TRENDS IN OVERWEIGHT AND OBESITY AMONG SERBIAN ADULT POPULATION 2000-2013

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SUMMARY – The aim of the study was to determine changes in body mass index (BMI) and in the prevalence of overweight and obesity in Serbian adult population. Data for this study were obtained from three National Health Interview Surveys, carried out as cross-sectional, nationally representative surveys in 2000, 2006 and 2013. The values of p for trends of sociodemographic and health related behavioral characteristics, of BMI distribution, and of overweight and obesity prevalence were determined by univariate and multivariate linear and logistic regression analyses, with year of survey as a continuous variable. The mean values of BMI and standard deviations in surveys were 26.09±3.92, 26.28±4.02 and 26.87±4.33 in men, and 25.91±5.25, 25.77±5.22 and 26.35±5.58 in women, respectively (trend $p<0.001$ both). The prevalence of obesity was 14.3%, 16.5% and 21.4% in men, and 20.0%, 19.7% and 23.3% in women, respectively (trend $p<0.001$ both). The prevalence of overweight did not change significantly during the observed period. In conclusion, the prevalence of obesity showed an increasing trend in both men and women, demanding targeted public health interventions.

Key words: *Overweight; Obesity; Trend; National health survey; Serbia*

Introduction

Recent estimates indicate an increasing prevalence of overweight and obesity worldwide; according to the World Health Organization (WHO)[1], more than 50% of the adult population in the WHO European Region are overweight and more than 20% are clinically obese. Data from the last National Health Survey in Serbia[2] showed that 35.1% of the adult population in Serbia (≥20-year-old) were overweight according to the body mass index (BMI, 25.0-29.9 kg/m^2) and 21.2% obese (BMI ≥30 kg/m^2). Being overweight or obese increases the risk of cardio- and cerebrovascular diseases, diabetes mellitus type 2, some types of cancer, gallstones, osteoarthritis, and some other health disorders and disability[3-5], and consequently contribute to the highest burden of disease in Serbia[6].

Studies that investigated the possible causes of overweight and obesity have shown that lifestyle habits (diet, physical activity, smoking, alcohol use) together with socioeconomic factors (education level, marital status and wealth index) significantly contribute to behaviors that lead to overweight and obesity[7-10].

Changes in BMI and prevalence of overweight and obesity over time have been investigated in many

countries[11-13]. Using data from three consecutive National Health Surveys for the 2000-2013 period, we investigated changes in BMI and in the prevalence trends of overweight and obesity among Serbian adult population aged ≥20 years.

Materials and Methods

Subjects

Data for this study were obtained from three National Health Interview Surveys carried out as cross-sectional, nationally representative surveys in 2000, 2006 and 2013, conducted by the Ministry of Health of Serbia and Dr Milan Jovanović Batut Institute of Public Health of Serbia. The study population included adults aged ≥20 years, permanent residents of the Republic of Serbia. Exclusion criteria were age below 20 years, persons who lived in collective households and/or institutions, residents of the Kosovo and Metohija region (under the UN Mission), and persons who were mentally unable to participate in the survey. Out of 9921 interviewed subjects in the first, 14 522 in the second, and 12 722 subjects in the third survey, data were analyzed for 9345, 13822 and 12460 subjects, respectively, after excluding those with missing data on weight and height measures.

Sampling design

A stratified, two-stage national representative random sampling approach was used for selection of the survey sample in all three surveys. The Population Census framework was used for the selection of clusters (from 1991, 2002, and 2011, respectively). All three surveys included randomly selected households (out of 6554 households in 2000, 5497 were interviewed; out of 7673 in 2006, 6156 were interviewed; and out of 6700 in 2013, 6500 were interviewed). Household response rate was 83.8% in 2000, 86.5% in 2006, and 64.4% in 2013. All members of the chosen households aged 20 and above were included.

Instruments and variables

Data sources were three types of questionnaires, i.e., one was a self-administered questionnaire for population above 15 years of age, and the other two questionnaires (for subjects above 15 years and household questionnaire) were filled by the interviewers. The variables included sociodemographic characteristics (age, gender, marital status, education), health related behavior variables (smoking status, alcohol consumption, level of physical activity, dietary habits) and objective findings (weight, height). Marital status was defined in two categories, i.e., married/living with partner and living without partner (including unmarried, divorced or widowed). Educational level was defined in three categories as elementary or low (≤8 years), secondary or middle (9-12 years) and post-secondary or high (>12 years, including university and post university education).

All health-related behaviors were self-reported. According to smoking status, participants were divided into non-smokers (those who had never smoked), former smokers (those who had stopped smoking 12 months before and earlier) and current smokers (those who smoked in the 12 months prior to the survey including those who quit within that year).

Alcohol consumption was assessed with questions on the use of alcohol drinks in the past 12 months with the following outcome categories: 1) those who have never drunk or have not drunk alcohol in the past 12 months (abstainers); 2) those who drink once a month and less; 3) those who drink 2-3 times *per* month; and 4) those who drink once a week and more. For the purpose of analysis, the second and third categories were combined as a "three times *per* month or less" category.

The level of physical activity was determined with a question related to the duration of daily transport physical activity (walking or riding a bicycle) with three outcome categories: low (10-29 minutes *per* day), moderate (30-59 minutes *per* day) and high level (more than 60 minutes *per* day).

Diet intake variables included breakfast frequency, adding salt at table, type of bread used, type of fat for food preparation, fruit/vegetable consumption frequency, and number of fruit/vegetable portions consumed daily.

Measurements

Measurements of weight and height were performed using standard procedures[14]. BMI was calculated by dividing body weight by height square (kg/m^2) and categorized according to the WHO criteria: BMI <18.50 kg/m^2 was considered as underweight, BMI 18.50-24.99 kg/m^2 as normal weight, BMI 25.00-29.99 kg/m^2 as overweight, and BMI ≥30.00 kg/m^2 as obesity[14].

Statistical analysis

Continuous variables were described with means and standard deviations, while categorical ones with frequencies and percentages. Prevalence rates with appropriate 95% confidence intervals (CI) were

estimated for the core study outcomes, namely, three categories of BMI, separately for male and female participants. All reported age-adjusted estimates and their 95% CI were weighted using probability-sampling weights calculated to reflect an underlying population of inhabitants in the Republic of Serbia in 2000, 2006 and 2013.

The χ^2-test or one-way ANOVA was used to determine statistically significant differences between survey years in the frequency or means of sociodemographic characteristics and characteristics of the sample related to health behavior. Univariate regression analysis with year of the study as the continuous independent variable and each socioeconomic and health behavior variables as outcomes were applied to assess the changes in these outcomes.

Investigation of BMI changes as continuous variable values, as well as changes of BMI categories over 13-year period were performed by using trend analysis. Trend analysis of BMI distribution included linear regression analysis separately for men and women, and five models were made: model 1 – univariate linear regression model with BMI as continuous outcome and year of survey as predictor; model 2 – multivariate regression model with BMI as continuous outcome and year of survey as predictor, adjusted for age; model 3 – regression model with BMI as continuous outcome and year of survey as predictor, adjusted for age, education, region and type of settlement; model 4 – model 3 plus marital status and employment; and model 5 – model 4 plus all health behavior variables. The trends were presented as linear regression coefficients and 95% CI (B, 95% CI). The level of statistical significance was set at p<0.05.

Trend analysis of the overweight and obese prevalence scores according to survey year stratified by sex was done by univariate and multivariate logistic regression; survey year was one of continuous predictors and proportion of overweight/obese was the outcome, and the first survey in 2000 was chosen as a reference category. Five models were formed: model 1 – overweight/obese as categorical outcome and year of survey as predictor; model 2 – adjusted for age; model 3 – adjusted for age, education, region and settlement; model 4 – model 3 plus marital status and employment; and model 5 – model 4 plus all health behavior variables. The trends were presented as odds ratios (OR) and 95% CI.

All statistical analyses were performed using SPSS version 21.0 software (SPSS Inc., Chicago, IL, USA) and STATA version 11.1 (StataCorp LP College Station, TX, USA) with the complex sampling design considered. Statistical significance was set at 2-sided p<0.05.

Results

In the study, 35 647 participants were included, 9365 in survey I, 13 822 in survey II, and 12 460 in survey III. Sociodemographic characteristics (age, sex, education, employment, marital status, region, and settlement) are presented in Table 1 and all differed significantly across study phases. The trend of changes for all variables (with the exception of sex and settlement) was statistically significant.

Regarding health habits, presented in Table 2, more than half of the survey subjects were ever-smokers (current and former), consumed alcohol once *per* week or more, and their transport physical activity was low. As for dietary habits, most of the subjects ate breakfast every day, added salt to food never or sometimes, used white bread and vegetable oil for food preparation, and about half of them ate fruit and vegetables once a day or more. All health-related behavior variables differed significantly among the three surveys and trend of these changes was significant for all of them.

Distribution of BMI across survey years with trend analysis, separately for men and women, is presented in Table 3. In men, the mean BMI was increasing throughout the study period. In women, after slight nonsignificant decrease in 2006, the mean BMI significantly increased in 2013. In men and women, the increasing trends of the mean BMI were significant for both unadjusted regression coefficient B and adjusted for various potential confounding variables (p<0.001).

Similar results were obtained when the prevalence of obesity was analyzed (Table 4). In men, the prevalence of obesity was steadily increasing from 2000 to 2013. In women, after negligible decrease in 2006 in comparison with 2000, significant increase in the prevalence of obesity was found in 2013. In men and women, the increasing trends of obesity prevalence, both unadjusted and adjusted, were statistically significant (p<0.001).

The prevalence of overweight was almost the same in all three surveys in both men and women (Supplementary Table 1). In women, the decreasing trend of overweight prevalence was significant

Table 1. Sociodemographic characteristics of study subjects, Republic of Serbia, 2000–2013

Characteristic	2000 n=9365	2006 n=13822	2013 n=12460	p[#]	B; p[&]
Age (yrs), mean (SD)	47.36±16.74	48.96±17.35	48.79±17.00	0.000	0.668; 0.000
Age group (yrs), n (%)				0.000	0.010; 0.050
20-44	4320 (46.1)	5848 (42.3)	5340 (42.9)		
45-64	3173 (33.9)	4811 (34.8)	4707 (37.8)		
≥65	1672 (20.0)	3162 (22.9)	2413 (19.4)		
Sex				0.000	0.001; 0.805
Men	4447 (47.5)	7300 (52.8)	6007 (48.2)		
Women	4917 (52.5)	6522 (47.2)	6453 (51.8)		
Region, n (%)				0.000	-0.031; 0.000
Vojvodina	2295 (24.5)	3731 (27.0)	3317 (26.6)		
Belgrade	1967 (21.0)	3076 (22.3)	2904 (23.3)		
Central Serbia	5103 (54.5)	7015 (50.8)	6239 (50.1)		
Settlement, n (%)				0.000	-0.001; 0.808
Urban	5654 (60.4)	7869 (56.9)	7497 (60.2)		
Rural	3710 (39.6)	5952 (43.1)	4963 (39.8)		
Education, n (%)				0.000	0.040; 0.000
Low	3121 (33.7)	4813(34.8)	3070 (24.6)		
Middle	4275 (46.2)	7001(50.7)	7161 (57.5)		
High	1863 (20.1)	2006(14.5)	2230 (17.9)		
Marital status, n (%)				0.000	0.040; 0.000
Married/living with partner	6774 (73.2)	9523 (69.1)	8123 (65.2)		
Living without partner[##]	2468 (26.8)	4252 (30.9)	4338 (34.8)		
Employment, n (%)				0.000	0.176; 0.000
Employed	5130 (55.4)	5327 (38.6)	4640 (37.2)		
Inactive[###]	3538 (38.2)	5861 (42.4)	4727 (37.9)		
Unemployed	594 (6.4)	2621 (19.0)	3093 (24.8)		

[#]One-way ANOVA or χ^2-test; [##]single/divorced/widowed; [###]economically inactive (student, disabled, housewife, retired); [&]trend analysis – univariate regression with year of study as continuous independent variable and all other individual variables as outcomes; SD = standard deviation

after adjustment for age, but when other possible confounding variables were included in the multivariate models, the trend was not significant any more.

Discussion

Our results indicated a significant increase in BMI and in obesity prevalence in Serbian adult population between 2000 and 2013. These results are comparable to the results of other studies. Between 1992 and 2007, a rapid and significant increase in the prevalence of overweight and obesity in the adult Swiss population (age >15) was noted (4.3% of overweight and 2.7% of obese)[15]. In a study by Kang *et al.*[13], the trend in overweight and obesity prevalence increased linearly in men over a 12-year study period, but there was no increase in women, where overweight/obesity even decreased. The mean BMI continuously increased in men from 23.2 kg/m² in 1998 to 24.0 kg/m² in 2009. A Canadian study showed an increase in overweight and obesity according to BMI in the adult population[12].

According to the WHO data, obesity prevalence has tripled since 1980 in many countries in the European WHO region; in 2008, there were 1.5 billion of overweight adults aged 20 years and above, and 500 million of them were estimated to be clinically obese[16].

A systematic review of studies on overweight and obesity trends by Finucane *et al.*[17] suggested

Table 2. Sample characteristics according to health behavior, Republic of Serbia, 2000–2013

Health behavior	2000 n=9365	2006 n13822	2013 n =12460	p#	B; p&
Smoking, n (%)				0.000	-0.075; 0.000
Non-smoker	4192 (44.8)	5372 (48.7)	5945 (49.1)		
Former smoker	1213 (13.0)	1709 (15.5)	2387 (19.7)		
Current smoker	3959 (42.3)	3960 (35.9)	3788 (31.3)		
Alcohol consumption, n (%)				0.000	-0.118; 0.000
Abstainer	306 (3.3)	383 (3.6)	2594 (20.8)		
Three times *per* month and less	4047 (44.3)	4331 (40.6)	3925 (31.5)		
Once *per* week and more	4787 (52.4)	5952 (55.8)	5942 (47.7)		
Breakfast frequency (%)				0.000	-0.037; 0.000
Every day	6665 (72.0)	10704 (77.4)	9691 (77.8)		
Sometimes	2072 (22.4)	2386 (17.3)	2297 (18.4)		
Never	525 (5.7)	688 (5.0)	473 (3.8)		
Adding salt (%)				0.000	0.086; 0.000
Always	754 (8.1)	1225 (8.9)	1153 (9.3)		
Sometimes	5405 (58.4)	6865 (49.7)	4883 (39.2)		
Never	3103 (33.5)	5716 (41.4)	6425 (51.6)		
Type of bread used (%)				0.000	-0.058; 0.000
Wholemeal bread	553 (6.0)	2047 (14.9)	1062 (8.5)		
All types of bread	1027 (11.1)	1245 (9.1)	2337 (18.8)		
Refined bread	7632 (82.8)	10463(76.1)	9061 (72.7)		
Type of fat for food preparation (%)				0.000	-0.065; 0.000
Vegetable oil	5399 (59.0)	9041 (66.1)	8976 (72.0)		
Animal fats (lard, butter, margarine)	3746 (41.0)	4636 (33.9)	3484 (28.0)		
Fruit consumption frequency (%)				0.000	-0.019; 0.001
Once a day and more	3948 (42.6)	6112 (44.4)	5778 (46.4)		
4-6 times *per* week	2763 (29.8)	4357 (31.7)	3309 (26.6)		
1-3 times *per* week and less	2552 (27.6)	3288 (23.9)	3372 (27.1)		
Vegetable consumption frequency (%)				0.000	-0.240; 0.000
Once a day and more	3196 (34.5)	7616 (55.4)	7332 (58.8)		
4-6 times *per* week	2495 (26.9)	4034 (29.3)	3547 (28.5)		
1-3 times *per* week and less	3570 (38.5)	2101 (15.3)	1581 (12.7)		
Physical activity† (%)				0.000	0.308; 0.000
Low (10-29 min *per* day)	7599 (82.7)	9033 (67.5)	5308 (42.6)		
Moderate (30-59 min *per* day)	791 (8.6)	2282 (17.1)	3506 (28.1)		
High (more than 60 min *per* day)	797 (8.7)	2066 (15.4)	3647 (29.3)		

#One-way ANOVA or χ^2-test; &trend analysis – univariate regression with survey years as continuous independent variable and all other variables as outcomes; †physical activity – refers to transport-related physical activity (walking or riding a bicycle)

Table 3. Distribution of body mass index (BMI) across survey years with trend analysis by gender, Republic of Serbia, 2000–2013

	Year			p for trend[&]
	2000	2006	2013	
Men				
N	4447	7300	6007	
BMI, mean ± SD	26.09±3.92	26.28±4.02	26.87±4.33	
Model 1	1.00	0.18 (0.03-0.34)*	0.78 (0.62-0.94)**	0.000
Model 2	1.00	0.08 (-0.07-0.23)	0.74 (0.58-0.89)**	0.000
Model 3	1.00	0.09 (-0-06-0.24)	0.72 (0.56-0.87)**	0.000
Model 4	1.00	0.32 (0.17-0.48)**	1.01 (0.84-1.16)** 0.000	0.000
Model 5	1.00	0.22 (0.04-0.41)*	0.98 (0.80-1.17)**	0.000
Women	Year			p for trend[&]
	2000	2006	2013	
N	4917	6522	6453	
BMI, mean ± SD	25.91±5.25	25.77±5.22	26.35±5.58	
Model 1	1.00	-0.14 (-0.34-0.05)	0.43 (0.23-0.63)**	0.000
Model 2	1.00	-0.12 (-0.30-0.06)	0.25 (0.07-0.43)[†]	0.000
Model 3	1.00	-0.15 (0.33-0.03)	0.38 (0.19-0.56)**	0.000
Model 4	1.00	-0.15 (-0.34-0.02)	0.41 (0.22-0.60)**	0.000
Model 5	1.00	-0.03 (-0.25-0.19)	0.40 (0.18-0.61)**	0.000

SD = standard deviation; [&]according to univariate and multivariate linear regression analysis (linear regression coefficient B and 95% confidence interval with study year as continuous predictor). First survey from 2000 was reference category; *p<0.05; **p<0.001; [†]p<0.01;
Model 1 = univariate regression model with BMI as continuous outcome and year of the study as predictor;
Model 2 = adjusted for age (as continuous variable);
Model 3 = variables from Model 2 plus education, region and settlement;
Model 4 = Model 3 plus marital status and employment;
Model 5 = Model 4 plus all health behavior variables

similar results, confirming that increase in the rates of overweight and obesity varied not only between countries and regions, but also between sexes[11]. Stable data on overweight and obesity prevalence over time are rare. All studies confirmed that half of the rise in obesity prevalence occurred between 1980 and 2000, and the other half between 2000 and 2008. Global overweight prevalence was 24.6% in 1980 and 34.4% in 2008, which in absolute numbers represents an increase from 572 million of overweight adults in 1980 to 1.46 billion in 2008, out of which 508 million were obese[11].

The rate of obesity is increasing both in developed and in developing countries. Data of the Global Burden of Disease Study in 2013 confirmed that obesity rates increased by 28% in adults and even by 47% in children[18]. According to this study, the number of overweight and obese adults increased from 857 million in 1980 to 2.1 billion in 2013. Data also suggest that obesity prevalence is higher in women as compared to men; in men, the increase was from 29% to 37%, and in women it was from 30% to 38%. In developed countries, there were more overweight and obese men, while in developing countries women were predominantly overweight and obese. Weber *et al.*[19] showed the extremely high obesity prevalence in some Eastern European countries and estimated that obesity prevalence in 2050 would be 80% in women in Bulgaria, Croatia and Czech Republic, while in men a prevalence as high as 90% is expected in Latvia, Estonia, Romania and Serbia.

Attempts to explain the large increase in obesity over the last three decades were focused on several potential

Table 4. Analysis of obesity prevalence trends across study years stratified by gender, Republic of Serbia 2000–2013

	Year			p for trend[&]
	2000	2006	2013	
Men	4448	7300	6008	
Obese, n	634	1206	1287	
% of obese[1]	14.3	16.5	21.4	
Model 1	1.00	1.19 (1.07-1.32)**	1.64 (1.47-1.82)**	1.00
Model 2	1.00	1.13 (1.02-1.26)*	1.61 (1.45-1.79)**	0.000
Model 3	1.00	1.12 (1.01-1.24)*	1.60 (1.44-1.78)**	0.000
Model 4	1.00	1.22 (1.10-1.36)**	1.78 (1.60-1.99)**	0.000
Model 5	1.00	1.17 (1.03-1.33)*	1.83 (1.61-2.07)**	0.000
Women	4917	6522	6453	
Obese, n	982	1285	1506	
% of obese[1]	20.0	19.7	23.3	
Model 1	1.00	0.98 (0.89-1.07)	1.22 (1.11-1.33) **	0.000
Model 2	1.00	0.99 (0.90-1.09)	1.16 (1.06-1.27)**	0.000
Model 3	1.00	0.99 (0.90-1.09)	1.26 (1.14-1.38)**	0.000
Model 4	1.00	0.96 (0.87-1.06)	1.23 (1.11-1.35)**	0.000
Model 5	1.00	1.04 (0.93-1.37)	1.22 (1.09-1.37)[†]	0.000

[&]Based on univariate and multivariate logistic regression analysis (odds ratio and 95% confidence interval; p value) with survey year as one of continuous predictors. First survey from 2000 was reference category; *p<0.05; **p<0.001; [†]p<0.01; proportions were calculated including weight coefficients of the sample;
Model 1 = univariate regression model with obesity as categorical outcome and year of survey as predictor;
Model 2 = adjusted for age;
Model 3 = adjusted for age, education, region and settlement;
Model 4 = Model 3 plus marital status and employment;
Model 5 = Model 4 plus all health behavior variables

contributors including increased caloric intake, changes of dietary habits, decreased physical activity, but also on environmental changes[20-23]. Nutrition transition as a result of modernization, urbanization, technological improvement and globalization of the world food market has led to an increased intake of high-calorie foods with low nutritive value and is considered as one of the main reasons for the global rise of overweight and obesity worldwide. The relative contribution of increased energy intake and reduced energy consumption to the obesity epidemic is not easy to quantify, and considering that historically, obesity has been associated with physical inactivity and excessive food intake. Access to prevention and treatment has long been primarily individual. However, given that in recent decades, the incidence of obesity has reached epidemic proportions, the focus of research has shifted from the individual to environmental factors.

In summary, the prevalence of obesity in Serbia showed an increasing trend in both men and women. The prevalence of overweight was high but remained stable during the studied period. Targeted health promotion interventions including public health policy programs are necessary to reduce the prevalence of overweight and obesity.

Limitations of this study included cross-sectional study design; furthermore, although there was a high response rate in all three surveys, a substantial number of subjects were excluded due to missing data on measured weight and height, so selection bias cannot be completely excluded; overweight and obesity were defined using BMI that may misclassify subjects because it poorly distinguishes between lean and fat mass; and self-reported outcomes for socioeconomic

Supplementary Table 1. Analysis of overweight prevalence trends across study years stratified by gender, Republic of Serbia 2000–2013

	Year			p for trend[&]
	2000	2006	2013	
Men	4448	7300	6007	
Overweight, n	1920	3132	2608	
% of overweight[1]	43.2	42.9	43.4	
Model 1	1.00	0.99 (0.92-1.07)	1.01 (0.93-1.09)	0.840
Model 2	1.00	0.97 (0.90-1.05)	1.01 (0.92-1.08)	0.868
Model 3	1.00	0.99 (0.92-1.07)	0.99 (0.92-1.08)	0.989
Model 4	1.00	1.05 (0.97-1.13)	12.07 (0.98-1.16)	0.249
Model 5	1.00	1.04 (0.96-1.13)	1.05 (0.96-1.15)	0.519
Women	4917	6522	6453	
Overweight, n	1532	1956	1940	
% of overweight[1]	31.2	30.0	30.1	
Model 1	1.00	0.94 (0.87-1.02)	0.95 (0.87-1.03)	0.339
Model 2	1.00	0.95 (0.87-1.03)	0.91 (0.84-0.99)*	0.097
Model 3	1.00	0.94 (0.86-1.02)	0.91 (0.84-0.99)*	0.088
Model 4	1.00	0.94 (0.86-1.02)	0.92 (0.84-1.01)	0.181
Model 5	1.00	0.96 (0.87-1.05)	0.96 (0.87-1.05)	0.623

[&]Based on univariate and multivariate logistic regression analysis (odds ratio and 95% confidence interval; p value) with survey year as one of continuous predictors. First survey from 2000 was reference category; *p<0.05; [1]proportions were calculated including weight coefficients of the sample;
Model 1 = univariate regression model with obesity as categorical outcome and year of survey as predictor;
Model 2 = adjusted for age;
Model 3 = adjusted for age, education, region and settlement;
Model 4 = Model 3 plus marital status and employment;
Model 5 = Model 4 plus all health behavior variables

and health behavior characteristics might be biased due to failure of memory or selective reporting.

There are few strengths of this study including large sample of adults aged 20 years and above; measurement of weight and height instead of self-reporting that has often been used in health surveys; application of probability-sampling weights in analyses and adjustment for various possible confounding factors in trend analyses of BMI, overweight and obesity.

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Sažetak

KRETANJE PREKOMJERNE TEŽINE I PRETILOSTI U ODRASLOJ POPULACIJI SRBIJE OD 2000. DO 2013. GODINE

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Cilj studije bio je utvrditi promjene u indeksu tjelesne mase (ITM) i učestalosti prekomjerne težine i pretilosti u odrasloj populaciji Srbije. Rabili su se podaci dobiveni anketiranjem u tri nacionalna ispitivanja zdravstvenog stanja stanovništva provedena kao presječne studije u reprezentativnom uzorku u 2000., 2006. i 2013. godini. Vrijednosti p za trendove sociodemografskih i zdravstvenih karakteristika ponašanja, raspodjelu ITM te prekomjerne tjelesne težine i pretilosti određene su univarijatnim i multivarijatnim linearnim i logističkim regresijskim analizama, pri čemu je godina istraživanja bila kontinuirana varijabla. Srednje vrijednosti ITM i standardne devijacije u tri nacionalne studije bile su 26,09±3,92, 26,28±4,02 i 26,87±4,33 kod muškaraca (p za trend <0,001) i 25,91±5,25, 25,77±5,22 i 26,35±5,58 kod žena (p za trend <0,001). Učestalost pretilosti bila je 14,3%, 16,5% i 21,4% kod muškaraca (p za trend <0,001) i 20,0%, 19,7% i 23,3% među ženama (p za trend <0,001). Učestalost prekomjerne težine nije se značajno promijenila tijekom promatranog razdoblja. U zaključku, učestalost pretilosti pokazala je rastući trend i kod muškaraca i kod žena, što zahtijeva ciljane javnozdravstvene intervencije.

Ključne riječi: *Prekomjerna težina; Pretilost; Trend; Nacionalno zdravstveno istraživanje; Srbija*