

Original Research Article

Overweight and obesity in women: prevalence, risk factors, and public health implications

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ABSTRACT

Background: The purpose of this study was to determine overweight/obesity frequency, nutritional and health behaviors in women living in a specific region in Turkey.

Methods: We conducted the cross-sectional study in which the sample comprised 458 women by analyzing the data acquired from the survey forms questioning nutritional and health behaviors between September 2018 and January 2019.

Results: The study found the women's overweight and obesity rate to be 40.2%. Also, there was a statistically significant correlation between their Body Mass Index levels and the increase in age averages, status of having a medium level of income and being unemployed, and having a chronic illness. In addition, their BMI levels increased with the status of sleeping less than six hours a day, having four and more meals a day, having no tea and coffee a day, having one and more portions of dessert a day, having one to three slices of bread a day, and doing no exercise. There was a statistically significant correlation between ($p < 0.05$).

Conclusions: According to our study, women's nutritional and health behaviors are effective on the development of overweight and obesity. Projects and health educations on nutrition and physical activity to be planned for women can be recommended.

Keywords: Health behaviors, Nutrition, Obesity, Overweight, Women's health

INTRODUCTION

Overweight and obesity are defined as "abnormal or excessive accumulation of fat in fatty tissues."¹ They have become a critically important international community health problem for countries across the World.² Important factors causing overweight and obesity are sedentary life style and diffusion of imbalanced and poor nutritional behaviors.³ Besides physical illnesses such as type 2 diabetes, cardiovascular diseases, musculoskeletal problems and a variety of cancers, obesity may cause psychological disorders. Also it has become a dangerous health problem because it worsens the prognosis of these illnesses.^{2,3}

The obesity rate worldwide has dramatically increased and nearly become three times greater since 1975.⁴ According to the 2016 data, more than 1.9 billion adults worldwide are overweight and more than 650 millions of these are defined as obese.¹ A study on obesity including 56 countries worldwide found that the obesity rate is higher among women than among men in 46 countries.⁵ According to the 2017 Organization for Economic Co-operation and Development (OECD) obesity data, the general obesity rate in Turkey is 28.8%.⁶ Also comparing the obesity rate of women (33.2%) with the rate of men (18.2%); the rate of women is nearly two times greater.⁷ Today obesity has been accepted as a pandemic. It has a particular impact on female gender. Factors such as age (especially adolescence and menopausal period),

pregnancy, number of childbirths and time of breastfeeding are considered among the causes of obesity specific to women.^{8,9} In addition obesity negatively affects women's health in the prenatal period and during pregnancy and mother-child health in the postnatal period.¹⁰

In light of the above, women are at risk for most chronic diseases. Also, obesity is a preventable illness. It is crucial that factors causing overweight and obesity in women be revealed and relevant measures be taken. The purpose of this study was to determine and evaluate overweight/obesity frequency and nutritional and health behaviors in women applying to a family health center in a region in Turkey. The secondary purpose of the study was to determine the correlation between the blood types and Body Mass Index levels of the women.

Research questions

- What are women's nutrition and healthy living behaviors?
- What are the Body Mass Index levels of women?
- Is there a relationship between women's obese/overweight status and their nutritional behaviors?
- Is there a relationship between women's obese/overweight status and health behaviors?

METHODS

Population and sample of the research

The target population of the study which was conducted in a Family Health Center in Turkey comprised approximately 15.000 women registered to five doctors working there. According to the calculations, the sample comprised 375 women based on 95% confidence interval and 5% margin of error. The study planned to reach at least 375 individuals via the probability systematic sampling method. This community-based cross-sectional study was conducted with 458 women who applied to the family health center and agreed to participate between September 2018 and January 2020.

Inclusion criteria

Being 18 years of age or older, having individually applied to the family health center, being able to read and write in Turkish, having no mental or psychiatric condition that would hinder participation in the assessment, not being pregnant, providing signed informed consent after receiving information about the study.

Exclusion criteria

Inability to read or write in Turkish, having a mental or psychiatric condition that prevents evaluation, being pregnant, not providing informed consent, providing

incomplete or inconsistent responses to the data collection tools.

Data collection and data collection tools

The study obtained data by having the participants complete a survey form via the face-to-face interview method. The data were collected through a questionnaire prepared by the researchers by reviewing the literature. The form includes a total of 22 questions. The questions concerning sociodemographic characteristics of the participants sought to determine their: age, height, weight, family type, education, employment, blood type, illness status, presence of a chronic illness in family and economic condition. Also our study questioned the presence of a chronic illness in family members and weight problems in first degree relatives of the individuals that show the demographic characteristics of women (age, education level, income status, working status) and nutritional and health behaviors, Obesity and Overweight, blood types and physical activity status of the individuals. According to the obesity classification by the World Health Organization, the study used Body Mass Index (BMI) to evaluate obesity. Accordingly, evaluating the women's BMI levels; BMI <18.5 was low-weight, BMI between 18.5-24.9 was normal, BMI between 25-29.9 was overweight, BMI >30 was obese and BMI>40 was morbid obese.¹¹ Health behaviors of the participants were evaluated via the questions determining their nutritional, smoking, alcohol, sleep and physical activity behaviors. When evaluating nutritional behaviors, the study questioned the frequency of the individuals to consume staple food and beverages in a day and in a week. Also, the study questioned physical activity behaviors via the number of exercises the individuals did in a week.

Data analysis

The study analyzed the data via the SPSS 20.0 statistics program. Number and percentage which are among descriptive statistics, were used for introductory characteristics of the women. The study examined the normal distribution of the data in comparing the correlation between sociodemographic characteristics and nutritional and health behaviors of the women according to BMI and used parametric tests (independent t-test, One way ANOVA) for the normally distributed data and non-parametric tests (Kruskal Wallis-H Test, Mann Whitney-U Test) for the non-normal distribution data. The results were evaluated in a 95% confidence interval and at a 5% significance level.

RESULTS

BMI values of the women who took part in our study were overweight (27.5%) and obese (12.7%) (Table 1).

Sociodemographic characteristics and BMI levels of the women who participated in our study. There was a

statistically significant difference between the women's age, schools, economic condition, employment, presence of a chronic illness and type of illness and their BMI ($p < 0.05$). According to Table 2, 81.7% of the women were aged 15 to 49 years, 36% were high school graduate, 64.6% had a medium economic condition, 66.4% were unemployed and 73.3% had no illness. Also the blood type of 41.5% was A. According to these results, found no statistically significant difference between the blood types and BMI of the women (Table 2).

Table 1: Body mass index rates of participants (n=458).

Body mass index	N (%)	Mean(SD)
0-18.4 kg/m ²	33 (7.2)	17.5 (0.7)
18.5-24.9 kg/m ²	241 (52.6)	22.0 (1.6)
25-29.9 kg/m ²	126 (27.5)	27.0 (1.4)
30 kg/m ² and above	58 (12.7)	34.6 (4.1)

Abbreviation: N= Number, %= percentage, SD= Standard Deviation

Table 2: Evaluation of women's sociodemographic characteristics and BMI (n=458).

Characteristics	N (%)	BMI mean (SD)	Statistics	P value
Age (in years)	15-49	374 (81.7)	F=79.425	<0.001
	49-85	84 (18.3)		
School of graduation	Not literate	18 (3.9)	F=27.873	<0.001
	Elementary school graduate	116 (25.3)		
	High school graduate	165 (36.0)		
	University graduate	159 (34.7)		
Economic condition	Bad	11 (2.4)	$\chi^2=6.642$	00.036
	Medium	296 (64.6)		
	Good	151 (33)		
Employment	Yes	154 (33.6)	t=-2.658	0.008
	No	304 (66.4)		
Presence of a chronic illness	Yes	122 (26.6)	t=7.228	<0.001
	No	336 (73.3)		
Type of chronic illness	Hypertension	39 (8.5)	F=28.221	<0.001
	Diabetes	15 (3.3)		
	Asthma	36 (7.9)		
	COPD	2 (0.4)		
	Other	32 (7)		
	No illness	334 (72.9)		
Illness caused by nutrition	Yes	104 (22.7)	t=4.099	<0.001
	No	354 (77.3)		
Blood type	A	189 (41.3)	F=0.845	0.497
	B	111 (24.2)		
	AB	58 (12.7)		
	O	85 (18.6)		
	I don't know	15 (3.3)		

t=Independent t-test; F=One-way ANOVA; χ^2 = Kruskal Wallis-H Test; BMI=Body mass index; SD=Standard deviation; n=Number; %= Percentage.

The nutritional habits and assessment of BMI levels of the women participating in the study. Accordingly, there was a statistically significant difference between the women's daily sleeping hour, daily consumption of bread and types of bread, daily consumption of coffee, consumption of dessert and their BMI ($p < 0.05$). Of the women; 26.5% smoked, 53.1% slept six to eight hours a day and 59.4% had three meals a day. Also 52.8% of them had one to three slices of bread a day and 55.7% chose white bread. Of the women, 55.6% stated that they had one to two cups of coffee a day and 69.4% had one portion of dessert daily (Table 3).

The presence of chronic diseases in the family, weight issues in first and second-degree relatives, and the BMI

levels of women were assessed. Accordingly, there was a statistically significant difference between the presence of a chronic illness in family, weight problems in first and second degree relatives and BMI levels ($p < 0.05$). According to Table 4, the most frequently encountered chronic illness in families of the women was hypertension at the rate of 33.8%. Of the women, 37.1% had weight problems in their first degree relatives and 34.3% in their second degree relatives (Table 4).

The assessment of the exercise status of participating women in relation to BMI is included. Accordingly, 39.1% of the women did not exercise in a week and there was a statistically significant difference between the number of weekly exercises and BMI levels ($p < 0.05$) (Table 5).

Table 3: Evaluation of BMI with nutritional habits (n=458).

Variables		N (%)	BMI mean (SD)	Statistics	P value
Do you smoke?	Yes	107 (23.4)	26.5 (5.8)	t=3.880	<0.001
	No	351 (76.6)	24.1 (4.6)		
Do you use alcohol?	Yes	31 (6.8)	23.1 (4.4)	Z=-1.89	0.058
	No	427 (93.2)	24.8 (5.0)		
How many hours a day do you sleep?	Four to six hours	49 (10.7)	25.8 (4.8)	F=9.835	<0.001
	Six to eight hours	243 (53.1)	23.9 (4.1)		
	Eight to ten hours	154 (33.6)	24.9 (5.4)		
	Ten to twelve hours	11 (2.4)	32.7 (9.8)		
	Twelve hours and above	1 (0.2)	29.4		
How many meals a day do you have?	Once or twice	155 (33.9)	24.6 (4.7)	F=7.654	<0.001
	Three times	272 (59.4)	24.4 (4.8)		
	Four times and above	31 (6.8)	28.1 (5.0)		
How many slices of bread a day do you have on average?	Never	34 (7.4)	3.5 (5.7)	F=24.647	<0.001
	One to three slices	242 (52.8)	23.9 (4.4)		
	Three to six slices	133 (29)	25.0 (4.3)		
	Six to nine slices	33 (7.2)	25.7 (4.8)		
	Nine to twelve slices	10 (2.2)	27.8 (4.7)		
	Twelve slices and above	6 (1.3)	43.7 (3.0)		
What type of bread do you choose to eat?	White bread	255 (55.7)	23.3 (5.5)	F=2.675	0.031
	Cereal bread	48 (10.5)	23.8 (4.1)		
	Rye bread	18 (3.9)	22.5 (2.1)		
	Whole wheat bread	115 (25.1)	24.1 (4.9)		
	Whole meal bread	22 (5)	24.2 (4.9)		
How many cups of coffee a day do you have?	Never	147 (32.1)	25.8 (5.1)	F=5.691	0.004
	One to two cups	256 (55.6)	24.2 (5.1)		
	Three cups and above	55 (12)	23.9 (3.9)		
How many glasses of tea a day do you have?	Never	29 (6.3)	26.1 (7.6)	F=5.497	<0.001
	One to four glasses	272 (59.4)	24.0 (4.3)		
	Four to eight glasses	121 (26.4)	25.1 (4.7)		
	Eight glasses and above	36 (7.9)	27.1 (7.2)		
How many portions of dessert a day do you have?	Never	59 (12.9)	24.7 (5.8)	F=4.050	0.007
	One	318 (69.4)	24.3 (4.4)		
	Two	66 (14.4)	25.7 (6.5)		
	Three and above	15 (3.3)	28.3 (5)		

t = Independent t-test; F = One-way ANOVA; Z= Mann Whitney-U; BMI=Body mass index; SD=Standard deviation; n=Number; %= Percentage

Table 4: Presence weight problems in the family and BMI evaluation (n=458).

Variables		N (%)	BMI (SD)	Statistics	P value
The presence of chronic diseases in the family	Hypertension	155 (33.8)	25.0 (4.7)	F=5.244	<0.001
	Diabetes	96 (21)	26.4 (6.4)		
	Asthma	38 (8.3)	25.1 (4)		
	COPD	5 (1.1)	24.4 (0.7)		
	Other	41 (9)	23.5 (6.1)		
	N/A	123 (26.9)	23.2 (3.5)		
First degree the presence of weight problems in family members status	Yes	170 (37.1)	26.2 (5.7)	t=4.772	<0.001
	No	288 (62.9)	23.8 (4.4)		
Second degree the presence of weight problems in family members status	Yes	157 (34.3)	26.1 (5.7)	t=3.975	<0.001
	No	301 (65.7)	24.01 (4.4)		

t = Independent t-test; F = One-way ANOVA; BMI=Body mass index; SD=Standard deviation; n=Number; %= Percentage

Table 5: Physical activity and BMI (n=458).

Variables		N (%)	BMI(SD)	Statistics	P value
Number of exercises per week (such as walking, cardio, running...)	Never	179 (39.1)	25.5 (5.4)	F=5.180	0.001
	Everyday	47 (10.3)	24.2 (4.9)		
	Once or twice	144 (31.4)	25 (4.6)		
	Three to four times	58 (12.7)	23.1 (4.7)		
	Four times and above	30 (6.6)	21.6 (3.6)		

F = One-way ANOVA; BMI=Body mass index; SD=Standard deviation; n=Number; %= Percentage

DISCUSSION

Obesity is a chronic and progressive illness reducing physical activity and causing social, physiological and psychological problems. It is crucial to reveal factors affecting obesity frequency in the struggle against obesity, which is an ever-increasing social problem. The findings of this study align with previous research indicating that various sociodemographic, behavioral, and genetic factors contribute to the prevalence of overweight and obesity in women.

Our study found the mean BMI value to be 24.07(±5.0). Comparing with other studies conducted in Turkey, our mean value was lower. Comparing with local studies, a study conducted by Büyükdoğrucan in 2019 found the mean BMI level to be (25.0±4.8), which is close to our study.¹² One of the strongest findings of our study was the positive correlation between age and BMI levels, with older women exhibiting higher obesity rates. This trend is widely documented in the literature, where age-related metabolic slowdown, hormonal changes (especially during menopause), and reduced physical activity contribute to increased fat accumulation.¹³ The studies conducted by Schooling, Nazlıcan et al, Doak et al, Okely et al and Jura obtained similar results.¹⁴⁻¹⁸ Accordingly, the reason that the mean BMI in our study was lower than other studies may be associated with the mean age of 36±13 years. It is possible to state that as age increases, the body metabolism slows down and physical activity reduces, which increases the overweight and obesity risk.

There was a statistically significant correlation between educational level and BMI levels. BMI values were 26.4 in those who were not literate and decreased to 23.5 in those who were university graduate. Büyükdoğrucan, Nazlıcan et al and Çayır found that educational level affects overweight and obesity.^{12,19,16} Accordingly, it is possible to conclude that women with a higher educational level have higher knowledge and skills concerning nutrition and physical activity. In addition it is possible to conclude that as educational level increases, women's social appearance anxiety increases and thus they show a greater attention to their appearance. The mean BMI was lower in the employed women than the unemployed women and the correlation between was statistically significant ($p<0.05$). A study conducted by Bakshi et al. found similar results.²⁰ Also the employed

women had a tendency to dieting more regularly than the unemployed women.²¹

Economic status was also found to be a key factor, as women with lower income levels exhibited higher BMI values. This aligns with prior studies suggesting that lower-income individuals often have limited access to healthy foods and healthcare, contributing to poor dietary habits and weight gain.² As the women's level of income increased, their BMI levels decreased. In the literature the studies conducted by Çayır et al and Bakshi et al found similar results.^{19,20} Accordingly, it is possible to think that as the economic condition of individuals decreases, their imbalanced and poor nutritional behaviors increase.

Our study found that the women with an illness had higher BMI levels. There was a statistically significant correlation between having an illness and BMI levels ($p<0.05$). Büyükdoğrucan and Nazlıcan found similar results to our study.^{12,16} Accordingly, it is possible to conclude that just as overweight and obesity cause illnesses, illnesses may cause obesity. Also our study found that the first illness with the highest BMI level was diabetes and the second one was hypertension. In addition, there was a statistically significant correlation between nutrition-related illnesses and BMI levels ($p<0.05$). Since these illnesses have imbalanced and poor nutrition and lack of physical activity in their etiology, we think that they cause overweight and an increase in BMI levels.

There was no statistically significant correlation between the women's blood types and BMI levels. Studies on this subject are not adequate. A study conducted by Wang et al. with overweight adults in 2018, found no statistically significant correlation between blood types and BMI levels, either.²² Our study has similar results to the aforementioned study.

Our study found a statistically significant correlation between the increase of sleeping hours and BMI levels ($p<0.05$). Also examining the literature; especially the sleeplessness experienced at night hours (less than six hours of sleep) causes obesity.²³ Our study found that the women sleeping four to six hours a day had higher BMI levels than those sleeping six to eight hours. In addition the study concluded that sleep duration of ten hours and above increased BMI values. Accordingly, it is possible

to state that sleep duration below or above six to eight hours ruins the circadian rhythm and increases BMI levels.

Nutritional habits played a substantial role in BMI variations. Women consuming four or more meals per day had higher BMI levels, consistent with findings suggesting that frequent meals may lead to excessive calorie intake, unless regulated by portion control and food quality.²⁴ Also the study found that the women having four and more meals a day had higher BMI levels. Büyükdoğan obtained a similar result in his study and concluded that an increase in the number of meals causes an increase in BMI levels.¹² We think that an increase in the number of meals and an abundant amount of calory received in every meal may create an imbalance between the energy received and consumed and cause overweight/obesity.

The study found that an increase in daily consumed tea and coffee reduced BMI levels. Caffeine which is available in tea and coffee is an important factor in reducing the body fat mass. Although we think that caffeine is effective on decreasing BMI levels by reducing the appetite and decreasing the metabolic rate, there is no consensus.²⁵ Accordingly, caffeine can be a part of the nutritional process when taken adequately and balancedly in the process of protecting from and treating obesity.

The study found a statistically significant correlation between the daily consumed slices of bread and number of dessert portions and BMI levels. Accordingly, as the number of daily consumed dessert portions increased, BMI values increased statistically.²⁴ It is possible to state that abundant consumption of dessert and bread triggers the desire to eat because it immediately increases and then quickly decreases the glycemic index and thus causes an increase in BMI levels.

Our study found that obesity is a multifactorial illness caused by environmental and genetic factors. Although the study did not fully determine the impacts of genetic factors on obesity, it found that the women with weight problems in their first and second degree relatives had higher BMI levels than those without these problems. Also there was a statistically significant correlation between ($p<0.05$). In the study conducted by Çayır and his colleagues and Locke and his colleagues, similar results were found to the results of our study.^{19,25} It is possible to think that nutritional behaviors and physical activity habits learned from family are sustained.

There was a statistically significant correlation between the individuals with a chronic illness in family and BMI levels ($p<0.05$). Accordingly, the women with a chronic illness in family had higher BMI levels. BMI levels were higher especially in those with diabetes in family, compared to other illnesses. Cole and Florez indicated in their study that environmental factors, obesity and genetic

factors are effective on the ethiology of diabetes.²⁶ Accordingly, it is possible to conclude that applications especially aimed at individuals with diabetes or a chronic illness in their family should comprise family members.

Our study found that regular physical activities conducted four and more times a week significantly reduced BMI levels ($p<0.05$). Also a variety of studies have determined that calory surplus caused by the decrease of physical activities increases the body fat.²⁷ In addition it is necessary to do physical activity frequently and intensely. WHO recommends that adults aged 18 to 64 years should do medium-intensity physical activity at least 150-300 minutes a week.¹

Limitations of the research

As a data collection tool, the comprehensibility of the form, which was created in the light of literature information, was evaluated with a preliminary study of 15 people and corrections were made in this direction. However, validity and reliability of the data collection form was not performed. This is the main limitation of this study. In addition, the fact that the BMI values of the participants in the study are based on the statements of the participants and cannot be generalised to the universe due to the limited sample group is among the limitations of the study.

CONCLUSION

As a consequence, our study in which we aimed to determine and evaluate overweight/obesity, nutritional and health behaviors in women and evaluated the correlation between their BMI levels and blood types, found the women's overweight and obesity rate to be 40.2%, which was too high. The study found no significant correlation between BMI levels and blood types. According to our study, the factors increasing BMI levels in the women were; increase of age, decrease of economic level, decrease of educational level, unemployment, presence of a chronic illness, presence of nutrition-related illnesses, having four and more meals a day, sleeping less (four to six hours) or more (10 hours and above) than normal, increase of daily consumed dessert, increase of daily consumed bread, presence of weight problems in first/second degree relatives and decrease of exercise frequency. BMI levels decreased as a result of the increase of daily consumed caffeine.

Healthy nutrition and regular physical activity are among the basic conditions of preventing common illnesses like obesity, diabetes and hypertension and having a healthy society. Considering that obesity frequency has a gradual increase and a dangerous and sneaky progress today; we can recommend that health training be provided especially to women, individuals in society and families concerning nutrition and physical activity. Also we can recommend that counseling be provided to them in order

to change risky nutritional behaviors positively and encourage them for physical activity.

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