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ORIGINAL ARTICLE

Population based study of obesity in Turkey: results of the Turkey Nutrition and Health Survey (TNHS)-2010

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Summary. *Aim:* The objective of this paper is to present a baseline data on the national prevalence and distribution of overweight and obesity in adults, derived from the results of Turkey National Nutrition and Health Survey (TNHS)-2010. *Methods:* Prevalence data for adults (9820 adults, aged 19–65 years) were the customised data from the nationally representative National Nutrition and Health Survey (2010). Body weight, height, waist and hip circumferences were measured and body mass index (BMI), waist to hip ratio were calculated. BMI (weight-kg/height-m^2), waist circumference (cm) and waist to hip ratio were classified and evaluated according to WHO criteria and recommendations. *Results:* Mean BMI for all age groups were 26.4±4.5 kg /m^2 in men and 28.9±6.4 kg/m^2 in women. Overall, prevalence of overweight and obese adults were 34.6% (39.1% in men, 29.7% in women) and 30.3% (20.5% in men, 41.0% in women) respectively. While the adults aged 51–64 years old were more likely to be obese (30.7% in men and 64.4% in women), adults aged 65 years and over were found to be more overweight (46.0% in men and 30.4% in women). High waist circumference and high waist-to-hip ratio were identified as 24.8% and 54.2% in men, as 53.9% and 40.4% in women, respectively. *Conclusions:* Obesity and overweight are major public health problems in Turkey. Preventive public measures have started to be implemented by the Turkish government and other bodies to control the increasing trends in obesity.

Key words: obesity, overweight, TNHS 2010, waist circumference, BMI

Introduction

Obesity and overweight is an important public health problem that has become epidemic have reached epidemic proportions globally and been associated with a range of serious health consequences (1-3). In the World Health Organization European Region the prevalence of obesity has risen threefold or more since the 1980s, including countries with traditionally low rates (4). Overweight and obesity are major risk factor for the development of chronic diseases and mortality (3, 5). This continuing increase in the prevalence of obesity has significant health implications. Obesity is associated with increased risk of a number of chronic diseases, including cardiovascular disease (CVD), hypertension, type 2 diabetes, and certain cancers, while being overweight is associated with increased risk of diabetes (type 2) (3, 5-6).

Overweight and obesity is also a major health problem in Turkish adults. Increasing prevalence of obesity is influenced by changes in lifestyle (especially low physical activity) and nutritional habits (regional energy dense foods). Substantial literature has emerged to show that the prevalence of obesity and overweight were estimated to range between 16.1-35.9% and 37.0-41.9%, respectively, in Turkish adult population (7, 8).

The last Turkey National Surveys on Food Consumption and Health were conducted in 1974 (9) and 1984 (10). The recent survey, Turkey Nutrition and Health Survey (TNHS)-2010 is the largest and most detailed survey ever undertaken of the dietary intake and health status of people in Turkey. TNHS-2010 provides detailed information on dietary intake, physical examination including clinical and biochemical variables, physical activity status and anthropometric measurements. It was conducted in collaboration of Ministry of Health, Hacettepe University Faculty of Health Sciences Department of Nutrition and Dietetics and Ankara Numune Training and Research Hospital.

The objective of the this paper was to evaluate the anthropometric measurements of adult population and present the national prevalence of overweight and obesity, derived from the results of TNHS-2010.

Methods

Sample

TNHS-2010 sample was designed as a weighted, multi-stage, stratified cluster sampling. The sampling unit of the survey is the households and sample of the survey was based on the results of the "2008 Address Based Population Registration System". Number of households was selected from each cluster by systematic random sampling method using the updated household lists by Turkish Statistic Institute (TURKSTAT) (11). The sample design and sample size of the TNHS-2010 gives the opportunity of representing Turkey as a whole, for settlements (urban and rural) and for the 12 geographical regions (The Nomenclature of Territorial Units for Statistics-NUTS1). The NUTS is a statistical classification that is used by member countries of European Union (12). Out of 19056 households, 11656 (61.2%) were reached. The survey was completed with an adult population of 9820. Of these 9820 Individuals, %76.3-77.3 (7492-7590) participated in the anthropometric measurements section of study (main reasons for not participating were lack of interest, lack of time and health problems). Out of total 9820 adults age over 19 years, 7569 had body weight (men: 2938, 38.8%; women: 4631, 61.2%) and 7492 had height (men: 2930, 39.1%; women: 4562, 60.9 %) measurements and 7471 (men: 2926, 39.2%; women: 4545, 60.8%) had calculated BMI data.

Ethical approval for the study was obtained from Ankara Numune Education and Research Hospital Research Ethics Committee. All participants provided written informed consent.

Fieldwork of the survey was carried out by 99 teams. Each team consisted of one team supervisor, one controller, one medical doctor, four interviewer (such as; dietitian, nurse, midwife, food engineer) and a laboratory technician. The questionnaires completed in the field were returned to Hacettepe University Faculty of Health Sciences Department of Nutrition and Dietetics for data analysis. The questionnaires were controlled and then data entry and editing were done using CSPro package. Statistical Package for Social Sciences for Windows Version 15.0 (SPSS Inc., Chicago, ILL., USA) software packages were used to conduct statistical analyses and construct the tables (13).

Anthropometric measurements

The TNHS-2010 "*Training and Procedures Manual for Field Application*" describes the protocol, equipment, quality control, and measurement procedures of anthropometric measurements that were used during the anthropometry examination (11). Body weight was measured in light clothes and without shoes with an electronic scale (Type SECA 861) to the nearest 0.1 kg, and height was measured barefoot in the Frankfort plane with a stadiometer (Type SECA 225) to the nearest 0.1 cm. Waist and hip circumferences were measured, with a non-elastic tape (SECA 200) to the nearest 0.1 cm, according to Lohman's Anthropometric Standardization Reference Manual and WHO recommendation (14-16). Pregnant and lactating women were not included to the data of adult women.

Body Mass Index (BMI): After BMI was calculated as weight (kg) / height (m^2), adult participants were classified into four BMI categories according to the WHO classification as; underweight (<18.5 kg/m^2), normal weight (≥18.5-24.9 kg/m^2), overweight (≥25.0-29·9 kg/m^2) and obesity (≥30.0 kg/m^2) (17-18).

Waist Circumference (WC): The cut-off criteria for adults' WC were recommended as; normal <94 cm (men) and <80 cm (women); normal to borderline, 94-102 cm (men) and 80-88 cm (women); abdominal obesity, ≥102 cm (men) and ≥88 cm (women) (16, 19-21). The WHO STEPwise Approach to Surveillance (STEPS) provides a simple standardized method for collecting, analysing and disseminating data in WHO Member countries. The WHO STEPS protocol for measuring waist circumference instructs that the measurement be made at the approximate midpoint between the lower margin of the last palpable rib and the top of the iliac crest (15). Hip circumference measurement is taken around the widest portion of the buttocks standing on the left side of the subject (14).

Waist to Hip Ratio (WHR): Waist to hip ratio (i.e. the waist circumference divided by the hip circumference) was suggested as an additional measure of body fat distribution. Abdominal obesity is further defined as waist to hip ratio above 0.90 for men and above 0.85 for women (16).

Statistical analysis

Statistical Package for Social Sciences for Windows Version 15.0 (SPSS Inc., Chicago, ILL., USA) software packages were used to conduct statistical analyses and construct the tables (13). For all estimations, statistical significance was defined with 5 % CI (P< 0·05). Sex- and age group-specific (19–30, 31–50, 51–64 and ≥65 years) mean and standard deviations of the anthropometric measures were calculated. Student's t test analysis was performed to investigate differences in mean values of anthropometric measures between men and women. The effect of age group on anthropometric measures was investigated by ANOVA and Tukey's test for multiple comparisons among all age groups. Tukey's test performs all possible pairwise comparisons between groups.

Results

Results were shown separately for the 19-30, 31-50, 51-64, ≥65 and over and overall year olds, for men and women, and for underweight, normal, overweight and obesity. Mean (±SD) body weight, height, body mass index (BMI), waist (WC) and hip (HC) circumferences and waist to hip ratio (WHR) of Turkish adults over 19 years were given in Table 1. Mean (±SD) body weight and height of the men were 77.2±13.9 kg and 170.9±7.4 cm and women were 70.9±15.5 kg and 156.8±6.5 cm, respectively. Mean body weights were varied depending on age groups and the lowest mean body weight was determined in 19-30 years, in both genders. Mean (±SD) BMI for all age groups were 26.4±4.5 kg /m^2 in men and 28.9±6.4 kg/m^2 in women. In both gender, BMI mean values were in the overweight (BMI= 25.0-29.9 kg/m^2) category according to WHO classification. Over 30 years exceeded the overweight cut off point of ≥ 25 kg/m^2. Mean BMI data of 19 to 30 year-olds stayed just below this point. It was found that as the educational status improve, mean BMI values decrease but on the other side increase in age, resulted with an increase in BMI in women (Table 1).

Table 1 shows the mean (±SD) values for waist and hip circumferences and waist to hip ratio depending on gender and WC also for age groups. For both men and women, waist circumference increased with age. Mean (±SD) waist and hip circumferences of the men were 93.1±12.7 and 102.0±9.0 cm and women were 90.1±15.2 and 107.5±12.8 cm, respectively. For all age groups both men and women had a greater waist circumference mean values than the recommended cut-off levels (≥94 cm in men and ≥88 cm in women) except for the age group 19-30 years. Men and women aged 19-30 years had smaller waist circumferences than those aged 51-64 and 65 years and over. For example, men and women aged 19-30 years had mean waist circumferences of 86.1 cm and 78.2 cm respectively, compared with 98.0 cm and 99.6 cm for men and women aged 51-64 and 98.1 cm and 98.6 cm for men and women aged 65 years and over. Mean (±SD) waist to hip ratios for men and women were 0.91±0.08 and 0.84±0.09, respectively. Abdominal obesity is defined as waist–hip ratio above 0.90 for men and above 0.85 for women by WHO (16).

Table 2 shows the percent distribution of BMI by gender and age group among 19 years and over.

Table 1. Mean (±SD) body weight, height, body mass index (BMI), waist (WC) and hip (HC) circumferences and waist to hip ratio (WHR) of Turkish adults over 19 years, TNHS 2010.

Anthropometric Measurements	Men				Women			
	Urban	Rural	Overall	P value*	Urban	Rural	Overall	P value*
Body weight (kg)	77.9±13.7	75.5±14.0	77.2±13.9	0.001*	71.1±15.3	70.3±15.8	70.9±15.5	0.147
Height (cm)	171.6±7.5	169.1±7.1	170.9±7.4	0.000*	157.4±6.5	155.2±6.4	156.8±6.5	0.067
BMI (kg/m^2)								
19-30 years	24.4±3.8	24.2±3.7	24.4±3.8	0.801	24.5±5.2	23.9±4.6	24.4±5.1	0.251
31-50 years	27.2±4.4	26.9±4.6	27.1±4.5	0.440	29.2±6.0	30.5±6.3	29.5±6.1	0.002*
51-64 years	27.8±4.2	27.6±4.9	27.8±4.5	0.544	32.6±6.1	32.0±5.5	32.4±5.9	0.244
≥65 years	27.9±4.0	26.8±5.3	27.4±4.6	0.038*	31.2±5.7	29.1±5.5	30.4±5.7	0.000*
BMI (kg/m^2)								
Illiterate	26.3±4.7	26.0±4.5	26.1±4.6	0.675	31.6±6.4	30.1±5.9	31.0±6.2	0.001*
Literate	26.9±4.8	26.1±4.7	26.7±4.8	0.239	29.8±6.3	29.0±6.2	29.6±6.3	0.440
Primary	26.8±4.5	26.7±4.9	26.8±4.6	0.675	29.5±6.0	28.7±6.3	29.6±6.1	0.027*
Secondary	25.3±4.4	24.8±5.0	25.2±4.6	0.676	27.4±5.7	23.7±5.9	26.6±5.9	0.677
High school, university	26.2±4.2	26.3±4.2	26.2±4.2	0.682	25.3±6.0	25.1±6.1	25.3±6.0	0.732
Overall	26.4±4.4	26.4±4.7	26.4±4.5	0.757	28.8±6.5	29.3±6.3	28.9±6.4	0.170
WC (cm)								
19-30 years	86.2±11.1	85.6±10.6	86.1±11.0	0.611	78.5±11.8	77.0±11.3	78.2±11.7	0.339
31-50 years	95.2±11.7	94.0±11.8	94.9±11.7	0.202	89.5±13.0	91.8±14.5	90.0±13.4	0.015*
51-64 years	98.8±11.9	97.0±13.2	98.0±12.2	0.132	99.9±13.4	98.3±13.1	99.6±13.2	0.123
≥65 years	100.4±12.0	95.0±13.9	98.1±13.1	0.000*	100.2±13.1	95.6±14.3	98.6±13.7	0.000*
Overall	93.3±12.7	92.7±12.9	93.1±12.7	0.396	89.8±15.1	91.1±15.5	90.1±15.2	0.073
HC (cm)	102.4±8.8	101.1±9.2	102.0±9.0	0.004*	107.5±128	107.3±12.9	107.5±12.9	0.578
WHR	0.91±0.08	0.92±0.09	0.91±0.08	0.109	0.83±0.09	0.85±0.09	0.84±0.09	0.006*

*$p<0.05$

The World Health Organisation (WHO) BMI cut-off points were used to estimate levels of underweight (<18.5 kg/m^2), normal weight (≥18.5-24.9 kg/m^2), overweight (≥25.0-29.9 kg/m^2) and obesity (≥30.0 kg/m^2). Overall, less than 2.2% of individuals were underweight, 32.9% were in the normal weight range, 34.6% were overweight and 30.3% were classified as obese. Of the men and women 1.8% and 2.7% respectively overall were underweight (based on a BMI of <18.5 kg/m^2), increasing to 8.1% of the women in the 19-30 years age group. A higher percent of men (38.6%) compared to women (26.6%) were of normal weight and a higher percent of men (39.1%) compared to women (29.7%) were overweight. In people over 30 years of age, overweight was more prevalent in men than in women, while obesity was more prevalent in women. These data also showed that men were more often overweight while women were more often obese.

Overall, 20.5% of men and 41.0% of women were obese. Prevalence of overweight and obesity were increased with age. In both men and women, 51-64 year olds had higher prevalences for overweight and obesity as compared to the 25-49 year olds. Overweight and obesity were more prevalent in the oldest group (51–64 years) than in the younger groups (19-30 years). Of the men and women aged 51-64 years 30.7% and 64.4% respectively, in this group were obese. In those aged 65 years and over, 1.4% was classified as being underweight, with 30.4% of women and 46.0% of men overweight and 53.5% of women and 25.8% of men obese (Figure 1).

Percentage of men and women in each age group with increased risk, identified by waist circumference was given in Table 3. Percentages of overall men and women with waist circumferences below 94 cm and <80 cm were 51.3% and 26.6%, respectively. Guide-

Table 2. Body mass index (BMI), prevalence of overweight and obesity according to age, settlement and educational status, TNHS 2010 (%)

	BMI (kg/m²)					
Characteristics	**Men (%)**		**Women (%)**		**Overall (%)**	
	25.0-29.9	**≥30.0**	**25.0-29.9**	**≥30.0**	**25.0-29.9**	**≥30.0**
Age (years)						
19-30	30.5	7.7	22.2	13.8	26.9	10.2
31-50	43.1	24.3	34.5	42.1	38.9	32.8
51-64	41.4	30.7	28.3	64.4	34.8	47.8
≥65	46.0	25.8	30.4	53.5	37.4	40.4
Settlement						
Urban	39.3	20.9	29.6	40.4	34.6	30.3
Rural	38.6	19.1	29.9	42.9	34.6	30.0
Education						
Illiterate	30.4	18.3	30.5	54.2	32.1	47.3
Literate	33.5	25.1	28.2	48.2	30.7	36.6
Primary	42.1	21.1	32.5	44.0	37.4	32.1
Secondary	30.6	15.1	26.7	26.9	29.5	18.6
High school, university	38.5	19.7	24.2	18.2	33.6	19.1
All	**39.1**	**20.5**	**29.7**	**41.0**	**34.6**	**30.3**

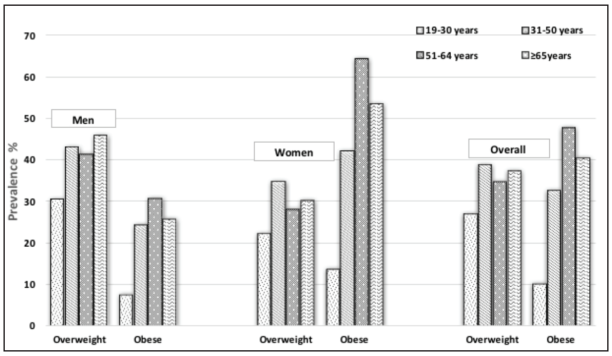

Figure 1. Body mass index (BMI), prevalence of overweight and obesity according to age

lines suggest that for men a waist circumference greater than 102 cm, and for women greater than 88 cm, indicates a substantially increased risk of metabolic complications of obesity (16). Overall, 24.8% of men had a waist circumference greater than 102 cm and 53.9% of women had a waist circumference greater than 88 cm. Compared with men aged 19-50 years had higher percentage of men in the oldest age group (51-64 years: 40.7% and 65 years and over: 39.3%) had a waist circumference of greater than 102 cm. Higher percentage of women aged 31 years and over compared with women aged 19-30 years had a waist circumference of greater than 88 cm (31-50 years:53.3%, 51-64 years: 82.7% and 65 years and over: 79.2%). Prevalence of greater waist circumferences were increased with age.

Percentage of men and women in each age group with increased risk, identified by waist to hip ratio was shown in Table 3. Approximately half of the men (54.3%) and 40.3% of the women had a waist to hip circumference ratio above the guideline thresholds for increased health risk which is 0.90 for men and 0.85 for women (16) (Table 3). Men were at increased risk for diet-related chronic diseases

than women. Risk increases with age group for both men and women. Majority of the men (75.7%) and women (84.8%) in the age group of 19-30 had a waist to hip circumference ratio below the guideline thresholds for increased health risk (<0.90 for men and <0.85 for women) (16).

A higher percentage of men in the two oldest age groups (≥51years, 79.1%) had a waist to hip ratio that was ≥0.90 than men in the two youngest age groups (19-30 years, 24.3%). A higher percentage of women in the oldest age group (65 years and over), 70.9 %, had a waist to hip ratio that was ≥0.85 than women aged 19-30 years.

Table 3. Percentage of men and women in each age group with increased risk, identified by waist circumference and waist to hip ratio, TNHS, 2010 (%).

Measurements	Age (years)				Settlement		Overall
	19-30	31-50	51-64	≥65	Urban	Rural	
				%			
Waist (cm)							
Men							
<94	76.8	44.2	33.3	35.2	51.3	51.3	51.3
≥102	8.1	26.8	40.7	39.3	25.1	24.0	24.8
Women							
<80	60.5	22.2	6.7	8.0	27.4	24.1	26.6
≥88	17.4	53.3	82.7	79.2	52.5	58.1	53.9
Waist/Hip Ratio							
Men							
<0.90	75.7	40.3	20.9	21.8	47.1	42.5	45.7
≥0.90	24.4	59.8	79.1	78.2	53.0	57.4	54.2
Women							
<0.85	84.8	64.7	38.6	29.1	61.3	54.8	59.7
≥0.85	15.2	35.3	61.4	70.9	38.7	45.3	40.3

Discussion

The present paper presents some part of results of a large survey examining the national prevalence of underweight, overweight and obesity, derived from the results of TNHS-2010.

Obesity is a major risk factor for the development of chronic diseases and mortality (3, 5). This continuing increase in the prevalence of obesity has significant health implications. Obesity is associated with increased risk of a number of chronic diseases, including cardiovascular disease (CVD), hypertension, type 2 diabetes, and certain cancers, while being overweight is associated with increased risk of diabetes (type 2) (3, 5-6).

Cardiovascular diseases are the first causes of death in Turkey, accounting for 47.73% of all deaths (ischaemic heart diseases 21.7%, cerebrovascular diseases 15% and others: 11%) and 19.3% of all disability- adjusted life years (DALYs) (male: 20.5%; female: 18%; urban: 18.4%; rural: 20.8%; western Turkey: 22.3; eastern Turkey: 12.4%) which are highly correlated with obesity (22). WHO recommends measurement of the BMI as a universal criterion of overweight (25.0-29.9 kg/m2) and obesity (≥30 kg/m2); measures of abdominal fat distribution such as WC or WHR are also encouraged (1, 16). Increased levels of fat deposition in the central area of the body, measured by waist circumference and waist to hip ratio, is associated with increased risk of chronic diseases. The WHR as a measure of abdominal fat accumulation has been a better predictor of cardiovascular risk than BMI (16, 23). Han et al. (19) and Lean et al. (20), have promoted the WC, and two different cutoffs for WC have been proposed based on data derived from population-based studies (94 or 102 cm for men, and 80 or 88 cm for women, respectively). Body fat distribution is recognized as an important indicator of disease risk.

In this study it was found that, overall, 32.9% of the adults were in the normal weight range, 34.6% were overweight and 30.3% were classified as obese. A higher percent of men (39.1%) compared to women (29.7%) were overweight. Out of total, 20.5% of men and 41.0% of women were obese. Mean (±SD) BMI for all age groups were 26.4±4.5 kg /m^2 in men and 28.9±6.4 kg/m^2 in women. Mean (±SD) waist circumference and waist to hip ratio of the men were 93.1±12.7 cm and 0.91±0.08 and women were 90.1±15.2 cm and 0.84±0.09, respectively. Cut-off points for a high waist circumference and high waist-to-hip ratio identified

as 24.8% and 54.3% in men, as 53.9% and 40.3% in women, respectively, to be at an increased and high risk for at risk for many chronic conditions such as diabetes, cardiovascular disease, and certain cancers.

In Turkey, several large studies on obesity prevalence in adults have been conducted recently, including: the Turkey Adult Heart Disease and Risk Factors Study (TEKHARF) carried out in 1990 and in 2000 (24), the Turkey Obesity and Hypertension Screening (TOHTA), the Turkey Diabetes Epidemiology Study (TURDEP) in 1999 (25,26), the Turkish Obesity and Hypertension Study (TOHS) in 2000 (27) and the Turkish Association for the Study of Obesity (TASO-TOAD in 2000-2005 (29) and others. In two publications several studies held on nationwide or regional level were reviewed. Depending on these studies, the prevalence of obesity and overweight were estimated to range between 16.1-35.9% (7.8-27.3% in men and 22.1- 43.0% in women) and 37.0-41.9% (17.4-49.2% in men and 20.4-41.0% in women), respectively (7,8). It could be mentioned that there is a great inequality in obesity prevalence among men and women.

The highest prevalence of obesity of 32.1% was reported in the TEKHARF (men, 21.1%; women 43.0%). The highest obesity frequency in women was also reported in this study (43.0%). Mean obesity in the TURDEP was 22.3% (men, 12.9%; women, 29.9%), which for men was the lowest frequency among the three studies. Overweight frequency was 35%, which was higher than the frequencies in the other studies. Mean obesity prevalence in the TOHTA was 19.40% (men, 14.4%; women, 24.6%), which was the lowest obesity frequency that has been reported in Turkey. The percentage of overweight subjects in the TOHTA was 24.1%. In the Turkish Association for the Study of Obesity (TASO-TOAD), 13878 individuals (6799 males and 7079 females) were screened in six different regions of Turkey between 2000-2005, among 20 years and over. Overall, 30.9% of the subjects were normal (men:33.4, women: 28.6%), 39.6% were overweight (men: 44.8, women: 34.5%), and 29.5% were obese (men: 21.8, women: 36.9%) (28).

In the study of Bagriacik et al. (28), the mean BMI was 27.52 kg/m2, 26.80 kg/m2 in men and 28.24 kg/m2 in women. The mean waist circumference was 98.5 cm in men and 79.8 cm in women. 30.9% of the subjects have normal weight (men: 33.4, women: 28.6%), 39.6% were overweight weight (men: 44.8, women: 34.5%), and 29.5% weight (men: 21.8, women: 36.9%) were obese. In this study, mean (±SD) BMI was 26.4±4.5 kg /m^2 in men and 28.9±6.4 kg/m^2 in women. Mean (±SD) waist circumference and waist to hip ratio of the men were 93.1±12.7 and 0.91±0.08 and women were 90.1±15.2 and 0.84±0.09, respectively. Similar mean values were found for BMI but mean waist circumferences for men and women were greater than the results of Bagriacik et al (28).

Iseri and Arslan (29), held a study with 4205 individuals consisting of 2263 males and 1942 females from seven regions of Turkey. The results show that only 40.1% (36.9% in men and 43.9% in women) of the Turkish population is in the normal range. Most of the population (56%) is overweight: preobese (40%), obese class I (12%), obese class II (3%) and obese class III (1%).

Obesity is an increasing public health problem in Turkey. In Turkish National Survey of Food Consumption and Health held in 1974, did not contain data on BMI. For the comparison of the results, BMI was calculated for men and women using the mean height mean body weight. Estimated mean BMI was found as 22.9 kg/m^2 (mean height: 168 cm, body weight: 64.7 kg) in men and 24.9 kg/m^2 (mean height: 153 cm, body weight: 58.4 kg) for women (9). Height was increased approximately 3 cm in men and 4 cm in women, within 36 years. The mean increase in body weight was 12.5 kg both in men and women (30).

Conclusion

In conclusion, these results highlight that the prevalence of obesity and overweight are the major problems within Turkey. Overweight should be prevented and treated before people shifts to obesity range. Increase in obesity prevalence can be explained in part by an unhealthy nutritional habits and lifestyle. Also the low physical activity of among adults may have effects on the increasing prevalence of obesity. Preventive public measures have started to be implemented by the Turkish government and other bodies to control the rising trends in obesity. Turkey prepared and launched programs "Healthy Nutrition and Active Life Program of Turkey (2010-2014)" and "Obesity Prevention and

Control Program of Turkey (2010-2014)" in 2010 (31, 32). Launched program "Healthy Nutrition and Active Life Program of Turkey was updated for the years 2014-2017, in 2013 (33). In the coming years, Turkey will be expecting a decrease in the obesity problem depending on the active and efficient implementation of the programs.

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