

Determinants of the Obesity of Adults in Turkey: An Empirical Study

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Abstract. *Obesity is a rapidly increasing health problem in Turkey. In this study, it was aimed to determine how adults who are obese in Turkey are affected by variables such as age, gender, marital status, education, income, as well as health status, physical activity time, adult diabetes, emotion, depressive, exercise, walking, cycling. The used econometric model is a two-stage Heckman model. While the probit model in the first stage of the model is estimated for specifying the variables which affect the probability of adults being obese/overweight, the Tobit model in the second stage is estimated to determine the effects of these variables on the adult body mass index (BMI). Data from Health Surveys of the Turkish Statistical Institute for the year 2016 are used in the study. The results show that the probability of being obese and BMI increase in age at a decreasing rate. On the other hand, the level of education decreases the probability of being obese and body mass index. Males are more likely to be overweight and obese than females, whereas the BMI of overweight-obese females is higher than the BMI of overweight- obese males. In addition, being married being middle or high income, being diabetic, being depressed and feeling worthless increase the probability of being overweight-obese and cause an increase in BMI level, while physical activities such as daily exercises and taking regular walks cause a decrease in the likelihood of being overweight-obese and BMI in Turkey.*

Keywords: Body mass index, Health, Heckman Model, Obesity, Physical activity, Sample selection bias, Socio-economic factors, Turkey

JEL Codes: C24, C25, D01, D91, I12

1. Introduction

The recent (current) changes in nutrition habits with the changes in social structure, the decline in real food prices in combination with the machine in agriculture has led to an increase in total calorie intake worldwide, and richer food consumption in terms of cholesterol and saturated fats (Lakdawalla and Philipson, 2007). With the rapidly changing eating habit, increased growth of business types requiring lower physical activity, increased urbanization rate, sedentary lifestyle, and time spent on computers or television has also increased the incidence of obesity (Yıldırım et al., 2008).

The World Health Organization describes obesity as a treatable disease that occurs as "abnormal or excessive fat accumulation in the body to the extent that it disrupts the health," because energy taken into the body through nutrients, in general, is more than the energy consumed by the human body (World Health Organization (WHO), 2019). Obesity causes the emergence of diseases such as diabetes, cardiovascular, insulin resistance, type II diabetes, coronary artery disease, polycysticover syndrome, liver lubrication, and

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shortening life expectancy (Yıldırım et al., 2008). From this perspective, it is stated that deaths related to obesity disease worldwide came in second place after smoking in the preventable death ranking (Turkish Endocrinology and Metabolism Association, 2019).

The World Health Organization measures obesity in general with its body mass index (BMI). BMI is obtained by dividing the individual's body weight (kg) into the square (m²) of the height of the individual (WHO, 2019). The values of BMI and the classification corresponding to these values are given in Table 1. Accordingly, those with a body mass index (BMI) below 18.49 are considered "weak", those between 18.50-24.99 are "normal weight", those between 25.00-29.99 are considered "overweight" (pre-obese), and those with 30.00 or higher are evaluated in the "obese" class.

Table 1. Body Mass Index

<i>Classification</i>	<i>BMI (kg/m²)</i>
<i>Weak (Low Weight)</i>	<16
Extreme Weakness	<16.00
Moderate Weakness	16.00-16.99
Mild weakness	17.00-18.49
<i>Normal</i>	18.50-24.99
<i>Pre-obez</i>	25.00-29.99
<i>Obez</i>	>=30
1st Degree	30.00-34.49
2nd Degree	35.00-39.99
3rd Degree	>=40.00

Source: Turkish Ministry of Health "Turkey healthy eating and moving life program 2014-2017.

According to World Health Organization data, 1.9 billion adults (ages 18 and over) are overweight in 2016, and more than 650 million adults are obese in the World (WHO, 2019). Obesity in Turkey has a similar appearance to the world, and the incidence of obesity is increasing day by day in Turkey. According to the 2016 Turkish Health Survey data, 19.6% of individuals in Turkey are obese, 34.3% are overweight. Also, 23.9% of women are obese, 30.1% of women are overweight, and 38.6% of men are obese, and 38.6% of men are overweight in Turkey (TurkStat, 2019a).

Food and soft drinks account for 14.6% of the total consumption expenditure of households in the highest 20% income group and 28.6% of total consumption expenditure of households in the lowest-income group according to the 2017 Income and Living Conditions Survey (TurkStat, 2019b). While the share of carbohydrate-weighted foodstuffs is high in the low-income group's food consumption pattern, the consumption of ready-made foodstuffs is higher in the food consumption pattern of the high-income group (Şengül, 2004). It can be said that this type of diet also causes obesity.

In recent years, it has been observed that there have been numerous studies on obesity in the international literature. In these studies, many economic and environmental factors are listed among the causes of obesity as well as genetic heritage, and it is suggested that the multi-story structures that increase with urbanization, inadequate green areas, unhealthy living conditions formed together with physical mobility, trigger many

diseases as well as increasing obesity. At the same time, the level of social awareness between countries and individuals and the different socio-economic conditions are also expressed as an important factor in the spread of obesity (Gupta et al., 2012; Gil and Takourabt, 2017; Yen, 2012; Yen et al., 2009).

In this study, it is aimed to show how obesity and overweight in adults in Turkey affect variables such as age, gender, marital status, education, income, as well as variables such as health status, physical activity duration, adult diabetes, feeling worthless, depressed, exercising, walking, cycling. The findings may contribute to the realization of the right health policies aimed at reducing obesity in Turkey.

2. Related Literature

As the incidence of obesity increases, there has been a significant increase in obesity-related studies in the literature. Some of the studies on obesity have been about identifying socio-economic and environmental factors that affect obesity. One of these studies, Demir et al., (2018), in the study of the determinants of obesity in adults in Turkey were estimated by the bivariate probit model, and the study found that obesity increased with age and decreased with education. Beyaz and Koç (2011) identified socio-economic variables affecting obesity prevalence in Antalya using a logistic regression model. The authors determined that gender, marital status, age, education, and car ownership variables affect obesity. Yumuk (2005) discussed the problem of obesity in Turkey through two surveys conducted in 1990 and 2000. In the study, the incidence of obesity increased from 18.6% in 1990 to 21.9% in 2000, and the problem of being overweight was more severe in men and women. Erem (2015), covering the years 1990 and 2010, stated that the incidence of obesity in Turkey increased over the years, from 18.8% in 1990 to 36% by 2010. In the study of Tansel and Karaoğlan (2017), they tried to determine the determinants of obesity in adults in Turkey by quantile regression method using the Turkish Health Research Survey data for 2008, 2010 and 2012. They got the body mass index as an indicator of obesity.

Tansel and Karaoğlan (2014, 2019a and 2019b) studies on health behaviors and obesity in Turkey examined the impact of education on obesity using the Turkish Health Survey Data conducted by TurkStat in 2008, 2010, and 2012. These studies have also covered health behaviors in the form of smoking consumption, alcohol consumption, consumption of fruits and vegetables, and regular activity. Villar and Domeque (2009) examined the relationship between household income and the state of being obese in the European Union member states. Data obtained from Eurostat were used in the study. The study found that the effect of income on obesity differed between men and women. Kain et al. (2003) found that in Latin American countries, the incidence of obesity in poor families was higher than in developed countries. The authors stated that the most important factors affecting obesity are factors such as nutrition opportunities (especially in children) before and after birth, socio-economic status of families, physical activity, and education level.

3. Data, Econometric Models and Variables

The 2016 Turkish Health Survey data used in this study was obtained from TURKSTAT. This recent survey was applied to 23,606 individuals in Turkey. The scope of the study included the individual aged 15 and older because the 2016 Turkish Health Survey did not include data such as the height and weight of individuals in the (0-14) age group. The number of observations is 17,242 for individuals aged 15 and beyond. Turkish Health Survey includes data from a wide range of variables related to age, gender, education status, income, daily activity, physical activity, health status, etc.

When studies related to obesity are examined, it is observed that the variables affecting obesity are generally age, gender, income, educational status, marital status, the situation at work, family type, settlement, daily movement time, frequency of physical activity, healthy eating, etc. (Wang and Lim, 2012; Shrewsbury and Wardle, 2008; Sobal and Stunkard, 1989). In this study, the variables that determine obesity in Turkey were selected in light of previous studies, as presented in Table 2. These variables are the gender of the individual, the age of the individual, the square of the age of the individual, whether the Social Security Institution meets the health costs, the level of education of the individual (examined in 5 categories), the marital status of the individual (examined in 3 groups), the way the individual works, the income level of the household (divided into 5 categories), whether the individual is diabetic, whether the individual is depressed, whether the individual is feeling valuable or not, whether the individual is in daily physical activity, whether the individual is feeling or not. Variables that indicate whether the individual walks for 30 minutes or more per day, indicating whether the individual rides 30 minutes or more daily.

Table 2. Variables and Definitions

Variables	Definition
BMI	<i>Body Mass Index (Calculated as the weight of the individual(kg) / Square of the individual's height.(m²)</i>
BMI	<i>If the individual is overweight or obese 1, otherwise 0</i>
Age	<i>Age</i>
Age square	<i>Age square</i>
Gender	<i>If the individual is male 1, otherwise 0</i>
SGK1	<i>If health care costs are covered by the Social Security Institution 1, if not covered, 0</i>
Educ1	<i>If the primary school has not finished or illiterate 1, otherwise 0 (reference)</i>
Educ2	<i>If primary school graduates are 1, otherwise 0</i>
Educ3	<i>If the secondary school, vocational secondary school graduate is 1, otherwise 0</i>
Educ4	<i>If high school graduate is 1, otherwise 0</i>
Educ5	<i>If university graduates,1, otherwise 0</i>
Single	<i>If never married,1, otherwise 0</i>
Married	<i>If married,1, otherwise 0</i>
Divorced	<i>If divorced or his spouse is dead, 1, otherwise 0 (reference)</i>
Occup1	<i>If paid, salaried or generalized,1, otherwise 0</i>
Occup2	<i>If the employer is 1, otherwise 0</i>
Occup3	<i>If adult works on its own account, 1, otherwise 0</i>
Occup4	<i>If a free family worker or unemployed,1, otherwise 0 (reference)</i>
Work type	<i>If it works full-time 1, otherwise 0</i>
Income1	<i>If household income is 1264 TL or less 1, otherwise 0 (reference)</i>
Income2	<i>If household income is between 1265-1814 TL, 1, otherwise 0</i>
Income3	<i>If household income is between 1815-2540 TL, 1, otherwise 0</i>
Income4	<i>If household income is between 2541-3721 TL, 1, otherwise 0</i>
Income5	<i>If household income is above 3721 TL, 1, otherwise 0</i>
Diabetes	<i>If adult diabetic,1, otherwise 0</i>
Depression	<i>If an adult had depression in the last 12 months, 1, otherwise 0</i>
Worthless	<i>If an adult hasn't felt worthless in the last two weeks,1, otherwise 0</i>
Daily exercise	<i>If adult exercises daily,1, otherwise 0</i>

Walk	<i>If an adult walk for 30 minutes or more per day, 1, otherwise 0</i>
Bicycle	<i>If an adult rides 30 minutes or more daily, 1, otherwise 0</i>

a. Econometric models

The model of the study is the two-stage Heckman model. The probit model is estimated in the first stage of the Heckman model. The dependent variable in the probit model is 1 in case the adult is overweight or obese, and 0 in the other (normal or weak). In the first stage, it determined how the independent variables in the model affect the probability that individuals are overweight/obese.

In the second stage of the Heckman model, the Tobit model is estimated that the dependent variable value is equal to the value of BMI if the individual is overweight or obese, and in other cases, censored with a value of zero. The Tobit model also determines the effect of the independent variables included in the model on the BMI. Therefore, the Heckman selection model allows you to obtain the information that both probit and tobit model offers separately at the same time, showing both the effects of descriptive variables in the model on the likelihood of being obese, as well as how the changes in independent variables affect BMI. This is the advantage of the Heckman selection model.

The first and second equations of the Heckman selection model are presented in equation 1 and Equation 2, respectively. If the adult is overweight or obese in the first equation, y_{1i}^* is equal to 1, if not 0, and y_{2i}^* equals the value of the body mass index if the adult is overweight or obese in the second equation, otherwise is zero.

$$y_{1i}^* = x_{1i}\beta_1 + u_{1i} \quad u_{1i} \approx N(0,1) \quad (1)$$

$$y_{2i}^* = x_{2i}\beta_2 + u_{2i} \quad u_{2i} \approx N(0, \sigma^2) \quad (2)$$

Here:

$$y_{1i} = \begin{cases} 1 & y_{1i}^* > 0 \text{ ise} \\ 0 & y_{1i}^* \leq 0 \text{ ise} \end{cases} \quad y_{2i} = \begin{cases} y_{2i}^* & y_{1i}^* > 0 \text{ ise} \\ 0 & y_{1i}^* \leq 0 \text{ ise} \end{cases}$$

β (β_1 and β_2 in 1st and 2nd equations respectively) shows parameter vectors, while x_1 and x_2 show the matrix of arguments in both equations.

These models were estimated to be the maximum likelihood estimator in equation 3 (Heckman, 1979; Greene, 2012). In equation 3, $\phi(\cdot)$ and $\Phi(\cdot)$ show the probability density and cumulative distribution functions of the standard normal distribution, respectively. U_1 and U_2 are the error terms that show bivariate normal distribution. ρ is the correlation coefficient.

$$\text{LogL}(\beta_1, \beta_2, \rho, \sigma | x_1, x_2) = \sum_{y_{1i}=0} (\log 1 - \Phi(x'_{1i}\beta_1)) \sum_{y_{1i}=1} -\log(\sigma) + \log \left(\phi \left(\frac{y_{2i} - x'_{2i}\beta_2}{\sigma} \right) \right) + \log \left(1 - \Phi \left(\frac{- \left(x'_{1i}\beta_1 + \rho \left(\frac{y_{2i} - x'_{2i}\beta_2}{\sigma} \right) \right)}{\sqrt{1 - \rho^2}} \right) \right) \quad (3)$$

The probit model estimated in the first stage calculates the Inverse Mills Ratio in Equation 4. to correct sample selection bias. Inverse Mills Ratio is used as an instrumental variable in Equation 2. In this case, Equation 2 turns to Equation 5.

$$\lambda_i = \frac{\phi(x'_i\beta_1)}{\Phi(x'_i\beta_1)} \quad (4)$$

$$y_{2i}^* = x_{2i}\beta_2 + \rho\sigma\lambda_i \quad (5)$$

b. Summary Statistics of Variables

The mean values and standard deviations of the variables used in this study are given in Table 3. 9,862 of the adults included in the survey were in the overweight or obese group, while 7,380 of the adults were in the normal or underweight group. In other words, 57.20% of adults in Turkey are in the overweight or obese group; 42.80% of them are in the weak or normal weight group. For all observations, the mean of the adult body mass index was 26.40. The age mean of individuals was 43.74.

For all observations, 20.8% of adults are single, 69% of them are married, and 10.1% of them are in the group of divorced or their spouses are dead. In addition, the proportion of adults with chronic diabetes is 10.9%, and the proportion of adults who have been depressed in the last year is 8.2%. Similarly, the proportion of individuals who are immobile in their daily work is 48%, while the proportion of individuals who are active in their daily work is 52% in Turkey. 62.6% of individuals walk less than 30 minutes per day, while 97.6% of them ride (bicycle) less than 30 minutes per day. Finally, 84% of all adults have a household income below Turkish Liras (TL) 3,721, while 16% have a household income above TL 3,721 (Table 3).

With the summary statistics of adults whose body mass index is 25 or higher (overweight or obese) in Turkey, the average body mass index is about 30 (1st degree obese). The average age of the individuals in this group is 48.67, and 79.3% of them are married. 44.3% of the individuals in this group are male, while 55.7% of them are female. 27.2% of them are at least high school graduates, and 32.3% of them have a household income of at least TL 2541 in Turkey (Table 3).

The average body mass index for adults below 25 (adults who are weak and normal weight) is about 21.88. 55.5% of the normal or weak weights adults have an average age of 37.15. 40.4% have high school and higher education levels (Table 3). 44.7% of the individuals in this group are male and 55.3% of them are female in Turkey.

Table 3. Descriptive Statistics

Variables	All Observation		Positive Observations (BMI>24.99)		BMI<25	
	mean	std. deviation	mean	std. deviation	mean	std. deviation
BMI	26.401	5.140	29.996	0.063	21.888	2.194
Age	43.745	17.855	48.674	15.705	37.152	18.424
Age square	2232.225	1703.793	2369.158	4.005	1719.683	1712.809
Gender	0.445	0.497	0.443	0.497	0.447	0.497
SGK1	0.841	0.366	0.864	0.343	0.811	0.392
Educ1	0.154	0.361	0.182	0.386	0.115	0.319

Educ2	0.345	0.475	0.423	0.494	0.241	0.428
Educ3	0.173	0.378	0.122	0.328	0.240	0.427
Educ4	0.180	0.384	0.150	0.357	0.220	0.415
Educ5	0.148	0.356	0.122	0.328	0.184	0.388
Single	0.208	0.405	0.088	0.283	0.367	0.482
Married	0.690	0.462	0.793	0.405	0.555	0.497
Divorced	0.101	0.302	0.119	0.324	0.078	0.268
Occup1	0.464	0.499	0.457	0.498	0.473	0.499
Occup2	0.017	0.131	0.020	0.139	0.015	0.120
Occup3	0.090	0.286	0.105	0.306	0.071	0.257
Occup4	0.429	0.244	0.418	0.261	0.441	0.216
Work type	0.599	0.490	0.618	0.486	0.575	0.494
Income1	0.213	0.409	0.211	0.408	0.215	0.411
Income2	0.273	0.446	0.277	0.448	0.268	0.443
Income3	0.183	0.387	0.189	0.392	0.174	0.379
Income4	0.172	0.376	0.170	0.376	0.171	0.377
Income5	0.161	0.367	0.153	0.360	0.171	0.377
Diabet	0.109	0.312	0.156	0.363	0.046	0.210
Depression	0.082	0.274	0.093	0.290	0.067	0.251
Worthless	0.218	0.413	0.229	0.421	0.202	0.401
Daily exercise	0.520	0.499	0.500	0.500	0.547	0.498
Walk	0.374	0.484	0.347	0.476	0.410	0.492
Bicycle	0.024	0.154	0.017	0.131	0.033	0.179
Sample size	17242	% 100.0	9862	% 57.2	7380	% 42.80

Adults who are overweight or obese are about 11 years older than adults who are weak or normal weight, and those married in this group are 25% more than those who are weak or underweight. Among adults who are overweight or obese, those with diabetes are approximately 3.5 times more than adults who are normal or underweight. This actually raises the expectation that those with diabetes are more likely to be obese (Table 3).

4. Results and Discussion

Parameter estimates of the Heckman selection model are presented in Table 4. Most of the parameters of variables in both equations have been obtained statistically significant and consistent with expectations.

Table 4. Parameter Estimation¹

Variables	Selection Model	Output Model
	Coefficients	Coefficients
Age	0.1002***	0.4965***
Agesquare	-0.0009***	-0.0046***
Gender	0.1732***	-0.5224***
SGK1	0.1317***	0.7789***
Educ2	-0.0523	-0.1757
Educ3	-0.1509***	-0.8193***
Educ4	-0.2424***	-1.3594***
Educ5	-0.3516***	-2.0432***
Single	-0.3436***	-1.3426***
Married	-0.0143	-0.3072*

¹ (*), (**), (***) significant level of % 10, % 5 and % 1 respectively.

Occup1	-0.1890***	-0.6594***
Occup2	-0.1855**	-0.4555
Occup3	-0.2001***	-0.5441**
Worktype	0.0234	0.0494
Income1	0.0366	0.3805**
Income2	0.1281***	0.6601***
Income3	0.1297***	0.6334***
Income4	0.1096***	0.3924**
Diabet	0.4341***	2.2568***
Depression	0.0896**	0.3165*
Worthless	-0.0244	0.1401
Dailyexercise	-0.0477**	-0.6810***
Walk	-0.0931***	-0.5680***
Bicycle	-0.0705	0.0177
Constant	-2.0991***	15.1223***
Lambda	5.2516**	
Rho	0.9758	
Sigma	5.3819	

The selection model is the model in which the dependent variable takes 1 if the adult individual is overweight or obese, otherwise 0. The output model in which the dependent variable takes its own value in case the adult's body mass index is 25 or higher than 25, and the body mass index is less than 25 model, which takes a value of 0. λ (inverse mills ratio) has been statistically significant. Namely, parameter estimates will be biased and inconsistent if zero observations are excluded from estimating the model.

Coefficients of age and age square variables in the selection model; In Turkey, adults with age are more likely to be overweight or obese, but this increase tends to decrease after a certain point. Another important finding of the study is that the likelihood of being overweight or obese is higher in men than in women. According to the data used in this study, the proportion of overweight or obese men in Turkey is 44.30%, while the proportion of overweight or obese women is 55.7%, but women are less likely to be obese in Turkey.

This result can be interpreted that women are less likely to be obese. Because women tend to diet, exercise, and therefore lose weight and care for their physical appearance, with their increasing and changing roles in society in Turkey. It has been found to be lower in adults with high levels of education who are more likely to be overweight or obese. As in developed countries in Turkey, the more education increases, the less likely it is to be obese.

In Turkey, a single adult was found to be less likely to be overweight or obese than married or divorced/widowed adults. Paid-duty workers are less likely to be overweight or obese than free-paid family workers in Turkey. The effect of full-time works on the likelihood of being obese was found to be statistically meaningless.

One of the important findings of this study is that as income increases in Turkey, adults are more likely to be overweight or obese, but in the last income group, this possibility appears to fall in a bit. Because of the different levels of social consciousness in developed and developing countries, the effect of socio-economic status on obesity also varies. With the increase in income, one of the key determinants of socio-economic status, obesity has increased in developing countries, and obesity has decreased in developed countries

(Gupta et al., 2012; Gil and Takourabt, 2017). Therefore, it can be said that income growth increases obesity in Turkey, which is a developing country.

Those who have diabetes in Turkey were found to be more likely to be obese than those who are not depressed. Similarly, the likelihood of an adult who does not feel worthless (feeling valuable) is less likely to be overweight or obese (although statistically meaningless) than the adult who feels worthless. When you look at the effect of physical activity on obesity, adults regularly daily exercise, 30 minutes or more of regular walking, and cycling for 30 minutes or more per day reduces the likelihood of being overweight or obese. This negative effect is more in adults walking for 30 minutes or more daily in Turkey.

When the Tobit (output) model, where BMI is censored for individuals who are weak or normal weight (for values 24.99 and below), was found to be statistically significant, much of the coefficients of the independent variables in the model were found to be statistically significant. The coefficient of the gender variable was found to be negative in this equation, contrary to the selection model.

This finding shows that although men in Turkey are more likely to be obese or overweight than women, the body mass index value of men is lower than the value of women's body mass index. According to the body mass index of 28.94 for men and 30.44 for women in Turkey, women are more obese than men. According to the output model, the higher the educational status of the individual, the lower the value of the body mass index, in other words, the higher the education, the relative weight of individuals can be said to decrease. BMI was found to be 1.34 lower than those who had never been married. This result shows that married individuals will be more overweight than single individuals. And the BMI of paid workers and workers who are self-employed are lower than free family workers and unemployed.

BMI values of individuals with higher household incomes were found to be higher. When looking at household income, BMI of adults with household income between 1,265 and 1815 TL is 0.38 points higher than BMI of adults in other income groups, and BMI is 0.66 points higher than adults with a household income of 1,815-2,541 TL compared to adults in other income groups. As income increases in Turkey, it can be said that the body mass index in adults, and therefore obesity, increases. Many studies on obesity have been noted that the effect of income on obesity in developing countries is positive (Kain et al., 2003).

The BMI value of individuals with diabetes was found to be 2.25 higher than non-diabetic individuals. The body mass index of depressed adults in the last 12 months was found to be higher (with a value of 0.315) than adults who were not depressed. The coefficient of the depression variable was also positively effected and statistically significant. This is more likely to be obese in Turkey than those who are not depressed. The effect of the adult's lack of feeling worthless on BMI is statistically insignificant but affect positively.

When the variables related to physical activity are examined in the model; according to the individual who does not exercise daily, the individual who walks for 30 minutes or more per day will have a lower body mass index than the individual who do not walks for more than 30 minutes per day in Turkey.

5. Conclusions

In this study, it was determined how socio-demographic and economic variables and daily exercise, diabetes, depressive, inability to feel worthless, and health status affect the likelihood of being overweight/obese and body mass index of adults in Turkey. Obesity is one of the important health problems in all the world and in Turkey. Determining the causes of obesity in Turkey will help design national health policies aimed at reducing obesity in the country.

In Turkey, men are more likely to be obese or overweight than women. However, men's body mass index value is lower than the body mass index value of women. While the likelihood of being obese and body mass index increases with age in Turkey, the increase in the body mass index is higher, and the likelihood of being obese and the increase in BMI tends to fall after a certain age (after the age of 45-54).

Considering the negative impact of education on obese/overweight and on the body mass index of adults in Turkey, individuals should be aware of obesity through education.

When the effect of the marital status on obesity in Turkey is examined, adults who never married are less likely to be obese than married people, adults who are married and divorced, or whose spouse is dead. At the same time, the body mass index of adults who never married is lower than those married, divorced, or the adult whose spouse is dead. Marriage and increasing age, lifestyles of individuals between work, children, and home increase obesity. It can be said that focusing on activities that improve the lifestyles of individuals in this group will reduce obesity.

For this reason, accessible daily exercise areas for adults, and walking paths should be made near the settlements, and measures should be taken to promote an active lifestyle.

In this study, it was determined that adults are more likely to be obese/overweight and that their BMI increases. An adult with a household income of 3,722 TL or more in Turkey is more likely to be obese or overweight than adults with low household income. A similar situation is seen in the body mass index, and as household income increases, BMI of the adult's increases in Turkey. In this case, it can be said that Turkey is a developing country in terms of obesity.

Adults with lower educational levels were more likely to be obese, so it will be effective in reducing obesity to training programs related to balanced and adequate nutrition in Turkey. Lastly, when adults exercise daily, walking 30 minutes or more a day, such as physical activity, is less likely to be obese, and the effect on the body mass index is negative. Therefore, one of the most important results of this study is that physical activity is very important in reducing the risk of obesity. In this case, it can be said that policies should be followed to promote physical activities in order to reduce obesity in adults in Turkey or to prevent being obese. Individuals should be encouraged to perform physical activities by making safe walking paths and bicycle paths in Turkey, and increasing green areas (such as city parks). It appears that increasing the level of education, informing the public on the health risk of obesity, and increasing the number of public exercise areas such as parks, bike, and walk trails could be vital for decreasing obesity in Turkey. More research should be done to examine the socio-economic inequality of obesity among adults and determine effective programs aimed at reducing obesity in Turkey.

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