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Ministry of Health

**MINISTRY OF HEALTH
GENERAL DIRECTORATE OF HEALTH PROMOTION**

TURKEY BODY WEIGHT PERCEPTION SURVEY

ANKARA 2012



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ABBREVIATIONS

BWP	Body Weight Perception
BMI	Body Mass Index
ABWP	Accurate Body Weight Perception
WHO	World Health Organization
OECD	Organization for Economic Co-operation and Development
TBWPS	Turkey Body Weight Perception Survey
TNHS	Turkey Nutrition and Health Survey
THS	Turkey Health Survey
TURKSTAT	Turkish Statistical Institute
IBWP	Inaccurate Body Weight Perception

ABSTRACT

Tobacco usage and obesity are counted among the most significant epidemics in the World in Twentieth century.¹ In accordance with the data of WHO, obesity frequency has been doubled as of 1980. While 5% of males and 8% of females were obese in worldwide in 1980, these rates increased to 10% for males and 14% for females in 2008.⁴ 33.0% of the population representing the adult group of 15 years old and more is overweight and 16.9% is obese with respect to the 2010 data of Turkey Health Survey of Turkish Statistical Institute.⁹ Whereas, in accordance with 2010 data of Turkey Nutrition and Health Survey, 34.6% of the population being 19 years old and more is overweight and 30.3% is obese in our country.¹⁰ As in all over the world, obesity is a significant public health matter in Turkey.

Accurate body weight perception (ABWP) is defined as the compatibility between the body weight perceived and measured, which indicates health related risks about weight condition.¹⁴ Body Mass Index (BMI) average and misperception of the people regarding their own body weight has increased among overall communities.¹⁵

The objective of Turkey Body Weight Perception Survey conducted for the first time at national level in Turkey is to analyze relation between the ABWP and the descriptive variables counted as residence, gender, age and educational status, as well as view of obesity as a matter of health and diet condition. It is anticipated that the outcomes of the survey will serve as a guide during development of programs and campaigns related with the obesity in the scope of "Turkey Struggle and Control of the Obesity Program (2010-2014)".

Sampling of the survey is identified on the basis of households and the national database where overall addresses in the country are registered. Multi-stage Stratified Clustered Sampling method is used. As a measure for participation frequency of households to the survey, it is identified to interview with at least one person aged 15 and more. Interviews were completed within 3894 of 5502 households (70.8%); questionnaires were responded with 6082 persons by means of face-to-face interview technique. Heights and weights stated by the participants aged twenty and older are evaluated in accordance with BMI category of the



World Health Organization (WHO). Growth references improved for school-age children and adolescents by WHO are used in evaluation of BMIs of 15-19 age group.^{3,21} In the scope of the study, Accurate Body Weight Perception (ABWP) is defined as the reliability between the BMI category and body weight perception (BWP) category.

In accordance with BMI category of participants; 3.6% is underweight, 39.7% has normal weight, 33.3% is overweight and 23.4% is obese. There is a statistically significant difference between females and males in terms of BMI category ($p < 0.001$). 36.6.% of males is overweight and 18.4% is obese, whereas 31.3% of females is overweight and 26.4% is obese. It is also observed that frequency of obesity is highest among participants with no education and has a frequency of 32.3%; whereas, this rate is lowest among participants with college/university degree and has a value of 10.3%. Difference between the educational levels is statistically significant ($p < 0.001$).

In case of category of the participants with respect to BWP, 10.5% is underweight, 51.9% has normal weight, 29.4% is overweight and finally, 8.2% is obese. 49.7% of participants has ABWP. Level of compatibility between the BMI and BWP category is weak ($\kappa = 0.25$, $p < 0.001$). In accordance with BMI category, only 38.7% of those overweight perceive themselves as overweight and 5.6% perceives as obese, 53.4% perceives as having normal weight and 2.3% perceives themselves as underweight. Only 25.8% of obese participants perceives themselves as overweight, 54.2% perceives as overweight, 18.9% perceives as having normal weight and 1.1% perceives as underweight. Therefore, ABWP frequency is 25.8% among obese, 38.7% among overweight, 71.8% and 62.5% among normal weight and underweight participants respectively. Other worldwide studies show that ABWP frequency is less among overweight and obese adults. As approximately two third of overweight and three fourth of obese people do not have ABWP, this matter should be overcome while struggling with obesity and shows that awareness regarding the obesity should be increased.

Frequency of those having ABWP is higher among those living in urban areas ($p < 0.01$), decreasing age groups ($p < 0.001$) and increasing education levels ($p < 0.001$). Lower ABWP frequency among those living in rural areas and lower ABWP frequency and obesity frequency in lower education groups may serve as

a guide for prioritized target mass of struggle with obesity programs aiming to create ABWP.

Those having ABWP (87.1%) view obesity as an health problem more when compared to those not having ABWP (83.4%) ($p < 0.001$). In accordance with BMI categories, 85.6% of overweight participants and 86,9% of obese participants view obesity as an health problem. With respect to the BWP categories, 90.3% of those perceiving themselves as overweight and 90.7% of obese participants consider obesity as an health problem. Non-perception of obesity as a health problem by one of every ten participants, who are obese or perceive themselves as obese, shows that significant lack of knowledge is in question, in which case view of obesity as a health problem by more people having ABWP will increase ABWP frequency and accordingly, will mitigate such gap.

89.3% of participants raising more than one respond to the question of how to understand obesity does not have any idea about the question, whereas, 5.1% indicates height and weight calculation to identify obesity, 3.9% supports that only a doctor can decide and 2.9% of participants think that obesity may be understood by analyzing the physical appearance. The fact that the nine of every ten participants do not have any idea about how to understand obesity shows the incredible size of lack of knowledge in this issue and highlights the requirement to increase obesity related awareness.

When the participants are analyzed in terms of diet status to lose weight during the last one year with respect to their ABWP, it is found that 29.1% of those having accurate body weight perception makes diet and 19.7% of those having inaccurate body weight perception makes diet, which indicates statistically significant difference ($p < 0.001$). The fact that the approximately one third of those having ABWP and one fifth of those not having ABWP make diet shows that increase of obesity related awareness is not sufficient and more efforts should be presented to create behavioral change in this respect.

Increasing ABWP frequency will increase awareness for health related risks arisen due to obesity and shall make overweight and obese people to show much more effort to have healthy weight. In addition, overweight and obese people shall perceive public health related messages and evaluate them accurately as they shall be aware of the fact that such messages are for them.



1. INTRODUCTION and OBJECTIVE

Tobacco use and obesity are counted as one of the most significant epidemics in the World in Twentieth century.¹ Overweight and obesity is defined as abnormal or over fat accumulation as to derange the health. While overweight and obesity status of adults is classified, height based weight index defined as Body Mass Index (BMI) is used and is calculated as weight in kilograms divided by the square of the height in meters. World Health Organization (WHO) defines 25 and more BMI value as overweight and 30 and more BMI value as obesity.² When the BMI is 25 and more, the risk of comorbidity increases.³

The main reason for overweight and obesity problem is the imbalance between calorie intake and usage. In worldwide, this situation arises due to excessive intake of high-energy foods having high fat, salt and sugar content, but low vitamin, mineral and other micronutrient contents, increase of some studies having sedentary nature, change of transportation type and increasing urbanization.²

1.1 Obesity in the world

In accordance with the data of WHO, obesity frequency has been doubled as of 1980. While 5% of males and 8% of females were obese in worldwide in 1980, these rates increased to 10% for males and 14% for females in 2008.⁴ In 2008, more than 200 million males and 300 million females were obese, among more than 1.4 billion overweight adults aged 20 and more in worldwide.² In all WHO regions, females are much more prone to be obese when compared to males.⁴

Prevalence of overweight and obese people has the highest in WHO America region (36% overweight, 26% obese) and lowest in South Eastern Asia region (11% overweight, 3% obese). Frequency of overweight females in WHO Europe, Eastern Mediterranean and America regions is more than 50%.⁴

Prevalence studies related with child obesity are significant in terms of inclusion of children and future health of the community, but such studies are not conducted frequently. It is found that 10% of school-age children (between 5-17 years old) is overweight (including obese children) (2004 data).¹ In accordance with 2010 data of WHO, more than 40 million children aged five and less is overweight. While it was previously thought that this problem was a matter of high-income

countries, today frequency of overweight and obese children increases in urban settlement areas of low- and middle-income countries.²

Overweight prevalence of infants and young children has the highest value in high-middle income countries (in accordance with the World Bank data, Turkey is included within high-middle income group) and the fastest increase is observed in low-middle income countries.^{5,6}

1.2 Obesity in Turkey

In accordance with 2008 data of WHO, measurement based overweight and obese males prevalence is 38.0% and 21.7% respectively for the age group of 20 and more; whereas, these rates are 30.1% and 34.0% for females.^{7,8}

In accordance with 2010 data of Turkey Health Survey (THS) conducted by Turkish Statistical Institute (TURKSTAT), 16,9% of adult population aged 15 and more is obese and 33.0% of them is overweight on the basis of BMI classification calculated with respect to the height and weight values stated by them. 37% of males aged 15 and more is overweight and 13% is obese in Turkey; whereas, these rates are 28% and 21% for females respectively.⁹

With respect to 2010 data of Turkey Nutrition and Health Survey (TNHS), 34.6% of population aged 19 and more is overweight and 30.3% of them is obese on the basis of BMI classification calculated with respect to the height and weight values measured. These rates are distributed among males and females as following; 29.7% and 41.0% for females and 39.1% and 20.5% for males respectively.¹⁰

In reference to the Updated Obesity data of OECD (Organization for Economic Co-operation and Development) for the year 2012, frequency of overweight male child aged 5-17 is 11.3% (including obesity) and female child is 10.3%.¹¹

1.3 Obesity related health problems

Overweight and obesity are much more correlated with mortality when compared to the underweight in worldwide. 65% of the world population lives in countries where overweight and obesity problems cause higher frequency of mortality (all high-income countries and most middle-income countries).



Overweight and obesity are ranked as the fifth risk among global mortality risks.²

The study having the largest scope to identify the relation between the obesity and mortality covers 1 million adults living in Europe and North America. In this study,, it is identified that mortality increases with respect to the increase in BMI in terms of those having BMI value of higher than 25 kg/m². Lifetime of those having Body Mass Index of 30-35 is 2-4 years shorter than those having normal weight. This difference is 8-10 years for the population having BMI 40-45, which indicates loss of expected lifetime for those smoking.¹

In all over the world, chronic diseases are the basic reason of capacity loss and mortality and affects all age and social classes, in particular old age groups and socially disadvantaged classes. In the future, it is expected that chronic disease will increase. Obesity is closely related with diabetes and is a significant public health matter representing key risk factor in terms of chronic diseases.¹

Overweight and obesity have adverse impacts on blood pressure, cholesterol, triglyceride and insulin resistance.⁵ High blood pressure and high cholesterol problems are observed among those having high BMI values. On the basis of above findings, obese population experiences higher risk in terms of coronary artery diseases, stroke and accordingly, mortality, as well as cardiac diseases.¹ Increase in type 2 diabetes risks is directly related with high BMI values. High BMI increase the risk of breast, colon/rectum, endometrium, kidney, esophagus (adenocarcinoma) and pancreatic cancers, kidney diseases and premature mortality risks.^{5,12} 44% of diabetes , 23% of ischemic cardiac diseases and 7-41% of specific cancer diseases are attributed to overweight and obesity.²

To achieve optimal health, target BMI should be in the range of 18.5-24.9 kg/m²; whereas median of BMI for adult population should be 21-23 kg/m². If BMI is in the range of 25.0-29.9 kg/m², risk increases in terms of comorbid. However, when BMI value is 30 kg/m² and more, this risk increases more.⁵

Strong relation between the obesity and chronic diseases recalls that obese people consult more to the health institutions; hence, spend more for healthcare when compared to normal weight people. The estimations based on different approaches and methods in various countries show that approximately 1-3% of total health spending is made due to the obesity. In accordance with

survey results of various countries, any obese individual makes 25% higher health spending when compared to normal weight individual.¹

Cause and effect relation between obesity related health problems shows that more health spending will be made in the future due to the increase in obesity during the last 20 years.¹

Obesity in the period of childhood increases obesity in adulthood, premature mortality and disability risks. In addition to increasing the future risks, obese children are subject to dyspnea, increasing fracture risks, hypertension, early signs of cardiovascular diseases, insulin resistance and psychological impacts.² According to the results of cohort study named Bogalusa Cardiac Survey covering children; obesity risk of children being overweight before the age of 8 increases significantly in their adulthood. In addition, overweight children may carry early signs of chronic diseases without being aware of the fact that this is a problem intensifying consequences of the disease. As a result, both children and their families do not take measures to decrease risks of the disease. Finally, it should be reminded that obese children have psychosocial problems including insufficient social share and low self-efficacy.¹

1.4 Body Weight Perception

Body weight perception (BWP) is defined as the image of body weight figured within our mind.¹³ Accurate body weight perception (ABWP) is defined as the compatibility between the perceived and measured body weight and shows awareness of health risks related with weight status.¹⁴ BMI average increases among all communities as the inaccurate perception of people regarding their weight status.¹⁵

Inaccurate Body Weight Perception (IBWP) (in other words, incompatibility between real weight of the individual and his/her own perceived weight) is intensely observed among overweight and obese adults. It is anticipated that inaccurate body weight perception of overweight and obese people prevents adoption of healthy attitudes and behaviors as a result of which their motivation to lose weight decreases. Overweight and obese population perceiving themselves as having healthy weight may not give effort to lose weight and may be less willing to be physically active and eat healthily.¹²



Surprisingly, there is insufficient empirical information about associated attitude and behaviors of IBWP among overweight and obese people. In addition, most of the studies about IBWP are prevalence studies analyzing IBWP in terms of socio-economic factors (social gender and race/ethnic origin, etc.). According to the limited data, IBWP is associated with key components preventing protection and loss of weight -mostly associated attitudes (eating interests, weight interest, etc.) and weight related behaviors (less weight loss attempts, unhealthy nutrition and less physical activity level, etc.) among overweight and obese people.¹² ABWP is a key instrument while defining risk of obesity related chronic diseases and may encourage people to lose weight.¹⁶

Body weight perception has relation with specific factors including gender, race, real body weight and socio-economic status. If the individuals have better knowledge about their own weight perception indicators, body weight control strategies may be developed more efficiently. In addition to the perception of body weight accurately, body size dissatisfaction and ideal body weight may contribute to identify behaviors related with body weight control. According to the studies searching the relation between different socio-economic status indicators and BMI, it is found that educational level is more associated with body weight perception and body dissatisfaction when compared to income and professional status and such relations has positive direct relation.¹⁷

Categories related with adult weight status and created on the basis of BMI by WHO ($<18.5 \text{ kg/m}^2$ underweight, $18.5 - <25.0 \text{ kg/m}^2$ normal, $25.0 - <30.0 \text{ kg/m}^2$ overweight, $\geq 30.0 \text{ kg/m}^2$ obese) are mainly used by researchers and clinicians. Less information is available about whether people out of the occupation category place themselves within accurate category. According to the surveys, adults may evaluate their heights and weights accurately; however, adults having normal weight estimate their body weight more than the real status and overweight, as well as obese adults tend to estimate their body weight less than the reality. Increasing obesity epidemics and obesity outcomes show that how to explain obesity is important to design interventions better aiming to decrease rate of overweight population. If people do not perceive themselves as overweight or obese, they may not try to lose weight and may not perceive obesity related public health messages.¹⁸

“Turkey Struggle and Control of the Obesity Program (2010-2014)” is prepared by the Ministry of Health to struggle with obesity efficiently, to increase knowledge of the community about struggle with obesity issue, to promote people gain sufficient and balanced nutrition and regular physical activity habits and accordingly, to decrease occurrence frequency of obesity and obesity related diseases in our country. In the scope of this program, enlightenment and awareness-raising of the community about obesity, sufficient and balanced nutrition and physical activity.¹⁹ In this context, it is important to evaluate ABWP of the community.

The objective of Turkey Body Weight Perception Survey (TBWP) performed at national level for the first time in Turkey is to analyze relation of ABWP with descriptive variables such as residence, sex, age and educational status, acceptance of obesity as health problem and dieting status. It is anticipated that outcomes of this survey will serve as a guide during improvement of obesity related programs and campaigns in the scope of “Turkey Struggle and Control of the Obesity Program (2010-2014).



2. MATERIAL AND METHOD

2.1 Sampling

Sampling of the study is identified from the household unit on the basis of Address based Register database by the TURKSTAT.

During identification of the sampling by TURKSTAT, all residences are included within the scope of sampling and residences where adequate number of household is not available and the population is less than 1% of the total population are excluded (small villages, hamlets, etc.). In the survey, corporate population (school, dormitory, nursery, nursing home, hospital, etc.) constituting 2% of total population is excluded. Any substitution for the household and individual is not utilized as no answer status is also taken into consideration during calculation of sample volume.

Multi-stage Stratified Cluster Sampling method is used. During the first stage, clusters are selected and then, in the second stage, households are selected from each cluster.

Stratification is made as rural/urban areas based on residences. According to the definition of TURKSTAT, residences with more than 20.000 population are called as urban and with a population of less than 20,000 are called as rural areas.

Clustering is made by TURKSTATS as to include 100 addresses on average for urban residences and rural residences having municipality organization; whereas, each residence unit is considered as a cluster for the rural settlements not having any municipality organization. Clusters are selected through systematic sampling method. Households are then selected from each cluster by means of systematic sampling method.

252 clusters and 4032 households as to be 16 households from each cluster are selected within urban residences and 148 clusters and 1480 households as to be 10 from each cluster are selected from rural settlements of sampling.

In the scope of the study, it is aimed to interview with at least one individual aged 15 and more from each household and interview with at least one person is identified as a measure for inclusion within the survey. Therefore, questionnaire

is applied to anyone included within the household, being at home when visited and accepting to participate in the survey.

Interviews are completed within 3894 of 5502 households (70.8%) (Table 2.1). Other households (1608 households) includes those where the study could not be applied due to non-existence of anybody in the course of visit or aged 15 and more, non-acceptance of participation to the survey or completion the questionnaire before ending the interview. In the scope of sampling, change in household numbers interviewed and included in TBWPS with respect to the residence is shown in Table 2.1.

Table 2.1 Residence based distribution of households interviewed and included in the scope of sample, TBWPS 2011

Residence	Household number		
	Sampling	Survey participation	%*
Rural	1470	1326	90.2
Urban	4032	2568	63.7
Total	5502	3894	70.8

* Column percentage

Questionnaire is applied to 6137 persons by means of face-to-face conversations in the scope of the survey. Change in the population interviewed with respect to the residence is presented in Table 2.2.

Table 2.2 residence based distribution of participants, TBWPS 2011

Residence	Number	%*
Rural	2322	37.8
Urban	3815	62.2
Total	6137	100.0

* Column percentage



2.2 Implementation

TURKSTAT defines the term of household as the community consisting of one or more persons, living in the same house or specific part of same house, eating together, sharing same income and expenses, participating household services and management, regardless of any relationship between them.²⁰

Questionnaire is implemented to the participants aged 15 and more, accepting to participate to the study, being at home at the time of visit and included in the scope of households covered by the study by means of face-to-face interviews

The questionnaire includes basic definitive questions such as date of birth, gender, educational status and height, mass weight, mass weight perception, obesity related attitude and behavior related questions.

Data collection stage of the study has been performed in April 2011 by provincial health directorates. Questionnaire implementation guide was provided to facilitate execution of the study in provinces. Implementation guide includes information about implementation type of the questionnaire, tasks and responsibilities of provincial directors during performance of the study, tasks and responsibilities of pollsters, items to be considered during implementation of questionnaire, entry of data to the computer environment and their presentation to the Ministry of Health. Pollster information form was created as to be used by pollsters on site during implementation of questionnaires. Pollsters are identified by directors at provincial health directorates among midwife, nurse and health officers, who have previously included in the community based surveys.

2.3 Classification of variables

Height and weight values stated by participants aged twenty and more are evaluated adult BMI classification of WHO (aged twenty and more). Growth references developed by WHO for school-age children and adolescents are used during evaluation of BMI of participants aged 15-19 (Table 2.3).^{3,21}

Table 2.3 Body Mass Index classification

Category	Body Mass Index
Underweight	< 18.50
Normal	18.50 - 24.99
Overweight	25.00 - 29.99
Obese	≥ 30.00

BWP category is made with respect to the underweight, normal, overweight and obese definitions asked as in the case of BMI classification.

In the study, Accurate Body Weight Perception (ABWP) is defined as same BMI category and BWP category calculated on the basis of body weight and height stated by the participants.

2.4 Statistical Method

Descriptive variables are defined as settlement (rural/urban), sex (male/female), age groups (15-24, 25-34, 35-44, 45-54, 55-64, 65-74, 75 and more), educational status (no education, primary incomplete, first level primary, second level primary, high school, college/university). Chi-square test, kappa coefficient reliability, logistic regression analysis, student? t test are used for statistical analysis. $p < 0.05$ is considered as statistically significance level.



3. FINDINGS

3.1 Descriptive Variables

In the scope of the survey, 6082 persons from 3894 households have completed questionnaires. 62.1% of the participants live in urban areas and 37.9% lives in rural areas; whereas, 62.7% of participants is female and the resting 37.3% is male. Average age is 43.9 (Standard deviation (sd): 16,9 min: 15 – max: 94). Most of the participants rating to 20.8% belong to the age group of 25-34. In terms of educational status, frequency of first level primary participants is 42.6%, high school is 16.0% and 13.5% of the participants interviewed have no education and 8.3% has college/university degree (Table 3.1).

Table 3.1 Specific descriptive characteristics of the participants, TBWPS 2011

Descriptive variables	Number	%*
Residence		
Rural	2303	37.9
Urban	3779	62.1
Sex		
Female	3812	62.7
Male	2270	37.3
Age groups		
15-24	928	15.3
25-34	1268	20.8
35-44	1219	20.0
45-54	1059	17.4
55-64	857	14.1
65-74	490	8.1
75 and more	261	4.3
Educational status		
No education	824	13.5
Primary incomplete	376	6.2
First level primary	2586	42.6
Second level primary	818	13.4
High school	973	16.0
College/university	505	8.3
Total	6082	100.0

* Row percentage

3.2 Body Mass Index based Evaluation

BMI average is calculated as 26.6 kg/m² on the basis of height and weight values stated by the participants (SD: 5,3). BMI average of those living in urban and rural areas is same. BMI average of female is 26.8 kg/m², male is 26.1 kg/m², where the difference is statistically significant (t: 5.152, p < 0.001).

In the BMI category based evaluation, it is identified that 39.7% of participants has normal weight, 33.3% is overweight, 23.4% is obese and 3.6% of the participants is in underweight (Table 3.2).

Table 3.2. Body Mass Index category of participants, TBWPS 2011

Body Mass Index Category	Number	Percentage (%*)
Underweight	216	3.6
Normal	2417	39.7
Overweight	2024	33.3
Obese	1425	23.4
Total	6082	100.0

* row percentage

Statistically significant difference is not observed between those living in rural and urban areas on the basis of BMI category. While 31,9% of participants living in rural areas is overweight and 24.3% is obese, these rates are 34.2% and 22.9% respectively for those living in urban areas. According to the same classification, statistically significant difference is in question between female and male (p < 0.001), where, 36.6% of male is overweight, 18.4% of them is obese and 31.3% of female is overweight and 26.4% is obese (Table 3.3, Figure 3.1). With respect to the age group based category, obesity frequency is highest among the age group of 55.64. Statistically significant difference exists between age groups on the basis of BMI category (p < 0.001) (Table 3.3, Figure 3.2). In terms of educational status, frequency of obesity rating to 32.3% is highest among those having no education and has the lowest value of 10.3% among college/university levels. Difference between the educational status is statistically significant (p < 0.001) (Table 3.3, Figure 3.3).



Table 3.3 Change of Body Mass Index category of participants on the basis of specific descriptive variables, TBWPS 2011

Descriptive variables	Body Mass Index category										p
	Underweight		Normal		Overweight		Obese		Total		
	Number	% *	Number	% *	Number	% *	Number	% *	Number	% *	
Residence											p>0.05
Rural	76	3.3	933	40.5	734	31.9	560	24.3	2303	100.0	
Urban	140	3.7	1484	39.2	1291	34.2	864	22.9	3779	100.0	
Sex											$\chi^2:69.5$ $p<0.001$
Female	160	4.2	1451	38.1	1195	31.3	1006	26.4	3812	100.0	
Male	56	2.5	966	42.6	830	36.6	418	18.4	2270	100.0	
Age groups											$\chi^2:1120.3$ $p<0.001$
15-24	125	13.5	617	66.5	142	15.2	44	4.8	45	100.0	
25-34	35	2.8	650	51.2	417	32.9	166	13.1	166	100.0	
35-44	19	1.6	426	34.9	459	37.7	315	25.8	315	100.0	
45-54	9	0.8	255	24.1	418	39.5	377	35.6	377	100.0	
55-64	12	1.4	219	25.6	301	35.1	325	37.9	325	100.0	
65-74	4	0.8	147	30.0	200	40.8	139	28.4	139	100.0	
75 and more	12	4.6	103	39.5	88	33.7	58	22.2	58	100.0	
Educational status											$\chi^2:409.3$ $p<0.001$
No education	23	2.8	252	30.6	283	34.3	266	32.3	824	100.0	
Primary incomplete	9	2.4	125	33.2	126	33.5	116	30.9	376	100.0	
First level primary	43	1.7	881	34.0	903	34.9	759	29.4	2586	100.0	
Second level primary	65	7.9	430	52.6	221	27.0	102	12.5	818	100.0	
High school	51	5.2	492	50.6	301	30.9	129	13.3	973	100.0	
College/ university	25	5.0	237	46.9	191	37.8	52	10.3	505	100.0	
Total	216	3.6	2417	39.7	2025	33.3	1424	23.4	6082	100.0	

* row percentage

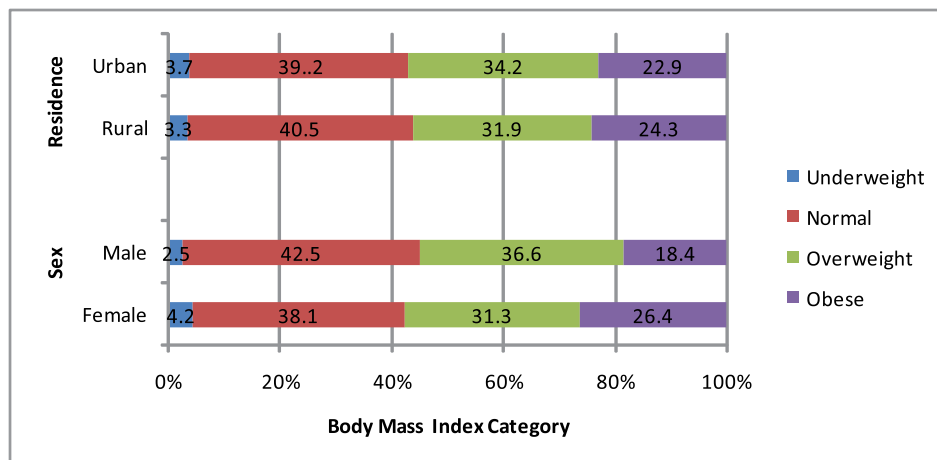


Figure 3.1 Distribution of Body Mass Index category on the basis of residence and sex, TBWPS 2011

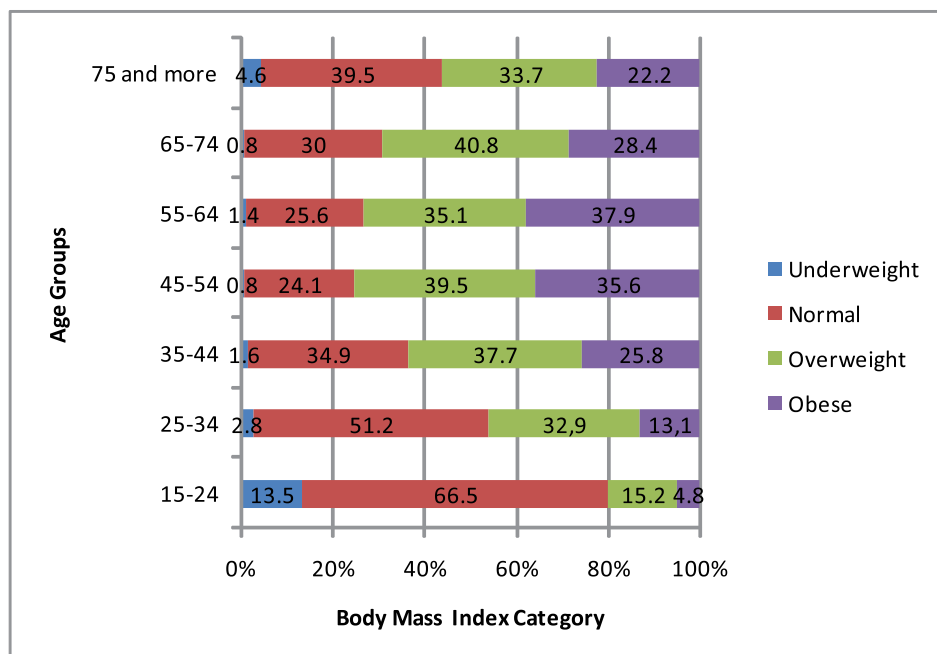


Figure 3.2 Distribution of Body Mass Index category on the basis of age groups, TBWPS 2011

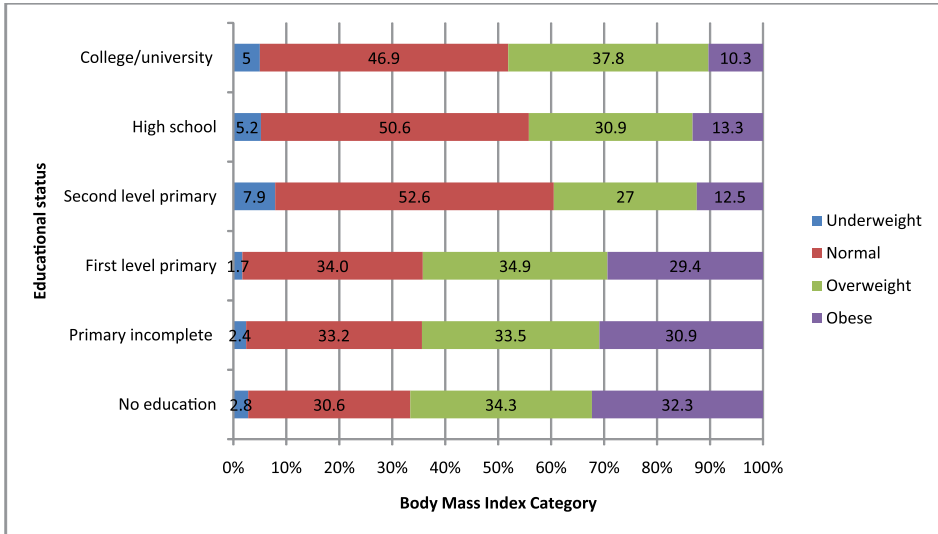


Figure 3.3 Distribution of Body Mass Index category on the basis of educational status, TBWPS 2011

3.3 Body Weight Perception Category based Evaluation

When the participants are asked about perception of their body weights, 51.9% perceives themselves in normal weight, 29.4% as overweight, 10.5% as underweight and 8.2% perceives as obese (Table 3.4).

Table 3.4 Body Weight Perception category of Participants, TBWPS 2011

Body Weight Perception category	Number	Percentage (%*)
Underweight	637	10.5
Normal	3161	51.9
Overweight	1787	29.4
Obese	497	8.2
Total	6082	100.0

* row percentage

When the evaluation is performed in terms of residence BWP category, statistically significant difference is observed between the rural and urban areas

($p < 0.001$), where 31.6% of those living in urban is overweight, 8.7% is obese and 25,7% of the participants living in rural areas is overweight and 7.4% is obese. On the basis of sex, statistically significant difference is estimated ($p < 0.001$), as 33.3% of female perceives themselves as overweight and 9,8% perceives as obese, rating to 22.7% and 5.5% for male participants respectively (Table 3.5 and Figure 3.4). Frequency of those perceiving themselves as obese on the basis of BWP category is 13.7% among 45-54 age group representing the highest value.

Statistically significant difference is observed between age groups in accordance with BWP category ($p < 0.001$) (Table 3.5 and Figure 3.5). As for educational status, statistically significant difference is estimated on the basis of BWP category ($p < 0.001$), as frequency of those having no education and perceiving themselves as obese is 11.9% and this frequency is 6.5% among those having college/university degree (Table 3.5 and Figure 3.6).



Table 3.5. Change of Body Weight Perception category of participants on the basis of specific descriptive variables, TBWPS 2011

Descriptive variables	Body Weight Perception Category										p
	Underweight		Normal		Overweight		Obese		Total		
	Number	% *	Number	% *	Number	% *	Number	% *	Number	% *	
Residence											χ^2 :32.1 $p<0.001$
Rural	265	11.5	1276	55.4	592	25.7	170	7.4	2303	100.0	
Urban	372	9.8	1885	49.9	1195	31.6	327	8.7	3779	100.0	
Sex											χ^2 :137.7 $p<0.001$
Female	377	9.9	1792	47.0	1271	33.3	372	9.8	3812	100.0	
Male	260	11.5	1369	60.3	516	22.7	125	5.5	2270	100.0	
Age groups											χ^2 :390.7 $p<0.001$
15-24	189	20.4	550	59.2	162	17.5	27	2.9	928	100.0	
25-34	152	12.0	667	52.6	380	30.0	69	5.4	1268	100.0	
35-44	78	6.4	586	48.1	437	35.8	118	9.7	1219	100.0	
45-54	52	4.9	503	47.5	359	33.9	145	13.7	1059	100.0	
55-64	60	7.0	416	48.5	294	34.3	87	10.2	857	100.0	
65-74	59	12.0	272	55.5	122	24.9	37	7.6	490	100.0	
75 and more	47	18.0	167	64.0	33	12.6	14	5.4	261	100.0	
Educational status											χ^2 :114.3 $p<0.001$
No education	118	14.3	422	51.2	186	22.6	98	11.9	824	100.0	
Primary incomplete	50	13.3	190	50.5	107	28.5	29	7.7	376	100.0	
First level primary	219	8.5	1271	49.1	851	32.9	245	9.5	2586	100.0	
Second level primary	109	13.3	464	56.7	205	25.1	40	4.9	818	100.0	
High school	97	10.0	542	55.7	282	29.0	52	5.3	973	100.0	
College/ university	44	8.7	272	53.9	156	30.9	33	6.5	505	100.0	
Total	637	10.5	3161	51.9	1787	29.4	497	8.2	6082	100.0	

* row percentage

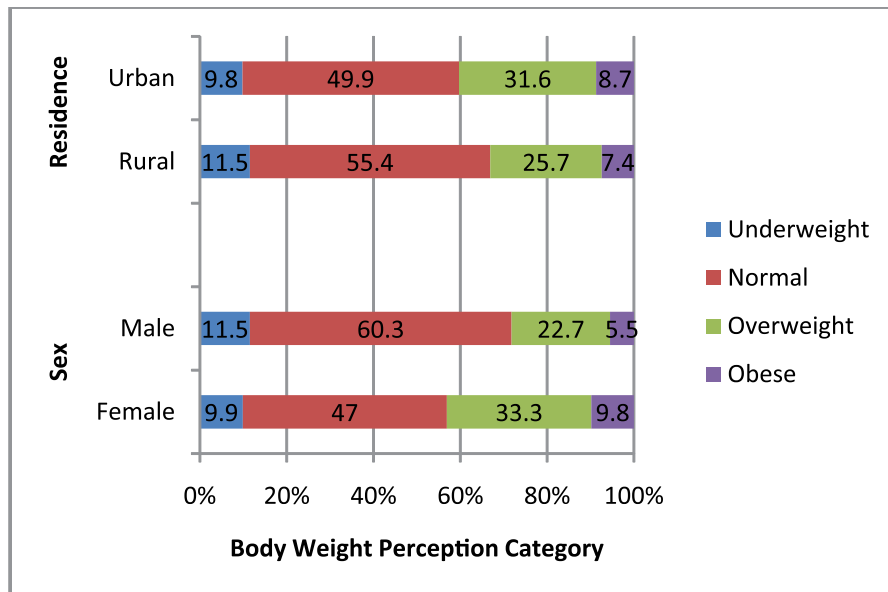


Figure 3.4. Distribution of Body Weight Perception category on the basis of sex and residence, TBWPS 2011

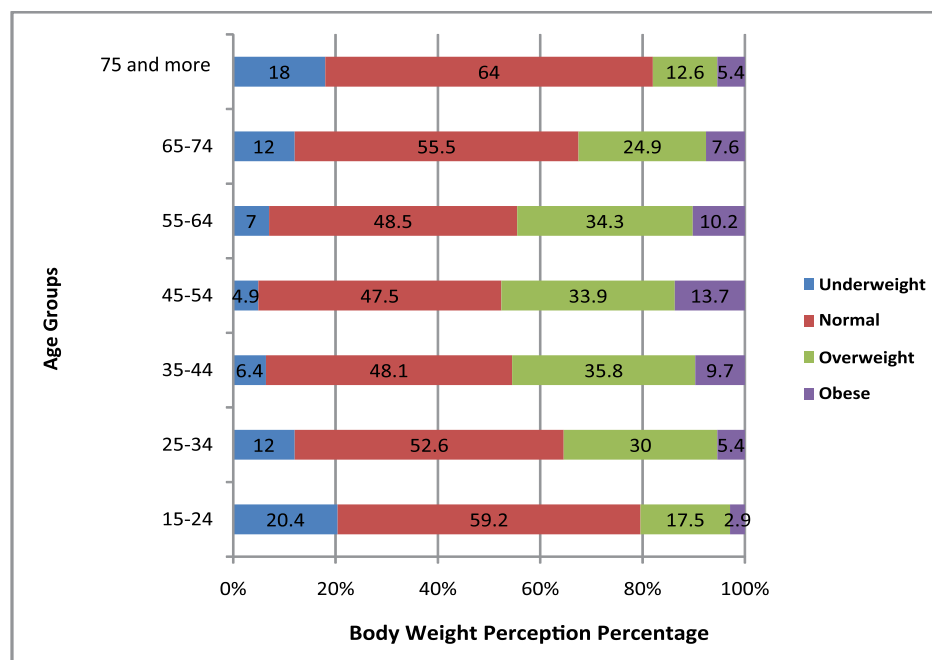


Figure 3.5 Distribution of Body Weight Perception category on the basis of age groups

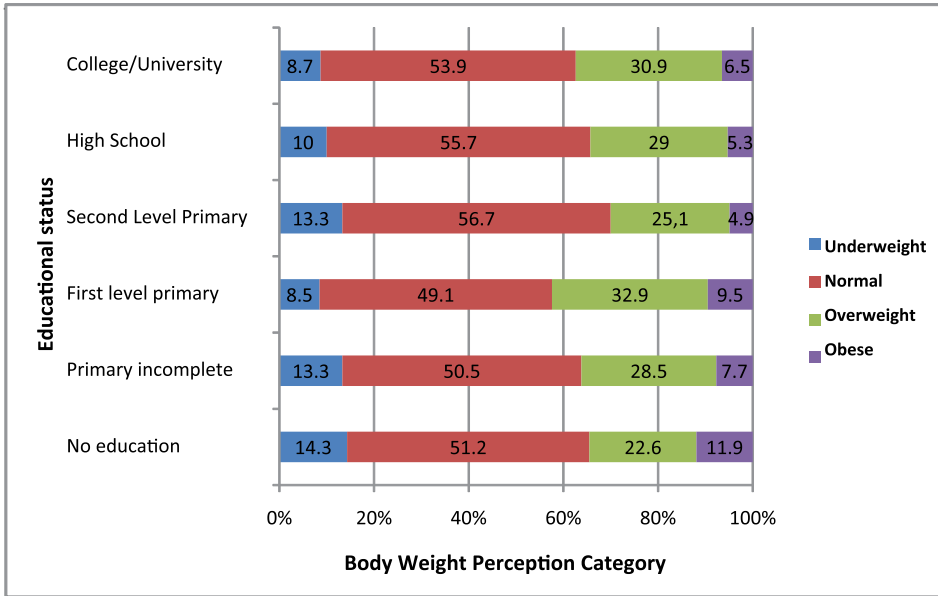


Figure 3.6 Distribution of Body Weight Perception category on the basis of educational status, TBWPS 2011

3.4. Comparison of Body Mass Index Category with Body Weight Perception Category, Accurate Body Weight Perception

When BMI and BWP categories of the participants are compared, low reliability is identified ($\kappa = 0.25$, $p < 0.001$). In accordance with BMI category, only 38.7% of overweight participants defines themselves as overweight and 5.6% perceives themselves as obese, 53.4% as having normal weight and 2.3% of overweight participants perceives themselves as underweight. 25.8% of obese participants view themselves as obese, 54.2% perceives as overweight, 18.9% as in normal weight and 1.1% of obese participants perceives themselves as underweight. 62.5% of underweight participants perceives themselves as underweight and 71.8% of normal weight participants finds themselves as having normal weight. ABWP frequency is 71.8% among normal weight participants representing the highest value and is estimated as 62.5% for underweight, 38.7% for overweight and 25.8% for obese participants (Table 3.6, Figure 3.7).

Table 3.6 Change of Body Weight Perception on the basis of Body Mass Index, TBWPS

2011

Body Mass Index Category	Body Weight Perception Category									
	Underweight		Normal		Overweight		Obese		Total	
	Number	% *	Number	% *	Number	% *	Number	% *	Number	% *
Underweight	135	62.5	77	35.7	2	0.9	2	0.9	216	100.0
Normal	444	18.2	1734	71.8	230	9.5	13	0.5	2417	100.0
Overweight	47	2.3	1080	53.4	783	38.7	114	5.6	2024	100.0
Obese	15	1.1	220	18.9	772	54.2	368	25.8	1425	100.0
Total	637	10.5	3161	51.9	1787	29.4	497	8.2	6082	100.0
$\kappa = 0.25. p < 0.001$										

* row percentage

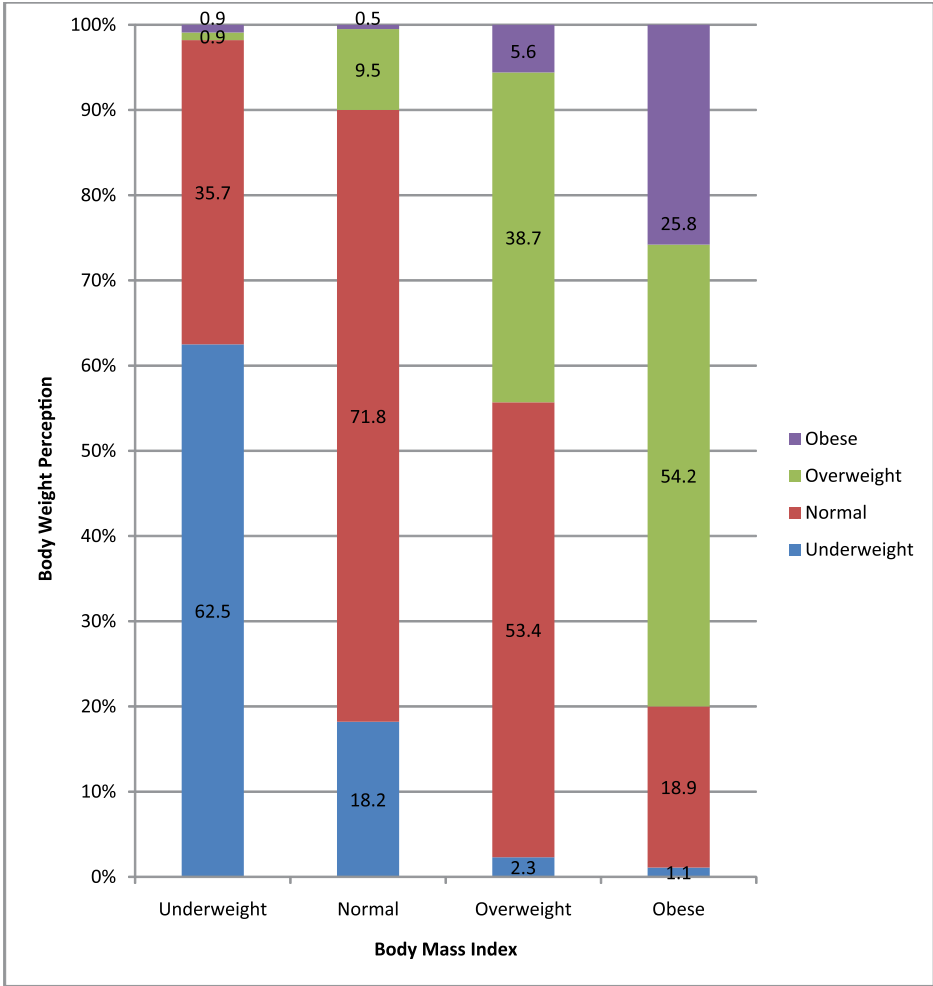


Figure 3.7. Change of body Weight Perception on the basis of Body Mass Index, TBWPS

2011

When BMI and BWP category underweight and normal weight participants are included within same group and overweight and obese participants are covered within another group, medium level reliability is estimated ($\kappa = 0.47$, $p < 0.001$). Only 9.4% of those being underweight or normal perceives themselves as overweight or obese and 40.9% of overweight or obese participants perceives themselves as underweight or normal (Table 3.7 and Figure 3.8).

Table 3.7 Change of Body Weight Perception on the basis of Body Mass Index (two groups), TBWPS 2011

Body Mass Index Category	Body Weight Perception Category					
	Underweight or normal		Overweight or obese		Total	
	Number	%*	Number	%*	Number	%*
Underweight or normal	2386	90.6	247	9.4	2633	100.0
Overweight or obese	1412	40.9	2037	59.1	3449	100.0
Total	3798	62.4	2284	37.6	6082	100.0
$\kappa = 0.47. p < 0.001$						

* row percentage

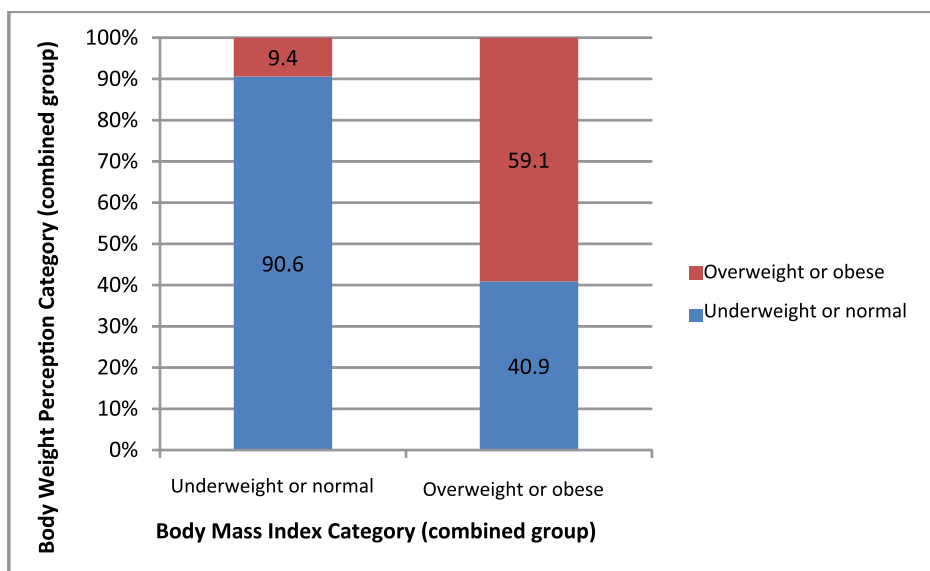


Figure 3.8 Change of Body Weight Perception on the basis of Body Mass Index (two groups), TBWPS 2011

When BMI and BWP categories of the participants are compared on the basis of residence, the consistency level between them is similarly weak in rural and urban areas (respectively $k=0.21$, $k=0.27$, $p<0.001$) (Table 3.8).

Table 3.8 Regarding the settlement the change of Body Mass Index and Body Weight Perception Classification, TOAA 2011

Body Mass Index	Body Weight Perception Classification																			
	Rural								Urban											
	Underweight		Normal		Overweight		Obese		Total		Underweight		Normal		Overweight		Obese		Total	
	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *
Underweight	43	56.6	31	40.8	1	1.3	1	1.3	76	100.0	92	65.7	46	32.9	1	0.7	1	0.7	140	100.0
Normal	200	21.4	670	71.9	60	6.4	3	0.3	933	100.0	240	16.2	1064	71.6	170	11.5	10	0.7	1484	100.0
Overweight	17	2.3	448	61.1	238	32.4	31	4.2	734	100.0	30	2.3	632	49.1	545	42.2	83	6.4	1290	100.0
Obese	5	0.9	127	22.7	293	52.3	135	24.1	560	100.0	10	1.2	143	16.5	479	55.4	233	26.9	865	100.0
Total	265	11.5	1276	55.4	592	25.7	170	7.4	2303	100.0	372	9.8	1885	49.9	1195	31.6	327	8.7	3779	100.0
	κ = 0.21. p< 0.001								κ = 0.27. p< 0.001											

* row percentage

If BMI and BWP classifications of the thin and normal groups as one group, over weighted and obese groups as another group are combined and evaluated separately as rural and urban, the coherence between them is on medium level. (in return $\kappa=0.45$, $p<0.001$). While the 46.1% of the over weighted and obese people living on the rural are perceiving themselves as underweight and normal, this percentage is in the urban 37.8%. (Table 3.9).

Table 3.9 Regarding the settlement the change of Body Mass Index and Body Weight Perception Classification (two groups), TOAA 2011

Body Mass Index	Body Weight Perception Classification									
	Rural					Urban				
	Underweight or normal		Overweight or obese		Total	Underweight or normal		Overweight or obese		Total
	No.	% *	No.	% *		No.	% *	No.	% *	
Underweight or normal	944	93.6	65	6.4	1009	1442	88.8	182	11.2	1624
Overweight or obese	597	46.1	697	53.9	1294	815	37.8	1340	62.2	2155
Toplam	1541	66.9	762	33.1	2303	2257	59.7	1522	40.3	3779
$\kappa=0.45. p<0.001$					$\kappa=0.49. p<0.001$					

* row percentage

By comparison with the BMI and BWP classifications of the participants according to the sex, the coherence along similar lines between the female and male is weak (in return $\kappa=0.27$, $\kappa=0.22$, $p<0.001$). (Table 3.10).

Table 3.10 Regarding the sex the change of Body Mass Index and Body Weight Perception Classification, TOAA 2011

Body	Body Weight Perception Classification													
	Female							Male						
	Underweight		Normal		Overweight		Obese		Underweight		Normal		Overweight	
	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *	No.	% *
Mass Index														
Underweight	99	61.9	58	36.2	2	1.3	1	0.6	160	100.0	36	% *	0	0.0
Normal	235	16.2	1002	69.0	204	14.1	10	0.7	1451	100.0	205	% *	26	2.7
Overweight	31	2.6	551	46.2	521	43.6	91	7.6	1194	100.0	16	% *	262	31.6
Obese	12	1.2	181	18.0	544	54.0	270	26.8	1007	100.0	3	% *	228	54.5
Total	377	9.9	1792	47.0	1271	33.3	372	9.8	3812	100.0	260	% *	516	22.7
$\kappa=0.27$. $p<0.001$							$\kappa=0.22$. $p<0.001$							

* row percentage

If BMI and BWP classifications combined in separate two groups according the sex, the coherence between them is both on female and male on medium level.(in return $\kappa=0.49$, $p<0.001$). While the 35.2% of the over weighted and obese women are perceiving themselves as underweight and normal, this percentage is by the men 51.0%. (Table 3.11).

Table 3.11 Regarding the sex the change of Body Mass Index and Body Weight Perception Classification (two groups), TOAA 2011

Body Mass Index	Body Weight Perception Classification									
	Female					Male				
	Underweight or normal		Overweight or obese		Total	Underweight or normal		Overweight or obese		Total
	No.	% *	No.	% *		No.	% *	No.	% *	
Underweight or normal	1394	86.5	217	13.5	1611	992	97.1	30	2.9	1022
Overweight or obese	775	35.2	1426	64.8	2201	637	51.0	611	49.0	1248
Total	2169	65.9	1643	43.1	3812	1629	71.8	641	28.2	2270
$\kappa=0.49. p<0.001$					$\kappa=0.44. p<0.001$					

* row percentage





49.7% of participants has Accurate Body Weight Perception (ABWP) (Table 3.12). ABWP is higher among those living in urban areas (51.2%) when compared to the rural areas (47.2%) and the difference between them is statistically significant ($p < 0.01$). ABWP ratio is similar between the genders (female: 49.6%, male: 49.7%) and any statistically significant difference is not found (Table 3.12, Figure 3.9). In terms of age groups, as the age increases, ABWP frequency decreases and the difference between these two criteria is statistically significant ($p < 0.001$) (Table 3.12 and Figure 3.10). As the education level increases, ABWP ratio increases between which statistically significant difference is in question ($p < 0.001$) (Table 3.12 and Figure 3.11).

In case of evaluation of Accurate Body Weight Perception with residence, age groups and educational status by means of logistic regression analysis, it is found that statistically significant difference does not exist between those living in urban and rural areas and the difference between age groups and educational level is less. When compared with the participants aged 75 and more, 35-44 age group has 2.23 times, 25-34 age group has 2.26 times and 15-24 age group has 2.10 times more ABWP on the basis of which statistically significant difference is obtained (Table 3.12, Figure 3.12). In terms of educational level, as the educational level increases, ABWP frequency increases with respect to those having no education and the difference between them is significant statistically. When compared to the participants having no education, first level primary participants have 1.29 times, second level primary has 1.43 times, high school level has 1.82 times and college/university level has 1.84 times more ABWP (Table 3.12, Figure 3.13).

Table 3.12. Change of accurate Body Weight Perception on the basis of specific descriptive variables, TBWPS 2011

Variables	ABWP (%)	OR*(95% CI**)	OR (95% CI)***
Residence			
Rural	47.2	1.00	1.00
Urban	51.2	1.78 (1.06-1.30)	1.04 (0.93-1.16)
Sex			
Female	49.6	1.00	
Male	49.7	1.00 (0.9-1.1)	
Age groups			
15-24	62.8	2.81 (2.12-3.73)	2.10 (1.55-2.85)
25-34	56.0	2.12 (1.61-2.78)	2.26 (1.77-2.89)
35-44	51.4	1.76 (1.33-2.31)	2.23 (1.81-2.73)
45-54	45.9	1.41 (1.07-1.86)	1.77 (1.46-2.15)
55-64	39.1	1.07 (0.80-1.42)	1.43 (1.22-1.77)
65-74	37.1	0.98 (0.72-1.34)	1.28 (1.06-1.53)
≥75	37.5	1.00	1.00
Educational status			
No education	38.0	1.00	1.00
Primary incomplete	39.1	1.05 (0.82-1.35)	1.05 (0.84-1.31)
First level primary	47.3	1.46 (1.25-1.72)	1.29 (1.02-1.62)
Second level primary	56.0	2.08 (1.70-2.53)	1.43 (1.17-1.74)
High school	59.4	2.39 (1.97-2.89)	1.82 (1.37-2.42)
College/ university	59.6	2.41 (1.92-3.02)	1.84 (1.45-2.34)
Total	49.7		

* OR: OddsRatio (Frequency of Probabilities), ** CI: Confidence Interval, ***logistic regression analysis

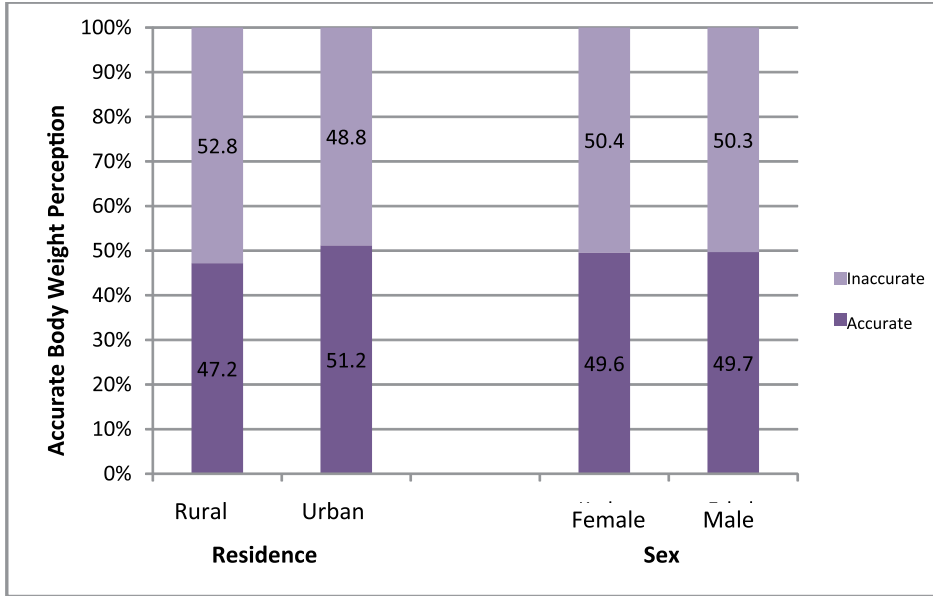


Figure 3.9. Distribution of Accurate Body Weight Perception on the basis of residence, TBWPS 2011

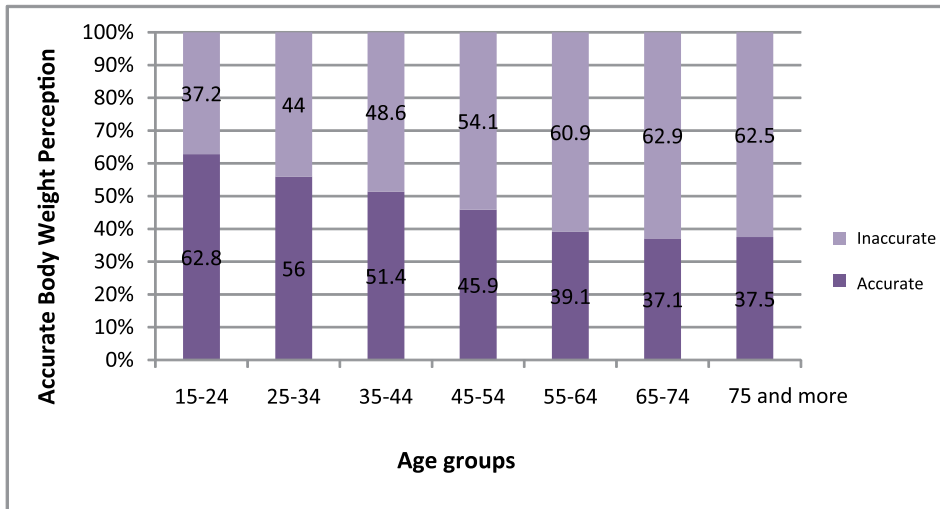


Figure 3.10. Distribution of accurate Body Weight Perception on the basis of age groups, TBWPS 2011

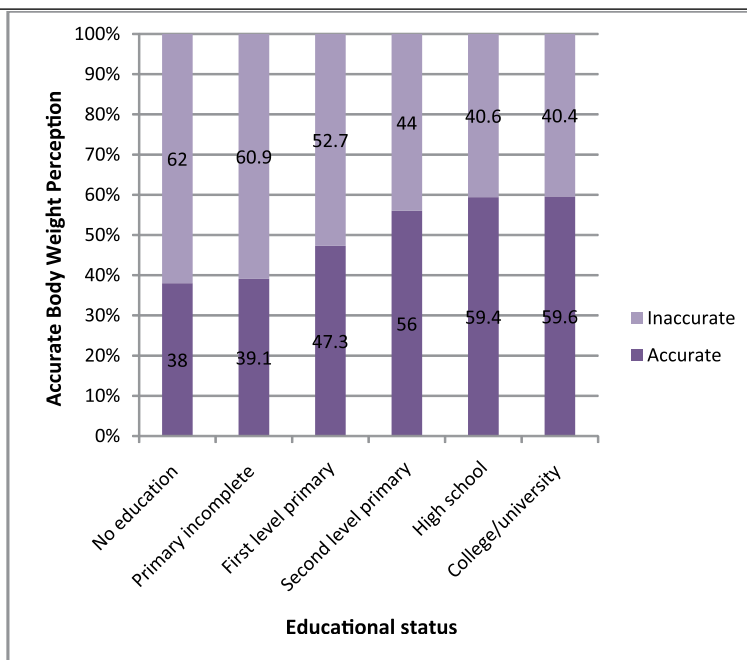


Figure 3.11. Distribution of Accurate Body Weight Perception on the basis of educational status, TBWPS 2011

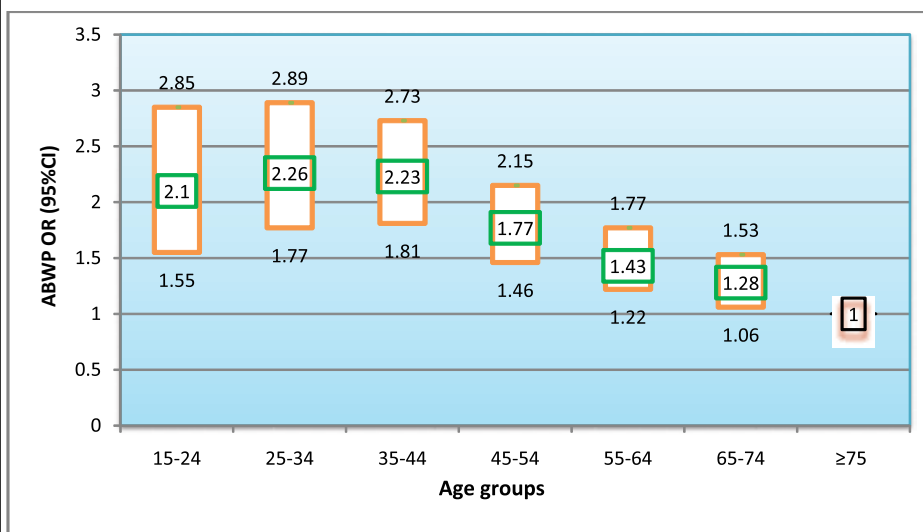


Figure 3.12. Age group based change of ABWP in accordance with the results of logistic regression, TBWPS 2011

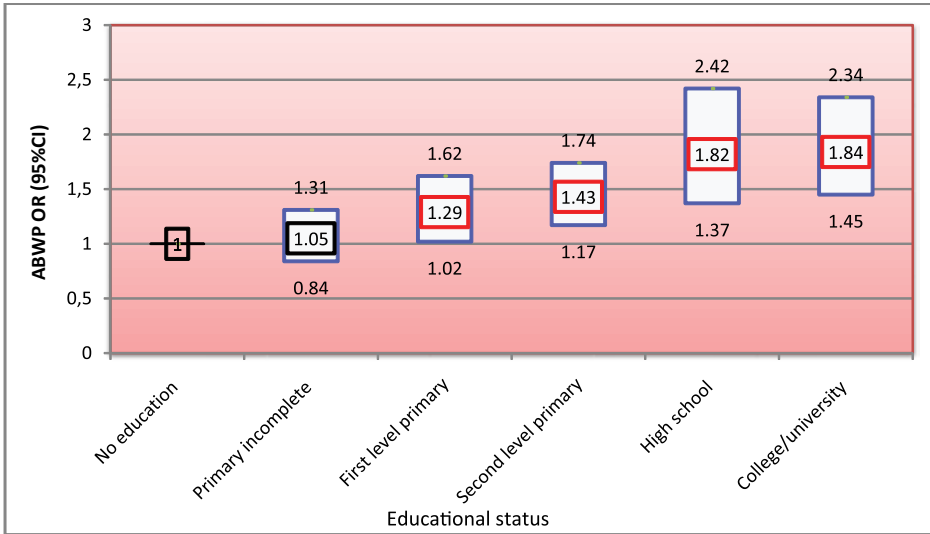


Figure 3.13. Educational status based change of ABWP in accordance with Logistic regression model, TBWPS 2011

3.5 Considering Obesity as Health Problem

Participants are asked whether they consider obesity as health problem according to which 85.3% view obesity as health problem, 10.6% does not view obesity as health problem and 4.1% presents no idea about the question (Table 3.13). 87.5% of those living in urban areas and 81.6% of those living in rural areas identify obesity as health problem between which the difference is statistically significant ($p < 0.001$). 86.9% of female participants and 82.6% of male participants think that obesity is health problem and the difference between them is statistically significant ($p < 0.001$) (Table 3.13 and Figure 3.14). Statistically significant difference exists between the age groups viewing obesity as health problem and the frequency among age group of 45-54 is the highest rating to 87.6% ($p < 0.001$) (Table 3.13 and Figure 3.15). Frequency for perception of obesity as health problem is lowest among those having no education with a frequency of 76.3% and has highest frequency of 94.3% among participants having college/university degree; therefore, the difference between the educational level groups is statistically significant ($p < 0.001$) (Table 3.13 and Figure 3.16).

Table 3.13 Change in considering of obesity as health problem by the participants on the basis of specific descriptive variables, TBWPS 2011

Descriptive variables	Considering of Obesity as Health Problem								p
	Yes		No		No idea		Total		
	Number	% *	Number	% *	Number	% *	Number	% *	
Residence									χ^2 :38.6 $p<0.001$
Rural	1880	81.6	304	13.2	119	5.2	2303	100.0	
Urban	3305	87.5	339	9.0	135	3.5	3779	100.0	
Sex									χ^2 :21.5 $p<0.001$
Female	3311	86.9	354	9.3	147	3.8	3812	100.0	
Male	1874	82.6	289	12.7	107	4.7	2270	100.0	
Age groups									χ^2 :87.0 $p<0.001$
15-24	655	80.4	125	15.3	35	4.3	815	100.0	
25-34	1090	87.1	114	9.1	47	3.8	1251	100.0	
35-44	1097	87.1	119	9.4	44	3.5	1260	100.0	
45-54	931	87.6	85	8.0	47	4.4	1063	100.0	
55-64	763	86.2	98	11.1	24	2.7	885	100.0	
65-74	429	84.3	57	11.2	23	4.5	509	100.0	
75 and more	220	73.6	45	15.1	34	11.3	299	100.0	
Educational status									χ^2 :145.4 $p<0.001$
No education	629	76.3	118	14.3	77	9.4	824	100.0	
Primary incomplete	294	78.2	63	16.8	19	5.0	376	100.0	
First level primary	2222	85.9	265	10.2	99	3.9	2586	100.0	
Second level primary	687	84.0	103	12.6	28	3.4	818	100.0	
High school	877	90.1	74	7.6	22	2.3	973	100.0	
College / university	476	94.3	20	4.0	9	1.7	505	100.0	
Total	5185	85.3	643	10.6	254	4.1	6082	100.0	

* row percentage

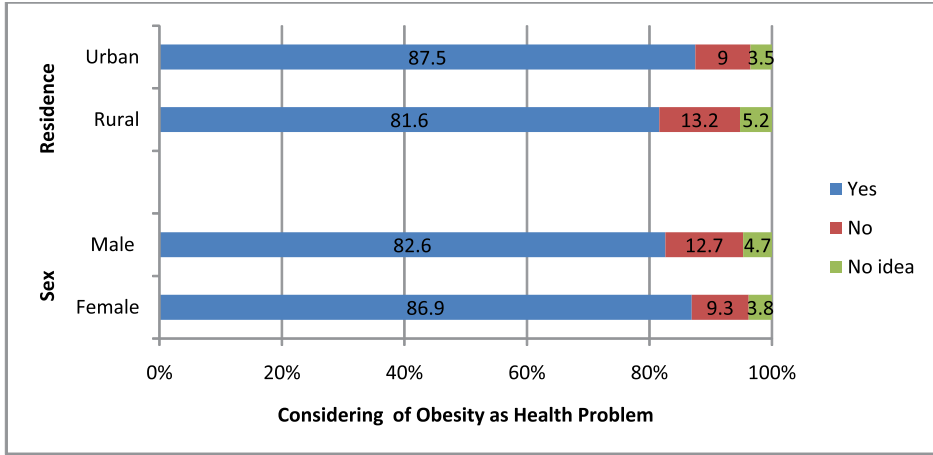


Figure 3.14 Change in considering of obesity as health problem on the basis of residence and sex, TBWPS 2011

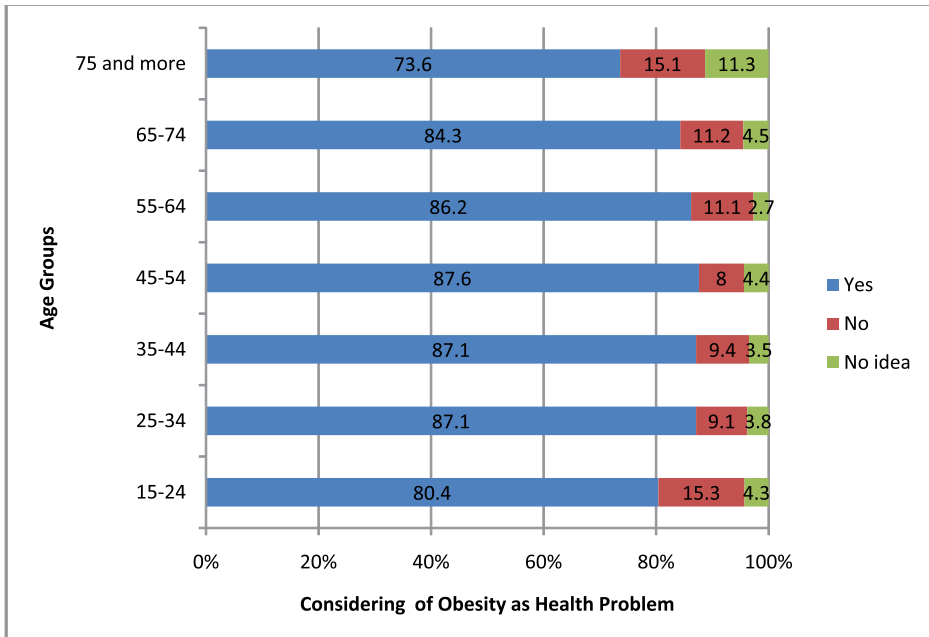


Figure 3.15. Change in considering of obesity as health problem on the basis of age groups, TBWPS 2011

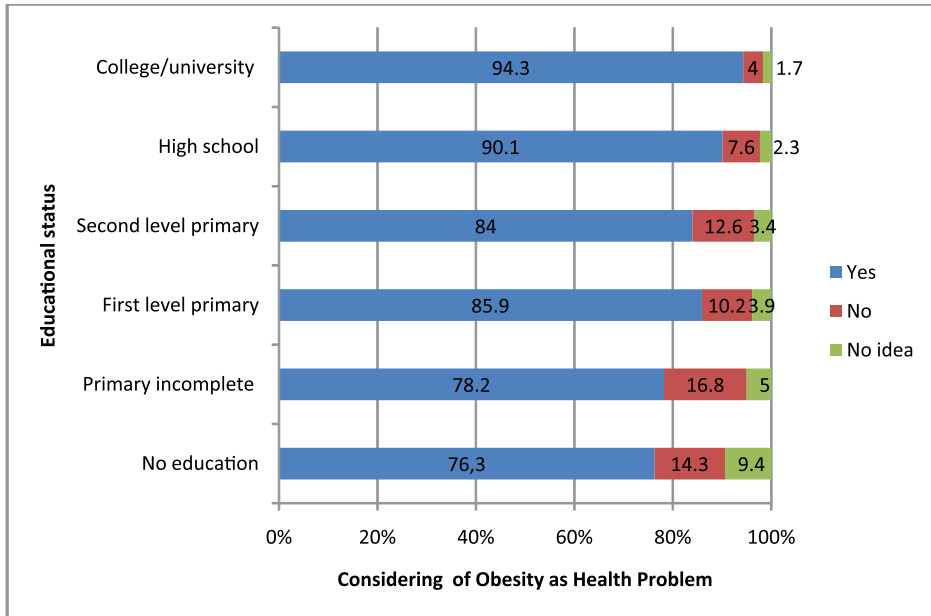


Figure 3.16 Change in considering of obesity as health problem on the basis of educational level, TBWPS 2011

When the question related with whether obesity is considered as health problem is evaluated in accordance with Body Mass Index category, statistically significant difference is obtained and the highest frequency is estimated among obese participants with a frequency of 86.9% ($p < 0.01$) (Table 3.14 and Figure 3.17). If this question related with whether obesity is considered as health problem is evaluated in accordance with Body Weight Perception category, statistically significant difference is obtained and the highest frequency is estimated among obese participants with a frequency of 90.7% ($p < 0.001$) (Table 3.14 and Figure 3.18). 87.1% of those having ABWP and 83.4% of the participants not having ABWP consider obesity as health problem and represent statistically significant difference ($p < 0.001$). (Table 3.14).



Table 3.14 Change in considering of obesity as health problem by the participants on the basis of Body Mass Index and Body Weight Perception categories, TBWPS 2011

Categories	Considering of obesity as health problem								p
	Yes		No		No idea		Total		
	Number	% *	Number	% *	Number	% *	Number	% *	
Body Mass Index									$\chi^2:14.6$ $P<0.01$
Underweight	174	80.6	24	11.1	18	8.3	216	100.0	
Normal	2041	84.4	273	11.3	103	4.3	2417	100.0	
Overweight	1732	85.6	214	10.6	78	3.8	2024	100.0	
Obese	1238	86.9	132	9.3	55	3.8	1425	100.0	
Body Weight Perception									$\chi^2:86.4$ $p<0.001$
Underweight	500	78.5	95	14.9	42	6.6	637	100.0	
Normal	2621	82.9	391	12.4	149	4.7	3161	100.0	
Overweight	1613	90.3	128	7.2	46	2.5	1787	100.0	
Obese	451	90.7	29	5.8	17	3.5	497	100.0	
Accurate Body Weight Perception									$\chi^2:16.7$ $p<0.001$
Accurate	2631	87.1	277	9.2	112	3.7	3020	100.0	
Inaccurate	2554	83.4	366	12.0	142	4.6	3062	100.0	
Total	5185	85.3	643	10.6	254	4.1	6082	100.0	

* row percentage

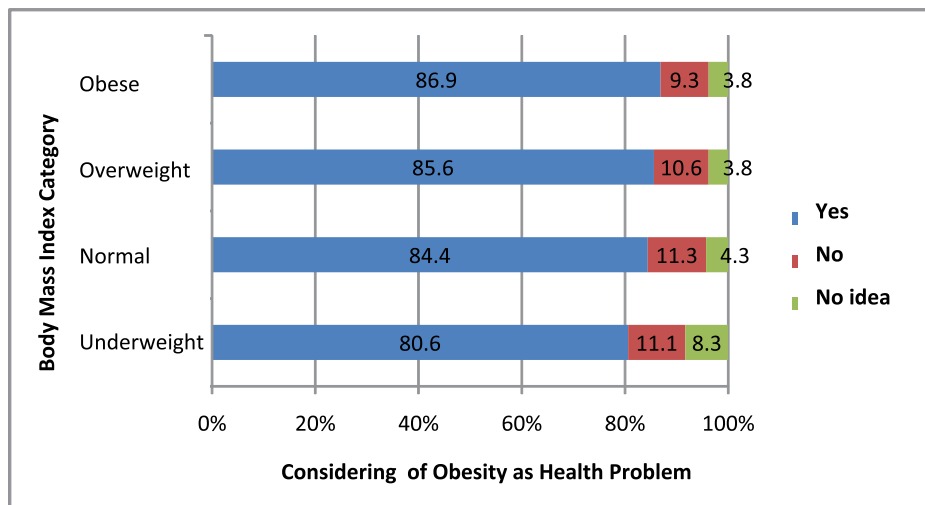


Figure 3.17. Change in considering of obesity as health problem by the participants on the basis of Body Mass Index category, TBWPS 2011

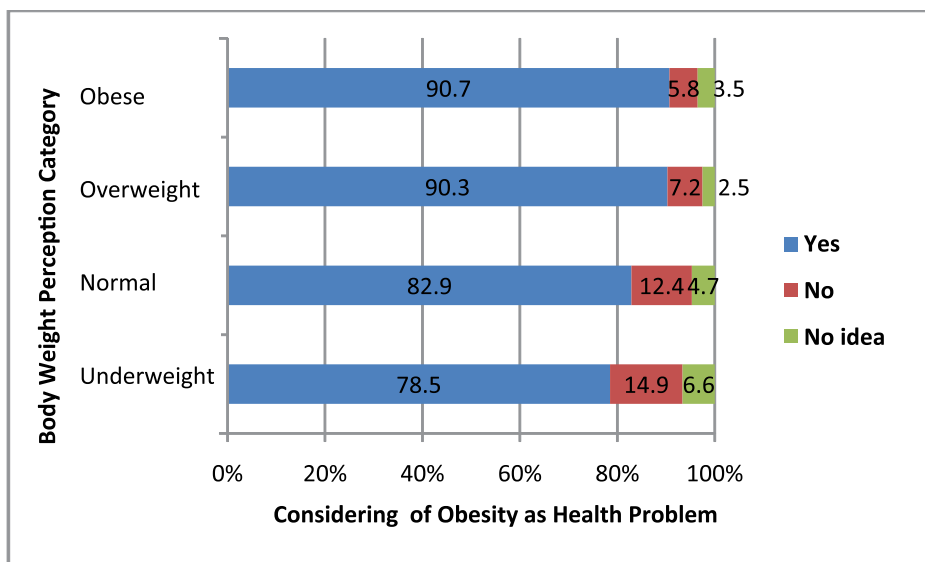


Figure 3.18 Change in considering of obesity as health problem by the participants on the basis of Body Weight Perception category, TBWPS 2011



Attaching more than one respond to the question about how to decide that an individual is obese, 89.3% of the participants has no idea, 5.1% identifies height and weight as a base for calculation, 3.9% states that a doctor can only decide and 2.9% supports that it may be understood on the basis of physical appearance.

3.6 Dieting status

17.4% of the participants states that they have gone on diet during the last one year (Table 3.15). Frequency of participants going on diet is 20.1% in urban areas and 12.9% in rural areas, representing statistically significant difference ($p < 0.001$). (Table 3.15, Figure 3.19). In terms of gender, frequency of dieting is 20.4% among female participants and 12.2% among male participants, representing statistically significant difference ($p < 0.001$; $p < 0.001$) (Table 3.15, Figure 3.19). Frequency of dieting is 21.2% within 35-45 age group and statistically significant difference is found between age groups ($p < 0.001$) (Table 3.15, Figure 3.20). From the point of educational status, frequency of dieting is 13.3% among the participant having no education is the lowest and 23.2% within the group of participants having college/university degree is the highest; , statistically significant difference exists between educational levels ($p < 0.001$) (Table 3.15, Figure 3.21).

Table 3.15. Change in status of participants dieting to lose weight in the last one year on the basis of specific descriptive variables, TBWPS 2011

Descriptive variables	Dieting status						p
	Yes		No		Total		
	Number	% *	Number	% *	Number	% *	
Residence							χ^2 : 50.5 $p<0.001$
Rural	298	12.9	2005	87.1	2303	100.0	
Urban	758	20.1	3021	79.9	3779	100.0	
Sex							χ^2 : 66.1 $p<0.001$
Female	778	20.4	3034	79.6	3812	100.0	
Male	278	12.2	1992	87.8	2270	100.0	
Age groups							χ^2 : 61.8 $p<0.001$
15-24	107	13.1	708	86.9	815	100.0	
25-34	251	20.1	1000	79.9	1251	100.0	
35-44	267	21.2	993	78.8	1260	100.0	
45-54	199	18.7	864	81.3	1063	100.0	
55-64	146	16.5	739	83.5	885	100.0	
65-74	66	13.0	443	87.0	509	100.0	
75 and more	20	6.7	279	93.3	299	100.0	
Educational status							χ^2 : 38.2 $p<0.001$
No education	110	13.3	714	86.7	824	100.0	
Primary incomplete	55	14.6	321	85.4	376	100.0	
First level primary	446	17.2	2140	82.8	2586	100.0	
Second level primary	120	14.7	698	85.3	818	100.0	
High school	208	21.4	765	78.6	973	100.0	
College /university	117	23.2	388	76.8	505	100.0	
Total	1056	17.4	5026	82.6	6082	100.0	

* row percentage

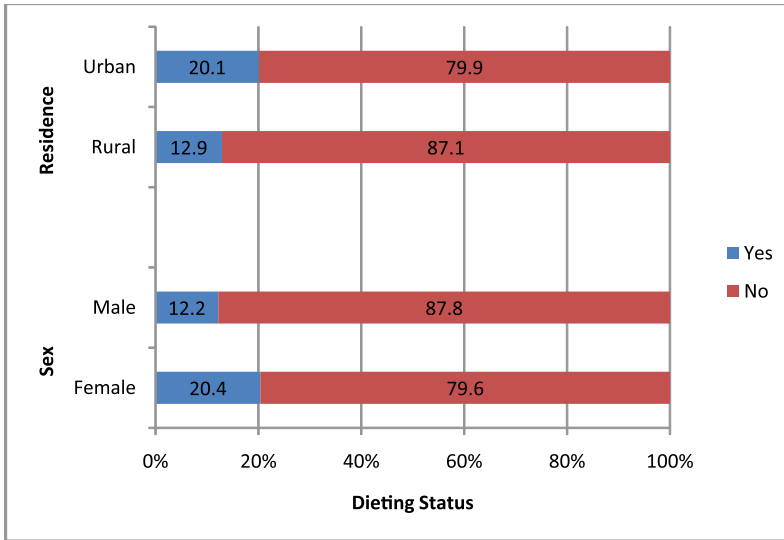


Figure 3.19 Change in status of participants dieting to lose weight in the last one year on the basis of residence and sex, TBWPS 2011

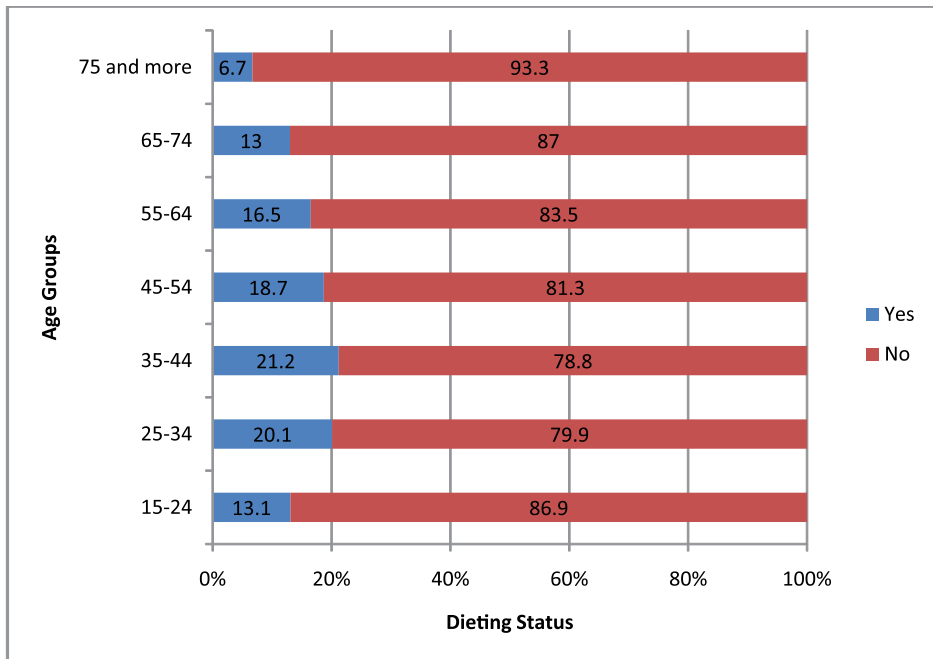


Figure 3.20 Change in status of participants dieting to lose weight in the last one year on the basis of age groups, TBWPS 2011

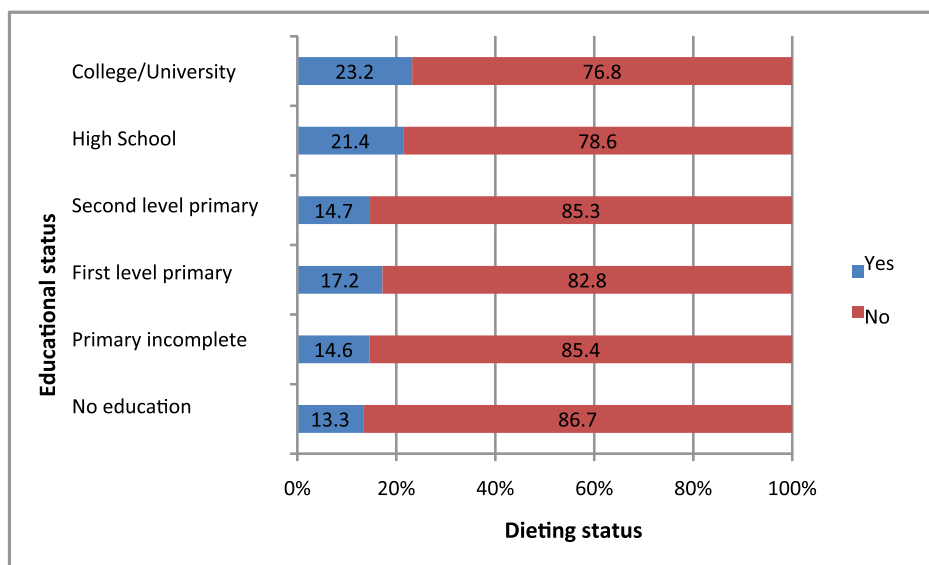


Figure 3.21 Change in status of participants dieting to lose weight in the last one year on the basis of educational status, TBWPS 2011

When the participants going on diet during the last one year are evaluated in terms of BMI category, statistically significant difference is obtained; obese participants have the highest frequency of dieting with a frequency of 28.4% ($p < 0.001$) (Table 3.16, Figure 3.22). In terms of BWM category based evaluation of the participants dieting during the last one year, the difference is statistically significant and the frequency is highest among obese participants with a frequency of 35.4% ($p < 0.001$) (Table 3.16, Figure 3.23). In case of ABWP based evaluation of the participants dieting during the last one year, 29.1% of those having accurate body weight perception goes on diet; whereas, this frequency is 19.7% for those having inaccurate body weight perception, representing statistically significant difference ($p < 0.001$) (Table 3.16).



Table 3.16 Change in status of participants dieting to lose weight in the last one year on the basis of Body Mass Index and Body Weight Perception categories, TBWPS 2011

	Dieting status						p
	Yes		No		Total		
	Number	% *	Number	% *	Number	% *	
Body Mass Index							<i>X²:221.4</i> <i>p<0.001</i>
Underweight	13	6.0	203	94.0	216	100.0	
Normal	255	10.6	2162	89.4	2417	100.0	
Overweight	384	19.0	1640	81.0	2024	100.0	
Obese	404	28.4	1021	71.6	1425	100.0	
Body Weight Perception							<i>X²:473.4</i> <i>p<0.001</i>
Underweight	35	5.5	602	94.5	637	100.0	
Normal	319	10.1	2842	89.9	3161	100.0	
Overweight	526	29.4	1261	70.6	1787	100.0	
Obese	176	35.4	321	64.6	497	100.0	
Accurate Body Weight Perception							<i>X²:38.3</i> <i>p<0.001</i>
Accurate	335	29.1	816	70.9	1151	100.0	
Inaccurate	453	19.7	1845	80.3	2298	100.0	

* row percentage

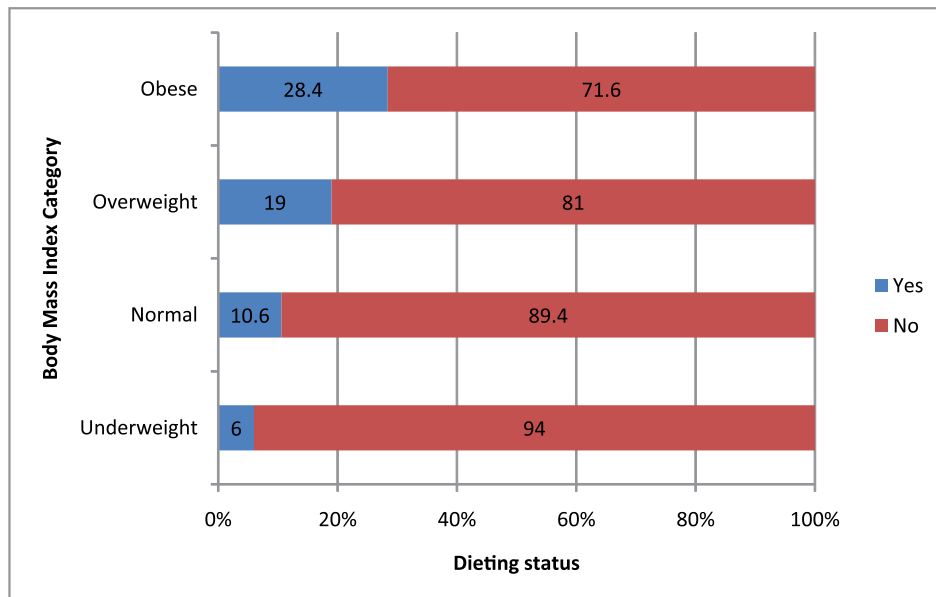


Figure 3.22 Change in status of participants dieting to lose weight in the last one year on the basis of Body Mass Index, TBWPS 2011

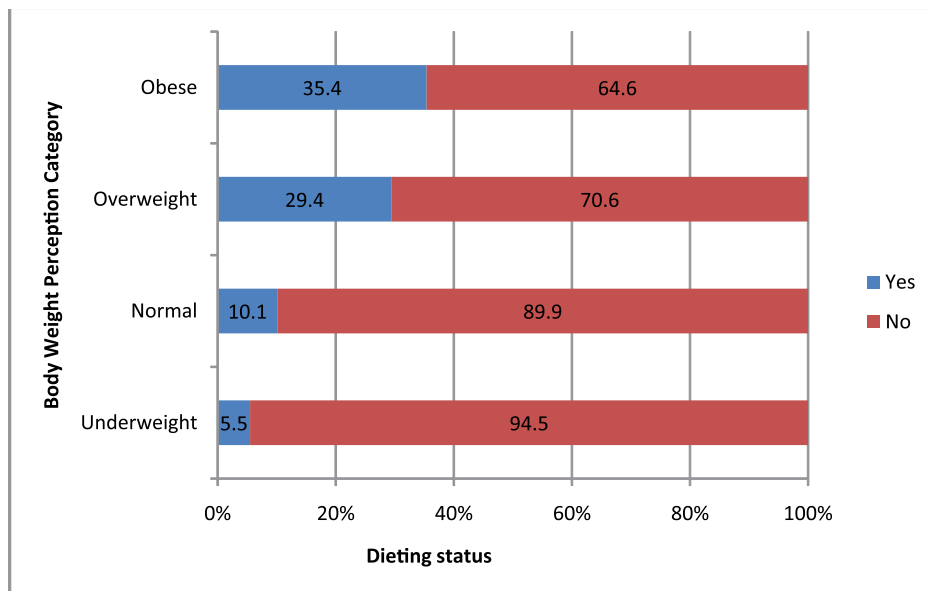


Figure 3.23 Change in status of participants dieting to lose weight in the last one year on the basis of Body Weight Perception, TBWPS 2011



4. DISCUSSION AND CONCLUSION

4.1 Body Mass Index based Evaluation

In the scope of this study conducted about body weight perception at national level for the first time in Turkey, 6082 persons aged 15 and more are interviewed within 3894 households among 5502 households (70.8%); BMI of the participants is calculated on the basis of height and weight values stated. Within the context of the survey conducted by Inoue et al. in Japan regarding health status of working community, questionnaire results and check-up records (height and weight measured) are compared as a result of which it is identified that correlation coefficient is $r:0.990$ between the measured and stated heights of 33514 participants aged 20-65 and the correlation coefficient between the measured and stated weight is estimated as $r: 0.982$.¹⁹ This result shows that BMI values calculated with respect to the measured and stated height and weights are similar.

In this study height and weight values stated by the participants aged twenty and more are evaluated in accordance with BMI category of WHO (aged 20 and more) . Growth references developed by WHO for school-age children and adolescents are used during interpretation of BMI of 15-19 aged participants (Table 2.3).^{3,21}

When BMI category of the participants is evaluated, it is found that 3.6% is underweight, 39.7% is normal, 33.3% is overweight and 23.4% of the participants is obese. In accordance with THS 2010 data of TURKSTAT and BMI category calculated on the basis of height and weight values stated by the adult population aged 15 and more; 5.9% of the participants is underweight, 44.7% is normal, 33.0% is overweight and 17,9% is obese.⁹ With respect to the BMI category calculated on the basis of measured height and weights of individuals aged 19 and more and BSA 2010 data; 2.2% of the participants is underweight, 32.9% is normal and 30.3% is obese.¹⁰ Although overweight ratio is searched within both studies, obesity frequency (23.4%) is between the values found by these two studies (16.9% and 30.3%). The fact that the obesity frequency among the participants aged 15-24 has the lowest value rating to 4.8% and TNHS includes those aged 19 and more may explain the reason for lower obesity frequency when compared to TNHS.

Statistically significant difference is not found between those living in rural and urban areas on the basis of BMI category. While 31.9% of those living

in rural areas is overweight and 24.3% is obese, these rates are 34.2% and 22.9% respectively for the participants living in urban areas. Similarly, in accordance with 2010 data of Turkey Health Survey, 32.6% of people living in rural areas is overweight and 17.1% is obese; whereas, 33.1% of people living in urban areas is overweight and 16.3% is obese.⁹

In the survey, according to BMI categorization, it is estimated that 36.6% of male participants is overweight and 18.4% is obese; whereas, these rates are 31.3% and 26.4% respectively for female. In accordance with THS 2010 data, overweight and obese male rates are 37.3% and 13.2% respectively and overweight and obese female rates are 28.4% and 21.0% respectively.⁹ Results in TNHS 2010 are similar representing a frequency of 39.1% and 29.7% respectively in terms of overweight male and female; 41.0% and 20.5% for obese female and male respectively.¹⁰

In terms of age groups, frequency of obesity is highest among 55-64 aged participants. According to the similar TNHS 2010 results, obesity frequency is highest among 51-64 aged group rating to 47.8%.¹⁰

It is found that frequency of obesity is highest rating to 32.3% among participants with no education and has the lowest value of 10.3% within the group with college/university degree. Similarly, as the level of education increases frequency of obesity decreases in accordance with BMI category calculated on the basis of measurement of height and weights of female giving birth during the last 5 years before the date of interview conducted by Turkey Population and Health Survey in 2008 (not being pregnant and who has completed three months as of last birth).²³

4.2 Body Weight Perception Category based Evaluation

When the participants are asked about perception of their body weights, 10.5% perceives themselves as underweight, 51.9% in normal weight, 29.4% as overweight, and 8.2% perceives as obese. When the evaluation is performed in terms of residence BWP category, 31.6% of those living in urban perceives themselves overweight, 8.7% as obese and 25.7% of the participants living in rural areas perceives themselves as overweight and 7.4% is obese. On the basis of sex, 33.3% of female perceives themselves as overweight and 9.8% perceives as obese; whereas, these rates are 22.7% and 5.5% for male participants respectively. In accordance with the study conducted by Alwan et al. in the scope of community based Seychelles Cardiac Survey III in the Republic of Seychelles, BMI category of participants covering 1255 individuals aged 24-64 is measured and it is found that



more females perceive themselves overweight and obese when compared with males.¹⁷

4.3 Comparison of Body Mass Index Category with Body Weight Perception Category, Accurate Body Weight Perception based Evaluation

When BMI and BWP categories of the participants are compared, low reliability is identified ($\kappa = 0.25$, $p < 0.001$). In accordance with BMI category, only 38.7% of overweight participants defines themselves as overweight and 5.6% perceives themselves as obese, 53.4% as having normal weight and 2.3% of overweight participants perceives themselves as underweight. 25.8% of obese participants view themselves as obese, 54.2% perceives as overweight, 18.9% as in normal weight and 1.1% of obese participants perceives themselves as underweight. 62.5% of underweight participants perceives themselves as underweight and 71.8% of normal weight participants perceives themselves as having normal weight. ABWP frequency is 71.8% among normal weight participants representing the highest value and is estimated as 62.5% for underweight, 38.7% for overweight and with ratio of 25.8% is the lowest for obese participants. In BMI and BWP categorization underweight and normal weight participants are included within same group and overweight and obese participants are covered within another group, medium level reliability is estimated ($\kappa = 0.47$, $p < 0.001$).

Medium level reliability shows that awareness level of overweight and obese people is not sufficient and the separation of overweight and obese concepts is not made adequately. Only three fifth (59.1%) of overweight or obese people perceives themselves as overweight or obese.

In accordance with the study performed by Duncan et al. in the scope of 2003-2006 National Health and Nutrition Review in the United States of America, ABWP frequency of 4784 overweight or obese adults aged 20 and more (with respect to the BMI category measured) is 77%, which is higher than the figure obtained in our study.¹²

In accordance with the study covering 4539 persons aged 20 and more and performed by Gutierrez-Fisac et al. in the scope of National Health Survey in Spain, frequency of overweight or obese participants is 48.6% and 73.1% of them perceives themselves as overweight or obese, which represents higher frequency when compared to the value obtained in the scope of our study.²⁴

When the BMI and BWP categories of the participants are compared on

the basis of gender, low reliability is found for both of them ($\kappa = 0.27$, $\kappa = 0.22$ respectively). When BMI and BWP categories are evaluated on the basis of gender by combining them within groups of two, the reliability between is at medium level both for females and males ($\kappa = 0.49$, $\kappa = 0.44$, respectively, $p < 0.001$).

In the scope of the study performed by Inoue et al., BMI and body weight perception are evaluated in three groups called underweight, normal and overweight and as a result, similar results are obtained as $\kappa = 0.30$ for females and $\kappa = 0.37$ for males.

49.7% of participants has Accurate Body Weight Perception (ABWP). This means that one of every two persons perceives their body weight inaccurately. ABWP is higher among those living in urban areas (51.2%) when compared to the rural areas (47.2%) and the difference between them is statistically significant. ABWP ratio is similar between the genders (female: 49.6%, male: 49.7%) and any statistically significant difference is not estimated. Overweight or obese female frequency is 43.1% and relevant ABWP value is 64.8%, which is 49.0% in male groups.

In accordance with the study performed by Inoue et al., ABWP frequency is found as 99.6% for females and 97.9% for male participants, which are higher than the values obtained in our study.²² With respect to the BMI category identified by Rahman et al., by means of the measurement performed on 2224 females aged 18-25 and consulting to 5 reproductive health clinics in USA, frequency of overweight or obese females is obtained as 52.2% and their ABWP frequency is found as 77%, which are higher than the values estimated in our study.²⁵ According to the study of Kim et al. performed with 8581 females aged 20-64 in the scope of Seoul Citizens Health Indicators Survey, BMI and BBA based on statements are compared and ABWP frequency is estimated as 57.4%, which is higher than the value obtained in our study.²⁶

In terms of age groups, as the age increases, ABWP frequency decreases; Participants aged 15-24 has 2.1 times more ABWP than those aged 75 and more. As ABWP decreases together with the age and due to the occurrence of obesity related diseases in old ages as a result of cause and effect relation of obesity related health problems, old age groups may be evaluated as the prioritized target mass during improvement of ABWP and struggle with the obesity.¹

In accordance with the study conducted by Gutierrez-Fisac et al., accurate body weight perception of overweight or obese females decreases with the age



and as for males, such perception decreases after 35 and more ages.²⁴

Since the participants having college/university degree have 1.84 times more accurate body weight perception than those having no education, ABWP frequency increases as the educational level increases. This result shows that people having lower educational level may be prioritized target mass during improvement of ABWP. Similarly, in accordance with the studies performed by Alwan et al. and Gutierrez-Fisac et al., ABWP frequency of overweight or obese is higher among higher educational level.^{17,24} According to the study of Rahman et al., as the educational level of females increases, ABWP frequency of overweight or obese participants increases as in our study.²⁵

4.4 Considering of Obesity as Health Problem

Participants are asked whether they consider obesity as health problem according to which 85.3% view obesity as health problem, 10.6% does not perceive obesity as health problem and 4.1% presents no idea about the question

When considering of obesity as health problem is evaluated on the basis of BMI category, difference is found between categories statistically (85.6% of overweight, 86.9% of obese). Similarly, statistically significant difference is found between BWP categories in the scope of the considering of obesity as health problem (90.3% of overweight, 90.7% of obese participants). The fact that the one of every ten participants being obese or perceiving themselves as obese does not consider obesity as health problem shows lack of knowledge in this context.

87.1% of those having ABWP and 83.4% of participants not having ABWP perceive obesity as health problem. Increasing ABWP level will contribute the frequency of considering of obesity as health problem.

Raising more than one respond to the question of how to understand obesity, 89.3% of participants does not have any idea about the question, whereas, 5.1% indicates height and weight calculation to identify obesity, 3.9% supports that only a doctor can decide and 2.9% of participants think that obesity may be understood by analyzing the physical appearance. The fact that the nine of every ten participants do not have any idea about how to understand obesity highlights the requirement to increase obesity related awareness.

4.5 Dieting status

17.4% of participants stated that they went on a diet to lose weight during

the last one year. In accordance with the BMI category calculated on the basis of heights and weights measured on 6910 employees aged 18-65 in 6 hospitals in Massachusetts, USA by Lemon et al., 33% of participants is found normal, 32.1% is overweight and 34.8% is identified as obese. 51% of participants stated they were still dieting. When compared with our study having similar BMI ratios, frequency of dieting is lower in our study.²⁷

Frequency of participants going on diet is 20.1% in urban areas and 12.9% in rural areas. In terms of gender, frequency of dieting is 20.4% among female participants and 12.2% among male participants. In accordance with the study performed by Burns et al, in the Netherlands and covering 2042 males and 2352 females aged 20-59 on the basis of Amsterdam and Maastricht municipality records, BMI average is calculated on the basis of height and weight values measured and found as 24.5 for females and 25.4 for males, which is 26.8 kg/m² for females and 26.1 kg/m² for males in our study. Although BMI average is lower than the values found in our study, frequency of those dieting to lose weight during the last one year is 37.2% for females and 20.8% for males, representing higher values when compared with our study.¹³

When the participants dieting during the last one year are evaluated on the basis of BMI category, it is obtained that 19.0% of overweight and 28.4% of obese participants go on diet. In BWP category, 29.4% of overweight and 35.4% of obese go on diet during the last one year. It is identified that participants perceiving themselves as overweight or obese go on diet much more than those being overweight or obese on the basis of BMI. In accordance with BMI category calculated on the basis of height and weight statements of 16891 persons aged 18 and more in the scope of Behavioral Risk Factors based 30 surveys conducted by Forman et al. within 28 states, except for Colombia and Hawaii regions, 47.9% of overweight or obese females still diets being 27.8% in terms of males and 52.1% of females having overweight or obese body weight perception still diets and this ratio is 36.9% for males. Dieting frequency of above study is higher than our study and similarly, those perceiving themselves as overweight or obese goes on more diet than overweight or obese people.²⁸ Dieting of one fifth of overweight, one third of obese participants shows lack of awareness regarding obesity. Increasing obesity related awareness may contribute to dieting of overweight or obese people and increase of their physical activities.

When the participants dieting to lose weight during the last one year are



evaluated on the basis of ABWP, it is obtained that 29.1% of those having accurate body weight perception goes on diet and 19.7% of those having inaccurate body weight perception diets. According to the study of Forman et al., frequency of dieting is higher and it is found that 51.1% of overweight or obese females having ABWP still diets; whereas, this frequency is 31.9% for those having inaccurate perception. As for males, these rates are 39.3% and 12.1% respectively.²⁸ The fact that the one third of individuals having ABWP and one fifth of those not having ABWP diets shows that obesity related awareness is not adequate and more efforts should be presented to create behavioral change in this context.

4.6 Conclusion

In this study, it is analyzed that 33.3% of participants is overweight and 23.4% is obese. In parallel with the worldwide outcomes, obesity is a significant public health problem in Turkey.

The fact that the two third of overweight individuals and three fourth of obese participants do not have ABWP is a significant matter required to be overcome while struggling with obesity and shows that obesity related awareness should be increased. Lower ABWP frequency in rural areas, lower ABWP frequency, but higher obesity frequency among the groups having lower education level may serve as a guide for prioritized target mass of struggle with obesity programs aiming to create ABWP.

The fact that the most of the participants do not have any idea about understanding obesity (9/19) and non-considering of obesity as health problem by obese participants or those perceiving themselves as obese (1/10) shows lack of information about obesity.

Individuals having ABWP perceive obesity as health problem more than those not having ABWP. One third of participants having ABWP and one fifth of those not having ABWP go on diet, which shows that obesity related awareness should be increased and more efforts should be presented to create obesity related behavioral change.

Increase of ABWP frequency will increase the awareness in terms of obesity related health risks and will make overweight and obese people show much more effort to have healthy weight. It will also contribute to the accurate evaluation of obesity related public health messages by the overweight and obese people.

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