Progress in Nutrition 2019; Vol. 21, N. 1: 77-85 DOI: 10.23751/pn.v21i1.7176

Original article

Effects of reproductive and sociodemographic factors on obesity in Turkish women: a pilot study

Sinem Bayram, Esra Köseler, Gül Kızıltan, Mehtap Akçil Ok, Esen Yeşil, Beril Köse, Merve Özdemir, Selen Müftüoğlu, Mendane Saka, Emine Aksoydan, Muhittin Tayfur, Perim Fatma Türker, Aydan Ercan

Başkent University, Turkey - E-mail: metins@baskent.edu.tr

Summary. *Background and aim:* Obesity has become a global epidemic. The current research aimed to determine sociodemographic and reproductive predictors of obesity among Turkish women. *Materials and methods:* Eligible subjects (n:833) were 40-64 years-old women living in Turkey. A questionnaire consisted of questions about sociodemographic and reproductive factors and the International Physical Activity Questionnaire were applied to participants by face to face interviews. Multivariate logistic regression examined the risk of being obese with a range of sociodemographic and reproductive factors. All analyses were performed with SPSS software (version 17.0; SPSS, Chicago, Ill., USA). *Results:* The mean BMI of women aged 51-64 years was 30.59±6.35 kg/m^2. After adjustments for all other variables, increased obesity risk remained significant in women who had two children, housewifes, minimum active ones, ex smokers and had less than high school education. For multiple regression analysis sociodemographic factors from the bivariate analyses were entered, controlling for menarch age, menopausal age, hormone RT, parity, number of stillbirth, abortion. There was significant association between family income, occupation, education and BMI. *Conclusion:* In summary these findings showed comparable patterns of association of sociodemographic and reproductive factors with obesity in Turkey. Specific healthy lifestyle counseling is important for decreasing obesity in childbearing age women.

Key words: women, obesity, reproductive factors, sociodemographics, body mass index

Introduction

The prevalence of obesity has been increasing worldwide and become a major public health problem in the World. The increasing number of obesity and overweight cases in developing countries, especially among women, requires serious attention because of its effects on the health care system and the quality of life. Obesity, which was detected among all socioeconomic and age groups in both developed and developing countries, may increase the risk of developing noncommunicable diseases (1).

Turkey has a population of about 76.7 million people with growing economy. In 2012, life expectancy at birth in Turkey was 74.6 years and increased by 3.5 years between 2000 and 2012. The prevalence and problem of overweight/obesity has increased significantly in the last 2 decades in both adults and children (2).

In 2011, more than one-in-five adults (22%) in Turkey was defined as being obese (based on actual measures of their height and weight). This rate remains lower than that in the United States (35% in 2012) and Mexico (32% also in 2012) (3).

Turkish Diabetes Epidemiology Study (TURDEP) I and II researches done in five cities and 15 provinces of Turkey. Between TURDEP-I (1997-1998) and TURDEP-II (2010) surveys, average age-

standardized BMI increased from 26.6 to 28.6 kg/m2 (six kg in women; seven kg in men) and average waist increased from 87.2 to 94.5 cm (six cm in women; seven cm in men) over 12 years in Turkey (4).

According to WHO report, adulthood obesity prevalence forecasts (2010-2030) predict that in 2020, 44% of men and 26% of women will be obese. By 2030, the model predicts that 51% of men and 25% of women will be obese (5).

Among Turkish adults, obesity is associated positively with age, female gender, hypertension, hyperlipidemia, diabetes, parity, smoking cessation, alcohol consumption, marital status, occupation, household income, and family history of obesity, diabetes and hypertension, and negatively with the level of education, current smoking, and physical activity (2, 6-8).

In a survey done in the Trabzon region, among women, a linear association was observed between parity (the number of live births) and the prevalence of obesity and also degree of obesity. In addition BMI were increased with parity (9).

Therefore, this study was conducted to determine the both demographic and reproductive risk factors of obesity among Turkish women.

Materials and Methods

Study participants

Eligible subjects for the study were women (n:833) who were 40-64 years-old and lived in Ankara, Turkey. These women were recruited for the study during the period from June to July 2015. This study was approved by Baskent University Institutional Review Board and written informed consent was taken from all subjects prior to study entry.

Questionnaire

A questionnaire which included age, marital and smoking status, household income, occupation, education, living arrangement, menarch and menauposal age, parity, hormone replacement therapy, number of stillbirth and abortion as sociodemographic and reproductive characteristics was administered by face to face interview method.

2.3 Physical Activity Level

Physical activity level was determined using the short form of the International Physical Activity Questionnaire (IPAQ). IPAQ was developed by a group of experts in the late 1990s by a multinational working group, supported by the WHO, in order to assess PA cross-nationally in adults aged 18-65 years. Four long (31-item) and four short (9-item) questionnaire versions have been designed, which can be self-administered or answered by telephone interview. The recall period used by all long and short IPAQ formats is either the last seven days or a "usual week". IPAQ instruments have been tested in both developed and developing countries and have demonstrated good reliability and acceptable validity properties, at least as good as other self-answered PAQs. The IPAQ committee suggests that the IPAQ-short, last seven days (last 7-d) version, is the format of preference for both national and internationally comparable prevalence studies. Following the published work by Craig et al.(10), the self-answered, last 7-d, IPAQ-short, has been very popular and many studies during the last six years have examined its reliability and validity properties. Turkish population reliability and validity of this questionnaire was determined by Öztürk in 2005(11). The participants physical activiy levels were categorized as 1)vigorous, 2)moderate intensity and 3)walking activities lasting for at least 10 minutes.

Body Mass Index (BMI)

Weight was measured to the nearest 0.1 kilogram using a balance-beam scale with subjects wearing light clothing and no shoes. Standing height was measured with a fixed stadiometer calibrated in centimeters. Body mass index (BMI) was calculated as the weight in kilogram (kg) divided by the square of the height in meters. According to the World Health Organization guidelines, BMI 18.5 to 25 kg/m^2 as normal and BMI ≥30 kg/m^2 as obese.

Statistical Analyses

The analysis of BMI data according to sociodemographic characteristics, smoking and reproductive variable are presented as mean±standard deviation (SD). The normality of the distribution of data was evaluated by the one sample Kolmogorov-Smirnov test.

Mean Differences between groups were determined using independent Student's t-test or Analysis of variance (ANOVA -F- test), as appropriate, followed by Tukey's post-hoc analysis. The univariate and multiple logistic regressions were performed to identify the effect of factors that are associated with obesity. The different logistic models (model 1 and model 2) were designed for reproductive and sociodemographic factors. The odds ratios (OR) are presented together with 95% CIs. Confidence intervals that do not include the value "1" are regarded as having statistical value. According to the given reference categories, CIs with values that include the value "1" are deemed not to be significant. The study data were analyzed using SPSS version 17.0 (SPSS, Chicago, IL, USA). Statistical significance was set at $p < 0.05$.

Results

The mean BMI of the Turkish women by some sociodemographic and reproductive characteristics are described in Table 1. The mean BMI was greater in women who had higher parity, abortus and stillbirth number, were housewives, older, had low education level and family income, both ex-smokers, non-smokers, actives and inactives. These differences were statistically significant ($p<0.05$). The mean BMI of women aged between 51-64 years and 40-50 years, were 30.5±6.35 kg/m^2 and 28.7±6.72 kg/m^2, respectively.

Table 2 shows the odds ratios (OR) for the association of obesity with some sociodemographic and reproductive factors. Menarch and menaupose age, received hormone replacement therapy, living arrangement and marrital status were not associated with obesity.

51-64 year-old Turkish women were more likely to be obese than 40-50 year-old [OR 1.88; 95% confidence intervals (CI) 1.42-2.49]. The risk of obesity increased with parity. Women who have more than 3 children were 8.8 times more likely to be obese compared with never childbirth women ($p<0.05$). Women who had at least one stillbirth or abortus had higher BMI besides 1.6 and 1.8 times more obesity risk than who do not stillbirth, respectively ($p<0.05$). It was found that obesity risk increased with higher income and education level. People with income level below the poverty threshold had increased risk of obesity [OR 2.20; 95% confidence intervals (CI) 1.61-3.01]. Housewives had 6.5 times higher obesity risk than working women. Women with less than high school education level had 10.5 times higher obesity risk compared with at least high school level. Both ex-smokers and smokers had almost 2.4 times higher obesity risk than non-smokers. Obesity risk was higher for inactive women than active ones [OR 2.41; 95% confidence intervals (CI) 1.81-3.22]. After adjustments for all other variables, increased obesity risk remained significant in women who had two children, housewifes, minimum active ones, ex smokers and had less than high school education ($p<0.05$).

Further adjustments were made for potentially confounding variables in two different models (Table 3). In the model 1 for multiple regression analysis sociodemographic factors from the bivariate analyses were entered, controlling for menarch age, menopausal age, hormone RT, parity, number of stillbirth, abortion. There was significant association between BMI and family income (OR 1.58; 95% CI 1.02-2.46), occupation (OR 5.46; 95% CI 3.47-8.59), education (OR 9.67; 95% CI 5.63-16.61).

In the model 2 reproductive factors from the bivariate analyses were entered, controlling for age, family income, marrital status, occupation, education, living arrangement. The model 2 showed a significant relationship between BMI and number of children [(parity: 2; OR 1.90; 95% CI 1.08-3.33 and ≥3; OR 2.57; 95% CI 1.35-4.90)] and abortion [(≥1 (OR 1.62; 95% CI 1.16-2.26)] (Table 3).

Discussion

Obesity is an increasing problem globally and it may cause many adverse effects on health. The prevalence of obesity in women has increased in the world. According to the National Health and Nutrition Examination Survey (NHANES), approximately 62% of American women greater than 20 years of age are overweight. If current trends continue, 58% of American adult women will be obese by 2030. In accordance with Turkish Adult Risk Factor Study (TEKHARF), the prevalance of obesity were 44.2% for women (12).

Table 1. Mean BMI* among Turkish women corresponding to selected risk factors

Risk factors	n	BMI (kg/m²)			t or F test	p value
		Min-Max	Mean	SD		
Age (years)						
40-50	545	18.40-54.30	28.77	6.72		
51-64	764	16.53-49.13	30.59	6.35	-3.95	0.000
Menarch age (years)						
≤13	772	16.53-54.30	29.81	6.61		
14	281	18.60-49.13	29.91	6.00		
15	158	18.78-46.33	29.61	6.81	0.07	0.978
≥16	98	18.02-43.29	30.03	7.51		
Menopausal age (years)						
≤45	275	18.70-46.40	30.58	6.67		
46-50	356	19.33-49.13	30.98	6.10	1.01	0.368
≥51	213	16.53-42.86	29.99	6.41		
Hormone RT*						
No	1157	16.53-54.30	29.72	6.57		
Yes	152	18.70-47.00	30.54	6.54	1.20	0.230
Parity						
0	146	18.02-45.35	26.82[a]	6.15		
1	196	16.53-43.28	26.43[a]	6.51		
2	589	18.60-49.13	29.76[b]	6.51	39.56	0.000
≥3	378	19.90-54.30	32.73[c]	5.41		
Number of stillbirth						
0	1164	16.53-54.30	29.59	6.52		
≥1	145	19.60-47.00	31.60	6.65	-2.86	0.004
Abortion						
0	667	18.02-46.33	28.71	6.39		
≥1	642	16.53-54.30	30.94	6.55	-4.97	0.000
Family income						
Above poverty line	882	18.02-54.30	28.93	6.43		
Poverty line	427	16.53-47.00	31.67	6.45	5.76	0.000
Marrital status						
Married	993	16.53-54.30	30.02	6.49		
Non-married	316	18.02-49.13	29.26	6.75	1.47	0.143
Occupation						
Employed	663	16.53-47.00	27.01	5.96		
Housewife	646	18.73-54.30	32.54	5.95	13.36	0.000
Education						
≥High-school	767	16.53-49.13	26.97	5.97		
<High school	542	18.60-54.30	33.33	5.49	15.97	0.000
Smoking status						
Non-smoker	764	18.02-46.40	30.30[a]	6.22		
Ex-smoker	190	16.53-49.13	31.06[a]	6.79	10.42	0.000
Smoker	355	18.40-54.30	28.18[b]	6.93		
Living arrangement						
Co-habitating	1218	16.53-54.30	29.82	6.57		
Alone	91	18.02-41.50	29.83	6.48	0.01	0.992
IPAQ*						
Active	45	19.60-47.01	31.09[a]	7.48		
Minimum Active	517	16.50-44.42	27.94[b]	6.23	23.26	0.000
Inactive	720	18.61-54.30	31.08[a]	6.40		

**BMI: Body Mass Index, RT: Replacement Therapy, IPAQ: International Physical Activity Questionnaire*
Values with different superscript letters are statistically significantly different (p<0.05).

Table 2. Univariate logistic regression of risk factors for obesity (BMI ≥ 30 kg/m²) in Turkish women

Risk factors	n	Unadjusted OR (95% CI)	p	Adjusted OR (95% CI)	p
Age (years)					
40-50	351	1.0§		1.0	
51-64	482	1.88 (1.42-2.49)	0.000*	0.82 (0.41-1.66)	0.595
Menarch age (years)					
≤13	493	1.0		1.0	
14	179	1.16 (0.81-1.65)	0.407	0.96 (0.52-1.78)	0.900
15	101	0.97 (0.63-1.51)	0.910	1.04 (0.48-2.25)	0.911
≥16	60	0.91 (0.52-1.56)	0.726	0.89 (0.34-2.35)	0.826
Menopausal age (years)					
≤45	182	1.0		1.0	
46-50	223	1.26 (0.83-1.92)	0.266	1.18 (0.68-2.05)	0.552
≥51	131	0.90 (0.56-1.43)	0.657	0.80 (0.42-1.52)	0.504
Hormone RT**					
No	727	1.0		1.0	
Yes	106	1.31 (0.85-2.01)	0.214	0.89 (0.46-1.72)	0.750
Parity					
0	100	1.0		1.0	
1	124	0.87 (0.50-1.52)	0.646	0.82 (0.32-2.10)	0.687
2	353	2.49 (1.57-3.94)	0.000*	2.43 (1.05-5.61)	0.037*
≥3	256	8.81 (5.21-14.86)	0.000*	2.16 (0.84-5.57)	0.109
Number of stillbirth					
0	735	1.0		1.0	
≥1	98	1.62 (1.03-2.56)	0.036*	0.95 (0.47-1.89)	0.887
Abortion					
0	417	1.0		1.0	
≥1	416	1.83 (1.38-2.43)	0.000*	1.62 (0.99-2.63)	0.052
Family income					
Above poverty line	560	1.0		1.0	
Poverty line	273	2.21 (1.61-3.01)	0.000*	0.81 (0.47-1.41)	0.470
Marrital status					
Married	615	1.0		1.0	
Non-married	218	0.76 (0.55-1.04)	0.083	1.42 (0.75-2.68)	0.271
Occupation					
Employed	409	1.0		1.0	
Housewife	423	6.56 (4.81-8.96)	0.000*	2.84 (1.61-5.01)	0.000*
Education					
≥High-school	459	1.0		1.0	
<High school	374	10.47 (7.37-14.86)	0.000*	4.95 (2.58-9.51)	0.000*
Smoking status					
Non-smoker	503	1.0		1.0	
Ex-smoker	105	2.43 (1.51-3.94)	0.000*	0.45 (0.25-0.81)	0.008*
Smoker	225	2.38 (1.73-3.29)	0.000*	1.29 (0.67-2.48)	0.431
Living arrangement					
Co-habitating	779	1.0		1.0	
Alone	54	0.98 (0.56-1.73)	0.965	1.16 (0.43-3.08)	0.765
IPAQ					
Active	32	1.0		1.0	
Minimum Active	316	1.72 (0.83-3.54)	0.145	5.50 (1.54-19.58)	0.008*
Inactive	468	0.69 (0.33-1.43)	0.312	1.97 (0.55-7.05)	0.297

*OR: Odds Ratio, CI: Confidence Interval, *p<0.05*, §Reference Group ***BMI: Body Mass Index, RT: Replacement Therapy, IPAQ: International Physical Activity Questionnaire*

Table 3. Multiple logistic regression coefficients of risk factors for obesity (BMI ≥ 30 kg/m²) in Turkish women

Risk factors	Adjusted OR	95% CI	p
Model 1			
Age (years)			
40-50	1.0§		
51-64	0.97	0.55-1.74	0.942
Family income			
Above poverty line	1.0		
Poverty line	1.58	1.02-2.46	0.040*
Marrital status			
Married	1.0		
Non-married	1.18	0.73-1.90	0.493
Occupation			
Employed	1.0		
Housewife	5.46	3.47-8.59	0.000*
Education			
≥ High-school	1.0		
< High school	9.67	5.63-16.61	0.000*
Living arrangement			
Co-habitating	1.0		
Alone	1.33	0.63-2.81	0.452
Model 2			
Menarch age (years)			
≤13	1.0		
14	0.88	0.58-1.34	0.567
15	0.71	0.41-1.22	0.222
≥16	0.59	0.30-1.16	0.129
Menopausal age (years)			
≤45	1.0		
46-50	1.12	0.68-1.84	0.652
≥51	0.88	0.49-1.56	0.669
Hormone RT			
No	1.0		
Yes	0.64	0.39-1.04	0.075
Parity			
0	1.0		
1	0.99	0.52-1.87	0.985
2	1.90	1.08-3.33	0.024*
≥3	2.57	1.35-4.90	0.004*
Number of stillbirth			
0	1.0		
≥1	1.10	0.63-1.89	0.733
Abortion			
0	1.0		
≥1	1.62	1.16-2.26	0.004*

*§ Reference Group; *p<0.05*
Model 1: adjusted for menarch age, menopausal age, hormone RT, parity, number of stillbirth, abortion
Model 2: adjusted for age, family income, marrital status, occupation, education, living arrangement

In the Turkish Epidemiology Survey of Diabetes, Hypertension, Obesity and Endocrine Disease (TURDEP-II) study which investigated the prevalence of obesity, 12-year obesity rise among women has been identified as 34% according to TURDEP 1(13). The average BMI of Turkish adults was 28.9±6.4 kg/m^2 as stated in Turkey Nutrition and Health Survey (14).

Women obesity is associated with increased risk of hypertension, metabolic syndrome, insulin resistance, dyslipidemia, systemic inflammation, cardiovascular disease, sleep apnea, polycystic ovarian syndrome, stroke, and mortality, various gender-spesific, colon and kidney cancers (15).

Multiple factors can account for obesity. Thus in this study the obesity risk factors for women was investigated and we found that some reproductive and sociodemographic factors, especially family income, parity, abortion, education contribute obesity among women aged 40-64 years in Turkey.

In the present study the mean BMI of 40-50 years and 51-64 years of women were 28.77±6.72 kg/m^2 and 30.59±6.35 kg/m^2, respectively (Table 1). 51-64 years old Turkish women were more likely to be obese than others and this group had 1.88 times higher obesity risk (95% CI 1.42-2.49) (Table 2). However this association was attenuated with adjustments in multiple logistic regression analyses ($p>0.05$) (Table 3). Weight gain increases with age for instance Wen et al. (7) found strongest association of age with obesity and obesity prevalance was highest among the women with 51-55 years of age.

The prevalence of overweight and obesity differs by marital status. The results of studies about marriage and weight gain are contradictory (16). A recent study indicated that non-married women were at increased risk overweight and obesity (17). While another study showed that entering marriage is associated with weight gain, particularly among women (18). In this study, non-married women had higher obesity risk than married women, but this risk wasn't statistically significant ($p>0.05$) (Table 2 and 3).

Education levels were strongly related to body weight in women. According to Turkey Nutrition and Health Survey (TNHS-2010), the average body weight of women decreased while education increased (14). Moreover the obesity prevalance was 18.4% in women with more than high school education whereas 54.2% in illiterate women. In a study conducted by Wardle et al. (19) stated that women with less education are at higher risk for obesity. A significant inverse association between educational level and BMI for women was found in the WHO MONICA Project in common with our study (20). After adjusted for reproductive factors (menarch age, menopausal age, hormone RT, parity, number of stillbirth, abortion), women who had less than high school education had 9.67 times higher obesity risk than who had at least high school education (Table 3).

In this study, the prevalence of obesity was conspicuously higher in housewife group. In the multiple logistic regression model adjusted for reproductive factors, housewifes had 5.46 times higher obesity risk than employed women ($p<0.05$). The occupational activity was thought to be the most potent factor protecting women against getting obese. Employed women might have more occupational walking activity (21). Housewives generally have less time to care about their health based on homemaking duties. Women's social participation has recently increased the number of working housewives, resulting in changes in dietary patterns. Changes in the dietary intake of housewives, along with decreases in physical activity, have led to the social problem of obesity (22).

Obesity rates are greater in high-income countries than middle and low income countries (23). According to Turkey Statistical Institute-Income and Living Conditions Survey, population below the poverty line was 15% of Turkish adults (24). Furthermore Erem et al. reported that there was a significant association between household income and prevalence of obesity in Trabzon, North side of Turkey (9).

The link between poverty and obesity may be complicated because of confounding factors especially physical activity status. In the previous study it is stated that low income women may be experiencing lower levels of physical activity (25). Thus we did adjustments for all other factors before investigated the association between income status and obesity, the relationship was not significant ($p>0.05$). However after adjustment for reproductive factors, women with low income (below the poverty line) had increased risk of obesity ($p<0.05$).

Sedentariness is associated with poor health, obesity, diabetes, other metabolic diseases, and premature death (5). In this research, according to IPAQ subgroups, minimum active and inactive women had higher obesity risk however after adjustment for other confounding factors minimum active women had significantly higher obesity risk than active ones.

The mechanism of weight gain after smoking cessation includes increased energy intake, decrease resting metabolic rate and physical activity, increased lipoprotein lipase activity (27). Consistent with the previous study (26), after adjustments for other confounding factors ex-smokers had significantly higher obesity risk than non-smokers in this study (Table 2).

Even adjusted for reproductive factors (menarch age, menopausal age, hormone RT, parity, number of stillbirth, abortion), income, occupation and education were associated with women obesity in the multivariate model (Table 3).

The average menopausal age of Turkish women was 46.4±1.9 years (27). Palacios et al. (28), observed the average menapausal age across the world: in Europe, it ranged from 50.1 to 52.8 years; in North America, it ranged from 50.5 to 51.4 years; in Latin America, it ranged from 43.8 to 53.0 years; and in Asia, it ranged from 42.1 to 49.5 years (29).

Menarche and menopausal age, hormone replacement therapy usage and number of stillbirth after adjusting for demographic factors (age, family income, marrital status, occupation, education, living arrangement) were not a strong predictor of obesity and were not significant in the multivariate model. However abortion and parity were strong predictors of obesity in this model (Table 3). Similar to our study, Bastian et al. (30) found that, in comparison to the reference group of no live births, increasing number of children were associated with higher rates of obesity in older women and that was independent of sociodemographic and other confounding factors.

There are some limitations of this study. The primary concern is the number of our study population may not be enough. Inclusion of more women in our study could make our data be true representative of the general population. The BMI is an usually valid method used for the evaluation of obesity. But the utility of BMI as an indicator of obesity may have limited our study's power to detect significant associations. Hence, BMI hasn't been found to be a reliable measure of obesity, it would be better if the body analyses of participants have examined.

In summary, these findings showed comparable patterns of association of sociodemographic and reproductive factors with obesity in Turkish women. Prevention of obesity among multiparous women may have a significant public health impact. Specific counseling such as promoting physical activity, healthy eating, and the maintenance of appropriate body weight is important for childbearing age women.

Acknowledgement

This research was approved by Baskent University Institutional Review Board (Project No:KA15/181) and supported by Baskent University Research Fund. We thank all study participants for their willingness to participate. No competing interests declared for this research.

References

1. Malik VS, Willett WC, Frank BH. Global obesity: trends, risk factors and policy implications. Nature Reviews Endocrinology 2013; 9: 13-27.
2. Erem C. Prevalence of Overweight and Obesity in Turkey. 1JC Metabolic&Endocrine 2015; 8: 38-41.
3. OECD Health Statistics 2014. How does Turkey compare? Available at: http://www.oecd.org/els/health-svstems/Briefmg-Note-TURKEY-2014.pdf (last accessed 10/07/2016).
4. Satman I, Omer B, Tutuncu Y, Kalaca S, Gedik S, Dinccag N, et al. Twelve-year trends in the prevalence and risk factors of diabetes and prediabetes in Turkish adults. Eur J Epidemiol 2013; 28: 169-80.
5. Nutrition, Physical Activity and Obesity Turkey. Available at: http://www.euro.who.int/ data/assets/pdf file/0017/243332/ Turkev-WHO-Country Profile.pdf?ua=l (last accessed 22/07/2016).
6. Maher CA, Mire E, Harrington DM, Staiano AE, Katzmarzyk PT. The independent and combined associations of physical activity and sedentary behavior with obesity in adults: NHANES 2003-06. Obesity 2013; 21: E730-E737.
7. Wen W, Gao YT, Shu XO, Yang G, Li H-L, Jin F, et al. Sociodemographic, behavioral, and reproductive factors associated with weight gain in Chinese women. Int J Obes Relat Metab Disord. 2003; 27: 933-40.
8. Lahmann PH, Lissner L, Gullberg B, Berglund G. Sociodemographic factors associated with long-term weight gain,

current body fatness and central adiposity in Swedish women. Int J Obes Relat Metab Disord. 2000; 24: 685-94.
9. Erem C, Arslan C, Hacihasanoglu A, Değer O, Topbas M, Ukinc K, et al. Prevalence of obesity and associated risk factors in a Turkish population (trabzon City, Turkey). Obesity Research 2004; 12: 1117-27.
10. Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. Medicine and Science in Sports and Exercise 2003; 35: 1381-95.
11. Ozturk, M. Üniversitelerde eğitim-öğretim gören öğrencilerde uluslararası fiziksel aktivite anketinin geçerliliği ve güvenirliği ve fiziksel aktivite düzeylerinin belirlenmesi. Yüksek lisans tezi, Hacettepe Üniversitesi, Sağlık Bilimleri Enstitüsü, Ankara, 2005.
12. Altan O. The impact of obesity on cardiovascular diseases in Turkey. Turk Kardiyol Dem Ars. 2003; 31: 279-89.
13. Satman I, TURDEP-II Çalışma Grubu. TURDEP-II Sonuçlan. Available at: http://www.turkendokrin.org/files/file/TURDEP II 2011.pdf (last accessed 05/07/2016).
14. Pekcan AG, Samur G, Dikmen D, Kızıl M, Rakıcıoğlu N, Yıldız E, Gökmen-Özel H, Mercanlıgil SM, Ersoy G, Karaağaoğlu N, Aksoy B, Yılmaz D, Ilgaz F, Türkoğlu İ, Bilgiç P, Demir S, Ersoy N, Fisunoğlu M, Yalçın T, Tamer F, Coşkun Y, Türkyılmaz S, Güler S, Buzgan T, Besler HT. Population based study of obesity in Turkey: results of the Turkey Nutrition and Health Survey (TNHS)-2010. Progress in Nutrition. 2017; 19(3): 248-256 DOI: 10.23751/pn.v19i3.5607.
15. Azarbad L, Gonder-Frederick L. Obesity in women. Psychiatric Clinics of North America 2010; 33: 423-40.
16. Klos LA, Sobal J. Marital status and body weight, weight perception, and weight management among U.S. adults. Eating Behaviors 2013; 14: 500-7.
17. Grabauskas V, Petkeviciene J, Klumbiene J, Vaisvalavicius V. The prevalence of overweight and obesity in relation to social and behavioural factors (Lithuanian health behavior monitoring). Medicina 2003; 39: 1223-30.
18. Dinour L, Leung MM, Tripicchio G, Khan S, Yeh MC. The association between marital transitions, body mass index, and weight: A review of the literature. Journal of Obesity 2012; Article ID 294974, 1-16.
19. Wardle J, Waller J, Jarvis MJ. Sex differences in the association of socioeconomic status with obesity. Am J Public Health 2002; 92: 1299-304.
20. Molarius A, Seidell JC, Sans S, Tuomilehto J, Kuulasmaa K. Educational level, relative body weight, and changes in their association over 10 years: an international perspective from the WHO MONICA Project. Am J Public Health 2000; 90: 1260-8.
21. Ersoy C, Imamoglu S. Comparison of the obesity risk and related factors in employed and unemployed (housewife) premenopausal urban women. Diabetes Research and Clinical Practice 2006; 72: 190-6.
22. Chung KH, Shin KO, Yoon JA, Choi KS. Study on the obesity and nutrition status of housewives in Seoul and Kyunggi area. Nutrition Research and Practice 2011;5:140-9.
23. James WP. The epidemiology of obesity: the size of the problem. J Intern Med 2008; 263: 336-52.
24. Türkiye İstatistik Kurumu Gelir ve Yaşam Koşulları Araştırması 2014. Available at: http://www.tuik, gov.tr/PreHaberBul teni eri, do? i d=l 8633 (last accessed 11/06/2016).
25. Register CA, Williams DR. Wage effects of obesity among young workers. Soc Sci Q 1990; 71: 130-141.
26. Filozof C, Femandez-Pinilla MC, Fernandez-Cruz A. Smoking cessation and weight gain. Obesity Reviews 2004; 5: 95-103.
27. Vural ZT. Menopoz. Available at:http://istanbulsaglik.gov.tr/w/sb/per/belge/menopoz.pdf (last accessed 08/07/2016).
28. Palacios S, Henderson VW, Siseles N, Tan D, Villaseca P. Age of menopause and impact of climacteric symptoms by geographical region. Climacteric 2010; 13: 419-28.
29. Fonseca AMD, Bagnoli VR, Souza MA, Azevedo RS, Couto Junior EDB, Soares Junior JM, et al. Impact of age and body mass on the intensity of menopausal symptoms in 5968 Brazilian women, Gynecological Endocrinology 2013; 29: 116-8.
30. Bastian LA, West NA, Corcoran C, Munger RG. Number of children and the risk of obesity in older women. Preventive Medicine 2005; 40: 99-104.

Correspondence:
Sinem Bayram
Başkent University, Turkey
E-mail: metins@baskent.edu.tr