

Food Groups	Amounts of change	Less consumption	Normal consumption	Over consumption
Milk Group	200 gr	< 1 portion	portion	>3 portion
Meat Group	30 gr	< 4 portion	4-6 portion	>6 portion
Vegetable-Fruit Group	Vegetable: 4-5 T* Fruit: one apple, pear, peach, orange 1 WG** strawberry, cherry, grape etc. A thin slice watermelon/ melon Three-five plum and apricot	<4 portion	4-10 portion	>12 portion
Cereal Group	A slice of bread (25 gr) A bowl of soup A slice of pie 2-3 T* rice-makaroni	<11 portion	11-12 portion	>12 portion
Fat- Sugar Group	1 SS*** sugar 1 SS*** jam- honey 1 SS***liquid oil 1 SS*** margarine/butter 5-8 piece black/green olive	<3 portion	4-5 portion	>6 portion

T*: Tablespoon, WG**: Water glass, SS***: Sweet spoon

Results

Socio-demographic features of subjects

42.55 % of subjects participating in the research were women and 57.45 % of them were men. The average age of the subjects was 36.15±8.96 for women and 39.22±7.89 for men. The average height was 163.25±5.93 cm for women and 176.18±6.26 cm for men. The average body weight was 64.87±12.12 kg for women and 86.80±14.47 kg for men. The average BMI was 24.34±4.73 kg/m^2 for women and 27.90±3.97kg/m^2 for men. The average waist circumference was 84.15±15.89 cm for women and 98.18±10.89 cm for men (Table 2).

Blood glucose and blood lipids measurement of subjects

When the averages of the blood findings for the subjects were analyzed, the PrBG was 84.83±12.59 mg/dl for women and 91.41±8.33 mg/dl for men, the PoBG was 100.92±23.92 mg/dl for women and 103.15±22.24 mg/dl for men, the total cholesterol was191.45±31.65 mg/dl for women 205.46±44.35 mg/dl for men, the HDL-c was 60.04±18.58 mg/dl for women and 43.84±10.25 mg/dl for men, the LDL-c was 120.10±34.17 mg/dl for women and 140.91±43.89 for men, the triglyceride level was 86.06±38.33 mg/dl for women and 147.75±82.84 mg/dl for men (Table 3).

It has been determined that there was a statistically significant difference between the gender of the subjects and the LDL-c and triglyceride values ($p<0.001$).

Table 2. Socio-demographic features of subjects

Socio-Demographic Features			
Gender	n	%	
Women	20	42.55	
Men	27	57.45	
Total	47	100.00	
	Mean ± Standard Deviation	Minimum	Maximum
Age(Year)			
Women	36.15±8.96	24	51
Men	39.22±7.89	24	52
Length(cm)			
Women	163.25±5.93	1.55	1.73
Men	176.18±6.26	1.65	1.88
Body Weight(kg)			
Women	64.87±12.12	46.00	99.00
Men	86.80±14.47	65.90	125.00
BMI(kg/m^2)			
Women	24.34±4.73	19.00	37.30
Men	27.90±3.97	21.40	38.30
WC(cm)			
Women	84.15±15.89	63	115
Men	98.18±10.89	85	125

Evaluation of glycemia, cholesterol, triglyceride and lipoprotein levels of subjects

When the blood findings of subjects shown in Table 4 were analyzed according to the diabetic diagnosis criteria of the subjects, (25) it was seen that 10 % of women and 14.81 % of men carried a risk with respect to impaired glucose tolerance (IGT; PrBG: in the interval of 100-125 mg/dl). Furthermore, according to the PoBG, 10% of women and 3.71% of men were within critical limits. According to the diabetic diagnosis criteria, it was not observed that was diabetes in any female or male subjects.

When the of cholesterol, triglyceride and blood lipoprotein levels were investigated, it was determined that 30% of the total cholesterol level was high in the women, and 51.85% was high in the men; that 30% of the HDL-c levels were low in the women, and that 70.37% of was low in the men; that 75% of the LDL-c levels were high in the women, and that 77.78% of them were high in the men; and that 5% of triglyceride levels were high in the women, and that 37,04% were high in the men.

Comparative analysis of WC, blood glucose and blood lipid levels of subjects according to their BMIs

According to BMI values, 60% of the women and 18.5% of the men were within the normal range, 35% of the women and 63% of the men were within the overweight class, and 5% of women and 18.5% of men were within the obese class.

Table 3. Blood glucose and blood lipids measurement of subjects

Blood Findings	Mean ± Standard Deviation	Minimum	Maximum	P	Result
PrBG(mg/dl)					
Women	84.83±12.59	73.00	122.00	0.137*	Not Significant
Men	91.41±8.33	73.00	106.00		
PoBG(mg/dl)					
Women	100.92±23.92	58.00	151.00	0.892*	Not Significant
Men	103.15±22.24	62.40	145.00		
Total Cholesterol (mg/dl)					
Women	191.45±31.65	133.60	274.40	0.307**	Not Significant
Men	205.46±44.35	145.00	305.40		
HDL-C(mg/dl)					
Women	60.04±18.58	38.30	101.70	0.107**	Not Significant
Men	43.84±10.25	28.00	67.00		
LDL-C(mg/dl)					
Women	120.10±34.17	71.60	196.20	**0.001****	**Significant**
Men	140.91±43.89	81.20	249.10		
Triglyceride(mg/dl)					
Women	86.06±38.33	38.00	194.00	**0.001****	**Significant**
Men	147.75±82.84	47.00	403.00		

*Unpaired t testi **Mann-Whitney U Testi

It was determined that there was no statistically significant difference between the women's PrBG and PoBG, according to their BMI values. However, a statistically significant difference was determined between the averages of WC (p<0.000), total cholesterol level (p<0.050), HDL-c (p<0.026), LDL-c (p<0.006), and triglyceride level (p<0.024) (Table 5). Accordingly, it was determined that there was a positive correlation between an increase in BMI values and the following: a widening of WC (r=0.88, p<0.0001), an increase in total cholesterol (r=0.53, p< 0.016), an increase in LDL-c (r=0.67, p<0.001), and an increase in triglyceride levels (r=0.51 p< 0.023). It was determined that there is a negative correlation between the increase in BMI values and HDL-c (r=-0.51, p<0.021).

We determined that there was no statistically meaningful relationship between age, PrBG, total cholesterol, HDL-c, and LDL-c according to the BMI values. However, there was a statistically significant difference between the average of WC (p<0.001), PoBG (p<0.040) and triglyceride levels (p<0.009). Accordingly, it was determined that there was a positive correlation between the increase in BMI values and the widening of WC (r=0.76, p<0.000), and an increase in triglyceride level (r=0.49, p< 0.009).

Nutrition consumption features and amounts of subjects

The changes in nutrition amounts consumed by the subjects for each nutrition group were investigated with the following results. The ratio of women who consumed milk less was (≤1 change/portion) 70.00%, and the ratio of men who consumed milk less was %88.90; the ratio of women who consumed it normally (2-3 change/portion) was 30.00 %, and the ratio of men who consumed it normally was 11.10 %. The ratio of women who consumed meat less was (≤4 change) 20.00 %, and the ratio of men consumed meat less was 11.10 % while the ratio of men who consumed it in excess was found to be (≥6 change) 22.20%.

The ratio of women who consumed cereal less (≤11 change) was 40 %, and the ratio of men who consumed

Table 4. Evaluation of glycemia, cholesterol, triglyceride and lipoprotein levels of subjects

Parameters	**Low**		**High**		**Total**	
	n	%	n	%	n	%
PrBG (mg/dl)*	≤99		≥126			
Women	18	90.00	-	-	20	100.00
Men	23	85.19	-	-	27	100.00
PoBG(mg/dl)**	≤140		≥199			
Women	18	90.00	-	-	20	100.00
Men	26	96.29	-	-	27	100.00
Total Cholesterol (mg/dl)	≤199		≥ 200			
Women	14	70.00	6	30.00	20	100.00
Men	13	48.15	14	51.85	27	100.00
HDL-C(mg/dl)	≤49		≥ 50			
Women	6	30.00	14	70.00	20	100.00
Men	19	70.37	8	29.63	27	100.00
LDL-C(mg/dl)	<100		≥ 100			
Women	5	25.00	15	75.00	20	100.00
Men	6	22.22	21	77.78	27	100.00
Triglyceride(mg/dl)	≤149		≥ 150			
Women	19	95.00	1	5.00	20	100.00
Men	17	62.96	10	37.04	27	100.00

** The percentage of women with PrBG between 100-125 mg/dl is 10.0%. The percentage of men is 14.81%.*

*** The percentage of women with PoBG between 141-199 mg/dl is 10.0%. The percentage of men is 3.71%.*

Table 5. Comparative analysis of Age, WC, blood glucose and blood lipid levels of subjects according to their BMIs

	Women				**Men**			
Parameters	**BMI Normal (18.50-24.99 kg/m^2)**	**BMI Overweight (25.00-29.99kg/m^2)**	**BMI Obese (≥30.00kg/m^2)**	**p**	**BMI Normal (18.50-24.99 kg/m^2**	**BMI Overweight (25.00-29.99 kg/m^2)**	**BMI Obese ≥30.00 kg/m^2**	**p**
Age(Year)	34.50±7.71	40.57±9.81	25.00±0.00	0.162**	37.80±9.01	39.11±8.15	41.00±7.17	0.823**
WC(cm)	73.25±6.06	98.42±9.91	115.00±0.00	**0.000****	88.80±3.89	95.82±6.15	115.60±9.58	**0.001***
PrBG(mg/dl)	85.51±13.81	83.35±12.15	87.00±0.00	0.804*	94.86±3.01	89.88±8.62	93.14±10.80	0.458**
PoBG(mg/d)	101.58±28.24	99.75±18.65	101.00±0.00	0.989**	111.66±19.71	95.33±21.60	121.20±14.20	**0.040****
Total Cholesterol (mg/dl)	179.88±22.73	203.52±35.96	245.00±0.00	**0.050****	185.90±24.25	209.11±50.22	212.60±51.88	0.591**
HDL- C (mg/dl)	67.46.±18.22	50.17±13.87	40.00±0.00	**0.026***	44.10±7.97	44.65±11.81	40.78±6.81	0.771**
LDL- C (mg/dl)	103.90±20.93	138.05±34.73	188.80±0.00	**0.006****	131.00±22.76	144.04±50.22	140.16±41.80	0.853**
Triglyceride (mg/dl)	67.36±24.07	118.27±41.00	85.00±0.00	**0.024***	84.52±27.49	145.99±72.26	217.00±109.62	**0.009***

*Kruskal-Wallis H Test ** OneWay ANOVA

cereal less was 7.40 % while the ratio of women who consumed it normally (11-12 change) was 55.00 %, and the ratio of men who consumed it normally was 85.20 %, and the ratio of women who consumed it in excess (≥12 change) was 5.00 %, and the ratio of men who consumed it in excess was 7.40 %.

The ratio of women who consumed fruits and vegetables less was (≤4 change) 30.00 %, and the ratio of men who consumed fruits and vegetables less was 22.20 % while the ratio of women who consumed them normally (4-10 change) was 65.00 %, and the ratio of men was 70.40%, while the ratio of women who consumed them in excess (>12 change) was 5.00 %, and the ratio of men was 7.40 %.

The ratio of women who consumed fat and sugar less was (≤3 change) 30.00 %, and the ratio of men who consumed fat and sugar less was 7.40%; the ratio of women who consumed them normally was (4-5 change) 65.00 %, and the ratio of men was 92.60 %; the ratio of women who consumed them in excess was (≥6 change) 5.00 % (Table 6).

Comparative analysis of BMI, WC, blood glucose, and blood lipid levels of subjects for each nutrition group

For women and men, when milk consumption levels were investigated, it was discovered that as milk consumption increased, BMI, WC, total cholesterol, and LDL-c increased while PrBG, PoBG, HDL-c, and triglyceride levels decreased. Among the subjects, the difference between their milk consumption levels and their average BMI, WC, blood glucose, and blood lipids was not found to be statistically meaningful. It was found that there was not a correlation between an increase in the milk consumption of individuals and their BMI, WC, blood glucose, and blood lipid levels in a negative or positive direction.

When the meat consumption levels of women were investigated, it was discovered that, as meat consumption increased, BMI, WC, PrBG, PoBG, total cholesterol, LDL-c, and triglyceride levels increased while HDL-c level decreased. The difference between the meat consumption levels of women and their average BMI, WC, blood glucose, and blood lipids was not found to be statistically significant. With the increase in meat consumption of the subjects, a correlation between BMI, WC, blood glucose, and blood lipids was not found, in either a positive or negative direction.

When the meat consumption levels of men were investigated, it was discovered that, as meat consumption increased, their BMI, WC, total cholesterol, LDL-c, and triglyceride levels increased, and HDL-c level reduced. In men, the difference between meat consumption levels and average values of blood glucose and blood lipids was not found to be statistically significant. In men, with an increase in meat consumption, the difference between the average values of BMI ($p<0.026$) and WC ($p<0.010$) was found to be statistically significant. In men, with an increase in meat consumption, there was a correlation between an increase in BMI ($r=0.50$ $p< 0.008$) and a widening of WC ($r= 0.57$ $p< 0.002$) in a positive direction.

When cereal consumption levels of women were investigated, it was discovered that, as cereal consumption increased, BMI, WC, total cholesterol, LDL-c, and triglyceride levels increased. The difference between the cereal consumption levels of women and their average values of BMI ($p<0.035$), WC ($p<0.025$), was triglyceride ($p<0.021$) found to be statistically significant. It was determined that, with the increase in cereal consumption of women, there was a correlation between an increase in BMI ($r= 0.51$ $p< 0.022$) and triglyceride ($r= 0.59$ $p< 0.006$) levels and the widening of WC ($r= 0.55$ $p< 0.011$) in a positive direction.

When the cereal consumption levels of men were investigated, it was seen that, as cereal consumption increased, the levels of BMI, WC, and triglycerides increased while HDL-c, total cholesterol, and LDL-c levels reduced. In men, the difference between cereal consumption levels and blood sugar and blood lipids averages was determined to be statistically significant. It was determined that there was a correlation between the cereal consumption of men and the widening of WC ($r=0.39$ $p< 0.04$) in a positive direction.

When the fruit and vegetable consumption levels of women were investigated, it was seen that, as fruit and vegetable consumption increased, BMI, WC, PoBG, and triglyceride levels increased. In women, the difference between fruit and vegetable consumption levels and average values of blood glucose and blood lipids was not found to be statistically significant. With the increase in fruit and vegetable consumption of the

Table 6. Nutrition consumption features and amounts of subjects

	Less consumption		Normal consumption		Over consumption		Total	
Nutrition Groups	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Milk Group								
Women	14	70.00	6	30.00	-	-	20	100.00
Men	24	88.90	3	11.10	-	-	27	100.00
Meat Group								
Women	4	20.00	16	80.00	-	-	20	100.00
Men	3	11.10	18	66.70	6	22.20	27	100.00
Cereal Group								
Women	8	40.00	11	55.00	1	5.00	20	100.00
Men	2	7.40	23	85.20	2	7.40	27	100.00
Vegetable-Fruit Group								
Women	6	30.00	13	65.00	1	5.00	20	100.00
Men	6	22.20	19	70.40	2	7.40	27	100.00
Fat- Sugar Group								
Women	6	30.00	13	65.00	1	5.00	20	100.00
Men	2	7.40	25	92.60	-	-	27	100.00

subjects, it was determined that there was no correlation between BMI, WC, blood glucose, and blood lipids in a positive or negative direction.

When the fruit and vegetable consumption levels of men were investigated, it was observed that, as fruit and vegetable consumption increased, BMI, WC, PoBG, total cholesterol, LDL-c, HDL-c, and triglyceride levels increased. In men, the difference between fruit and vegetable consumption levels and average values of blood glucose and blood lipids was not found to be statistically significant. However, a significant difference was found between the fruit and vegetable consumption of men and BMI ($p<0.050$). It was determined that, with an increase in fruit and vegetable consumption of subjects, there was not a correlation between BMI, WC, blood glucose, and blood lipids in a positive or negative direction.

When the fat and sugar consumption levels of women were investigated, it was seen that, as fat and sugar consumption increased, BMI, WC, PoBG, total cholesterol, LDL-c, and triglyceride levels increased. In women the difference between fat and sugar consumption levels and average values of BMI ($p<0.013$), WC ($p<0.003$), and triglyceride ($p<0.006$) was found to be statistically significant. It was determined that there was a correlation between the increase in fat and sugar consumption of subjects and an increase in BMI ($r= 0.44$ $p< 0.047$) and a widening of WC ($r= 0.53$ $p< 0.015$) in a positive direction.

In men, when fat and sugar consumption levels were investigated, it was seen that, as fat and sugar consumption increased, BMI, WC, and PoBG levels increased. In men, the difference between fat and sugar consumption levels and average values of blood glucose and blood lipids was not found to be statistically significant. It was determined that, as the fat and sugar consumption of subjects increased, there was no correlation between BMI, WC, blood glucose, and blood lipids in either in a positive or negative direction (Table 7).

Physical activity levels of subjects

When the subjects were investigated according to their PAL, it was determined that the ratio of women who had a low level of physical activity was 85.00 %, and the ratio of those who had a normal level of physical activity was 15 %. It was found that women did not

Table 7. Comparative analysis of BMI, WC, blood glucose, and blood lipid levels of subjects for each nutrition group

	Women				**Men**			
	Milk Group							
Parameters	**Less consumption**	**Normal consumption**	**Over consumption**	**p**	**Less consumption**	**Normal consumption**	**Over consumption**	**P**
BMI (kg/m^2)	24.00±3.59	25.13±7.10	-	0.869*	28.05±4.16	26.66±1.80	-	0.643*
WC (cm)	84.07±15.84	84.33±17.52	-	0.804*	99.12±11.15	90.66±4.04	-	0.139*
PrBG (mg/dl)	86.32±14.33	81.35±6.88	-	0.563*	90.71±8.51	97.00±4.00	-	0.142*
PoBG(mg/dl)	106.06±26.36	88.90±10.94	-	0.137*	102.10±22.52	111.53±21.83	-	0.589*
Total Cholesterol (mg/dl)	188.44±29.03	198.48±39.09	-	0.248*	203.60±43.87	220.36±73.65	-	0.877*
HDL-C (mg/dl)	61.89±20.29	55.71±14.42	-	0.563*	43.34±9.60	47.80±16.72	-	0.728*
LDL-C (mg/dl)	115.30±31.04	131.28±41.43	-	0.322*	138.05±39.51	163.73±78.82	-	0.643*
Triglyceride (mg/dl)	89.32±44.12	78.46±20.58	-	0.869*	148.25±84.48	143.83±85.01	-	0.877*
	Meat Group							
BMI (kg/m^2)	22.40±4.41	24.83±4.81	-	0.257*	25.73±2.45	26.97±3.24	31.78±4.46	**0.026****
WC(cm)	72.25±11.32	85.87±16.68	-	0.478*	90.66±4.04	95.50±9.03	110.00±10.27	**0.010****
PrBG (mg/dl)	81.07±7.46	85.77±13.59	-	0.670*	96.30±5.08	90.45±8.31	91.83±9.90	0.534**
PoBG (mg/dl)	96.85±10.20	101.93±26.43	-	1.00*	112.20±20.81	97.63±23.34	115.16±14.60	0.140**
Total Cholesterol (mg/dl)	170.35±25.56	196.73±31.45	-	0.219*	184.03±10.83	207.67±49.80	209.53±48.78	0.633**
HDL-C(mg/dl)	61.07±13.83	59.78±19.96	-	0.670*	52.96±15.45	42.42±8.79	43.50±11.43	0.466**
LDL-C(mg/dl)	100.00±20.34	125.12±35.51	-	0.219*	123.03±27.56	146.31±47.52	133.63±40.93	0.717**
Triglyceride (mg/dl)	66.22±26.05	91.02±39.93	-	0.219*	86.10±15.00	142.23±71.92	195.16±113.87	0.073**
	Cereal Group							
BMI (kg/m^2)	21.46±3.20	26.09±4.88	28.20±0.00	**0.035****	25.15±1.90	27.79±3.69	31.90±7.77	0.330**
WC (cm)	73.25±8.77	91.09±16.31	95.00±0.00	**0.025****	93.00±4.24	97.21±10.09	114.50±14.84	0.185**
PrBG (mg/dl)	82.60±6.17	87.43±15.84	74.00±0.00	0.381**	85.45±7.70	92.67±7.68	82.85±13.93	0.232**
PoBG (mg/dl)	101.17±20.81	98.44±26.73	126.00±0.00	0.507**	93.00±2.82	104.43±21.93	98.55±44.47	0.612**
Total Cholesterol (mg/dl)	175.76±22.02	203.54±34.63	184.00±0.00	0.249**	239.70±61.23	205.26±45.88	173.50±37.47	0.379**
HDL-C (mg/dl)	65.00±19.09	58.07±18.54	42.00±0.00	0.277**	48.25±10.25	44.13±10.57	35.95±1.34	0.312**
LDL-C(mg/dl)	103.08±22.70	131.57±38.36	130.00±0.00	0.174**	163.00±50.91	140.33±45.14	125.50±34.64	0.813**
Triglyceride (mg/dl)	60.15±20.23	100.91±39.15	130.00±0.00	**0.021****	119.40±71.55	152.37±87.25	123.00±52.32	0.792**

Table 7. Comparative analysis of BMI, WC, blood glucose, and blood lipid levels of subjects for each nutrition group

	Vegetable-Fruit Group							
BMI(kg/m^2)	23.38±3.40	24.49±5.37	28.20±0.00	0.634**	25.98±2.82	27.46±2.85	37.85±0.63	**0.050****
WC(cm)	79.83±15.38	85.30±16.75	95.00±0.00	0.553**	94.50±7.71	96.52±8.22	125.00±0.00	0.058**
PrBG (mg/dl)	80.40±6.24	87.71±14.35	74.00±0.00	0.259**	86.16±9.47	92.33±7.51	98.35±7.99	0.263**
PoBG(mg/dl)	98.71±30.31	100.00±21.62	126.00±0.00	0.529**	103.95±25.82	99.54±19.99	135.00±7.07	0.144**
Total Cholesterol (mg/dl)	187.60±25.79	193.80±35.92	184.00±0.00	0.873**	213.93±68.54	198.36±35.70	247.50±67.17	0.532**
HDL-C(mg/dl)	64.45±21.20	59.39±17.93	42.00±0.00	0.367**	39.56±3.54	45.17±11.61	43.95±9.97	0.661**
LDL-C(mg/dl)	64.45±21.20	59.39±17.93	42.00±0.00	0.789**	157.35±59.14	132.22±38.13	174.10±34.08	0.240**
Triglyceride (mg/dl)	75.43±36.24	87.59±39.49	130.00±0.00	0.425**	132.58±70.34	147.63±89.99	194.50±48.79	0.374**
	Fat- Sugar Group							
BMI(kg/m^2)	20.28±1.27	26.38±4.65	22.20±0.00	**0.013****	26.15±0.63	28.04±4.10	-	0.579*
WC(cm)	68.83±3.97	91.46±14.74	81.00±0.00	**0.003****	92.50±3.53	98.64±11.18	-	0.484*
PrBG (mg/dl)	84.23±5.30	85.84±15.17	75.20±0.00	0.485**	91.00±2.82	91.44±8.65	-	0.817*
PoBG(mg/dl)	98.76±24.98	101.28±25.26	109.00±0.00	0.604**	93.50±6.36	103.92±22.92	-	0.308*
Total Cholesterol (mg/dl)	178.88±30.25	198.73±32.20	172.30±0.00	0.361**	240.85±91.28	202.63±43.22	-	0.517*
HDL-C(mg/dl)	71.21±24.69	54.42±13.87	66.00±0.00	0.248**	51.00±15.55	43.26±9.95	-	0.379*
LDL-C(mg/dl)	100.08±25.55	130.75±35.00	101.70±0.00	0.109**	174.50±105.50	138.22±39.01	-	0.643*
Triglyceride (mg/dl)	53.75±10.51	103.59±36.46	52.10±0.00	**0.006****	157.00±120.20	147.02±82.67	-	1.000*

*Mann-Whitney U testi ** Kruskal-Walls H testi

have an intense level of physical activity. Regarding men, the ratio of those who had a low level of physical activity was found to be 66.70 %, the ratio of those who had a normal level of physical activity was 22.20 %, and the ratio of those who had an intense level of physical activity was 11.10 % (Table 8).

When the PAL of women was investigated, it was determined that, as the physical activity level increased, the average levels of BMI, WC, PrBG, PoBG, and triglycerides decreased. It was determined that there was a rise in the HDL-c levels of women linked to the increase in their PAL. The difference between the average values of BMI, WC, blood glucose, and blood lipids was not found to be statistically significant (Table 9). It was determined that, with the increase in the women's PAL, there was no correlation between BMI, WC, blood glucose, and blood lipids in a positive or negative direction.

When the PAL of men was investigated, it was seen that the average levels of BMI, WC, PoBG, and triglycerides were reduced in those who had an intense level of physical activity when compared to those with low levels. It was discovered that there was an increase in the men's HDL-c levels linked to the increase in PAL. With the increase in the physical activity levels of the men, the difference between average values of BMI, WC, blood glucose, and blood lipids was not found to be statistically significant (Table 9).

It was determined that there was a correlation in a positive direction between an increase in the physical activity level of men and an increase in HDL- c ($r= 0.51$ $p< 0.006$), and that there was a correlation in a negative direction with an decrease in PoBG ($r=- 0.43$ $p< 0.024$).

Discussion

It necessary that an adequate and regular approach to nutrition become a global priority. Balanced

Table 8. Physical activity levels of subjects

	Low (<150 minute/week)		Normal (150 minute/week)		Heavy (>150 minute/week)		Total	
PAL	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Women	17	85.00	3	15.00	-	-	20	100.00
Men	18	66.70	6	22.20	3	11.10	27	100.00

Table 9. Comparative analysis of BMI, WC, blood glucose and blood lipids of subjects as per physical activity groups

	Women				Men			
	PAL							
Parameters	**Low**	**Normal**	**Heavy**	**p**	**Low**	**Normal**	**Heavy**	**p**
BMI (kg/m^2)	24.84±4.79	21.50±3.82	-	0.153*	28.64±4.46	26.01±2.51	27.23±1.92	0.679**
WC(cm)	85.58±16.72	76.00±6.55	-	0.458*	100.44±12.59	93.00±3.28	95.00±5.00	0.668**
PrBG (mg/dl)	85.61±13.51	80.36±3.17	-	0.751*	91.66±9.21	90.68±8.37	91.36±2.09	0.970**
PoBG (mg/dl)	103.87±24.28	84.13±14.96	-	0.153*	109.51±19.82	94.06±24.75	83.10±18.51	0.065**
Total Cholesterol (mg/dl)	190.91±32.73	194.50±30.45	-	0.874*	209.67±38.69	177.46±53.11	236.16±65.05	0.087**
HDL-C (mg/dl)	59.73±19.48	61.76±15.33	-	0.671*	40.50±7.91	47.98±10.79	55.56±13.54	0.074**
LDL-C (mg/dl)	119.79±35.08	121.83±35.20	-	0.874*	145.22±36.05	115.50±45.48	165.83±76.09	0.136**
Triglyceride (mg/dl)	88.79±40.76	70.60±15.61	-	0.791*	162.17±91.14	105.50±39.42	145.76±87.19	0.332**

*Mann-Whitney U testi ** Kruskal-Walls H testi

nutrition and physical activity are two significant factors for avoiding obesity and for having a healthy life. It is clear that, particularly for individuals who work on at a desk for most of their work day, nutrition and physical activity inadequacies exist, made worse by time constraints. Since people who work at a desk spend the majority of their time as sitting and have a lack of physical activity because of this situation, these people face the risk of obesity (17, 18). In research conducted on 130 employees who work at a desk, it was determined that the BMI values of the women in this group were higher than those of women in general at a meaningful level (26).

In our study, we focused on volunteer subjects who work as academicians at the university who we evaluated as employees working at a desk. In this research, according to BMI values, 60% of women and 18.5% of men were within the normal class, 35% of women and 63% of men were within the overweight class, and 5% of women and 18.5% of men were within the obese class.

In research conducted in Kayseri, for men aged 20 or above, the prevalence of overweight and obesity as per BMI was found to be 39.6%. In logistic regression analysis, being university graduate, being a widower, having a family history of weight problems, and having obesity with a BMI value of 25 kg / m^2 were considered to be risk factors (27). In research conducted in Tokat, the average values of BMI were found to be 25.7 in men and 27.9 kg/m^2 in women; the prevalence of obesity was found to be 33.6 in women and 12.9 in men, and, in women, meaningful level of high obesity frequency was observed (28). In this research, according to the BMI values of women, it was determined that a statistically significant difference was not present between age, PrBG, and PoBG a statistically significant difference was determined, however, between the average values of WC ($p<0.000$), total cholesterol level ($p<0.050$), HDL-c ($p<0.026$), LDL-c ($p<0.006$), and triglyceride ($p<0.024$). According to the BMI values of men, it was determined that there was no statistically total cholesterol significant difference between age, PrBG, total cholesterol, HDL-c, and LDL-c. However, a statistically significant difference was discovered between the average values of WC ($p<0.001$), PoBG ($p<0.040$), and triglycerides ($p<0.009$).

In a study conducted in Japan with 634 men and 396 women who did not have hypertension, it was determined that there was no significant differences in the correlation between BMI, WC, and percentage of body fat to cardiovascular risk factors (29). In another study conducted with 6027 female and male subjects in Japan, it was discovered that BMI values were related to triglyceride, HDL-c, and LDL-c serum concentrations in a significant way (30). Again, in another study, 44 overweight or obese people subjected to a lifestyle intervention for three months based on nutrition training two times a week, psychological support, and an exercise program. The lifestyle intervention caused a significant reduction in metabolic profile as including BMI, WC, systolic and diastolic blood pressure, plasma glucose, and plasma triglycerides (31). In a study conducted with female workers working in a farm, a prevalence of MetS, body shape, and individual risk factors was found to be meaningfully high. It was found that MetS was related to BMI ($p <0.01$), fat mass (%) ($p <0.01$), WC ($p <0.001$), and HDL-c ($p <0.001$) (32). In another study, when obese individuals were compared to those who were not obese, while age, WC, fat mass, fat-free body mass, total body water, and basal metabolism rate increased, the levels of high density lipoproteins was found to be meaningfully low. In obese individuals, there was a significant difference between values of blood glucose, HbA1c, insulin resistance and C-reactive protein, and systolic and diastolic tension values when compared to individuals who were not obese (33). In another study, the prevalence of metabolic syndrome for obese women was found to be 56.9 %. While it was found that, as obesity level increased, the average values of blood glucose levels ($p=0.048$), the homeostatic model of assessment of insulin resistance (HOMA-IR) ($p=0.009$), and insulin levels ($p=0.031$) increased in a significant way although the levels of triglyceride, total cholesterol, LDL-c and HbA1c were not statistically significant, an increase was observed in them ($p>0.05$). It was determined that, with changes in nutrition and lifestyle, a reduction in a tendency towards obesity, dyslipidemia, and MetS (34) would occur. A study revealed that, in Korean adults, age, gender, WC, and BMI were positively correlated with hypertension (35).

To have healthy nutrition and healthy operation of the body, obtaining 55-60 % of energy from carbohydrates, 10-20 % from proteins and 25-30 % from fats (1,36) is required. In our study, by also considering nutrition consumption, the relationship with parameters was investigated. In our study, the difference between the milk consumption levels of men and women and the average values of BMI, WC, blood glucose, and blood lipids were not found to be statistically significant. However. in a study of workers, it was determined that, with an increase in milk consumption, there were increases in WC (p:0.0001) and BMI (37). In our study, the difference between the meat consumption levels of women and average values of BMI, WC, blood glucose, and blood lipids was not found to be statistically significant. In men, with an increase in meat consumption, the difference between average values of BMI ($p<0.026$) and WC ($p<0.010$) was statistically significant.

In one study, while a significantly large number of workers consumed meat (45.9 %), no correlation was found between meat consumption and dyslipidemia (38). In a study conducted with mine workers in India (38) it was found that their protein intake was significantly low. In our study, the difference between the cereal consumption levels of women and average values of BMI ($p<0.035$), WC ($p<0.025$), and triglyceride ($p<0.021$) was found to be statistically significant.

In a study, it was shown that consumption of full cereals (three portions or more a day), correlated to BMI in 11 out of 14 cross-sectional studies, and that it correlated to low WC in three studies ($p<0.05$) (39). In another study, full cereal consumption had a strongly inverse relationship to waist hip ratio and abdominal fats (40). In a study conducted in America, it was determined that cereal porridge was the most significant factor in reducing *myocardial infarction* risk and that, with each additional 10 g of cereal porridge, the risk was reduced by 29 % (41). In another study, it was determined that consumption of a diet not including full cereals increased the blood cholesterol level and that it led to the consumption of fewer micronutrients (42). In our study, the difference between the levels of fruit and vegetable consumption in women and men and the average values of blood glucose and blood lipids was not found to be statistically significant.

When a researchers evaluated 20 studies being conducted in different regions of the world related to fruit and vegetable consumption, they determined that high consumption of fruits and vegetables reduced blood pressure, improved vascular function, and had positive effects on BMI, WC, and cholesterol values (43). In our study, the difference between fat and sugar consumption levels in women and average values of BMI ($p<0.013$), WC ($p<0.003$), and triglyceride ($p<0.006$) was found to be statistically meaningful. In men, the difference between fat and sugar consumption levels and average values of blood glucose and blood lipids was not found to be statistically significant. In our research, we discovered that, as physical activities increased, the average levels of BMI, WC, PrBG, PoBG and triglyceride were reduced. It was determined that there was an increase in HDL-c levels depending on the increase in physical activity levels.

In the literature, studies conducted with different groups (11,44,45,46) concluded that, as BMI increased, PAL decreased. In certain studies, with people who had high levels of BMI and were defined as obese, physical activity values were found to be significantly low, not only in employees working at a desk but in all groups generally.

The BMI values of physically active subjects were low (47,48,49,50). In one study, it was determined that the physical activity levels of individuals working at a desk were generally insufficient but that this did not have a relationship to obesity with respect to BMI (51). In our research, when subjects were investigated according to their PAL, it was determined that 85.00 % of women had a low level of physical activity and that 15 % of them had a normal level of physical activity. It was determined that women did not have an intense level of physical activity. In men, the ratio of those having a low level of physical activity was determined to be 66.70 %, the ratio of those with a normal level of physical activity was found to be 22.20 %, and ratio of those having an intense level of physical activity was found to be 11.10 %.

In a study investigating the physical activity levels of academicians at Cukurova University, it was determined that 57.5 % of academicians in the Faculty of Religious Studies and the Faculty of Education, 55 % of academicians in the Faculty of Medicine, and the 22.5

% of academicians in the Faculty of Agriculture did not take part in physical activity (52). In another study, a statistically significant difference was not found between the BMI, the body fat mass (BFM), the body fat percentage (BFP), and the PAL of the academic personnel working at Nigde Omer Halisdemir University. Because academicians spent the majority of their day working at a desk, it was emphasized that their PAL were very low, and that, because of a lack of movement, their risk of having diseases like obesity, high blood pressure, etc. increased (53). In a study at Karadeniz Technical University, the physical activity of for the academicians working there, the inactive ratio was at 39 %, the less active level was at 50 %, and the active level was at 11%; at the same time, while their obesity level was low at a ratio of 2.8 %, at normal level with a ratio of 44 8 %, at overweight level with ratio of 41% and at obese level with ratio of 11,4%. Depending on the academicians' age, academic title and number of years worked, their time devoted to physical activity are reducing, and their overweight ratios are increasing (16).

Conclusion

In conclusion, we conclude that it is necessary that academicians who are overweight and who have impaired glucose tolerance and dyslipidemia to get healthy by having balanced nutrition and an increased level of physical activity.

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Correspondence:
Nildem Kizilaslan,
Tokat Gaziosmanpasa University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Turkey
E-mail: nildem.kizilaslan@gop.edu.tr