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Predictors of overweight and obesity among adults aged 50 years and above: Serbian national health survey

Prediktori prekomerne telesne mase i gojaznosti kod osoba starih 50 i više godina: nacionalno istraživanje zdravlja stanovnika Srbije

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Abstract

Background/Aim. Obesity is a complex and multifactorial condition related to morbidity, mortality, poor quality of life and many other problems. The aim of the study was to determine the prevalence of overweight and obesity and factors associated with them (demographic, socioeconomic factors and lifestyle) in adults aged 50 years and above in Serbia. **Methods.** This cross-sectional study, representative for the population in Serbia, was carried out in one-year period, including 6,932 people aged 50 and over. Individuals were interviewed and anthropometrically examined. The association between overweight and obesity with demographic, socioeconomic and behavioral factors was analyzed using multivariate logistic regression. **Results.** Age, level of education and smoking were significantly associated with overweight and obesity, regardless of gender. Marital status was significantly associated with obesity, regardless of gender and with overweight only in women. Breakfast consumption habit was significantly associated with obesity only in men. There was no significant association of overweight and obesity with the type of settlement, alcohol consumption and physical activity, regardless of gender. **Conclusion.** The results of our study indicate the need for more intensive implementation of measures affecting the factors which contribute to overweight and obesity. Emphasis should be put on the population-based policies and programs that support environmental changes.

Key words:
obesity; overweight; prevalence; age factors; socioeconomic factors; risk assessment; serbia.

Apstrakt

Uvod/Cilj. Gojaznost je kompleksno i multifaktorijalno stanje povezano sa obolevanjem, umiranjem, lošim kvalitetom života i mnogim drugim problemima. Cilj ovog rada bio je da se utvrde prevalencija prekomere telesne mase i gojaznosti i faktori povezani sa njima (demografski i socioekonomski faktori i stil života) kod odraslog stanovništva Srbije, starog 50 i više godina. **Metode.** Istraživanje je sprovedeno kao studija preseka na reprezentativnom uzorku stanovništva Srbije i obuhvatilo je 6 932 osobe stare 50 i više godina. Ispitanici su bili intervjuisani i mereni su im antropometrijski pokazatelji. Povezanost između prekomerne telesne mase i gojaznosti sa demografskim, socioekonomskim i bihejvioralnim faktorima analizirana je primenom multivarijantne logističke regresije. **Rezultati.** Starost, nivo obrazovanja i pušenje bili su značajno povezani sa prekomernom telesnom masom i gojaznošću, nezavisno od pola. Bračni status je bio značajno povezan sa gojaznošu i kod muškaraca i kod žena, dok je povezanost sa prekomernom telesnom masom utvrđena samo kod žena. Redovnost uzimanja doručka bila je značajno povezana sa gojaznošću kod muškaraca. Nije utvrđena značajna povezanost prekomerne telesne mase i gojaznosti sa mestom stanovanja, konzumiranjem alkohola i fizičkom aktivnosti, bez obzira na pol. **Zaključak.** Rezultati naše studije ukazuju na potrebu intenzivnije primene mera za suzbijanje faktora rizika od prekomerne telesne mase i gojaznosti. Posebno su značajne populacione strategije i programi koji podržavaju promene u okruženju.

Ključne reči:
gojaznost; telesna masa, prekomerna; prevalenca; životno doba, faktori; socioekonomski faktori; rizik, procena; srbija.

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Introduction

Excess body weight poses one of the serious public health issues of the 21st century [1]. The World Health Organization (WHO) emphasizes that the world is in a grip of a global epidemics, and it is estimated that by 2020 obesity (OB) will be the single biggest cause of death on the planet [2]. In countries of the European Region overweight (OW) prevalence varies from 32% to 79% among men, and from 28% to 78% among women. In addition, the prevalence of OB ranges from 5% to 23% among men and from 7% to 36% among women [3]. Epidemiological studies show that OB is associated with increased risks of morbidity, premature mortality, negative effects on health related quality of life [4, 5] and reduced life expectancies [6]. Obese people are at the higher risk for a number of chronic diseases, including metabolic and cardiovascular disease, musculoskeletal problems, lower physical function and some cancer [7]. Those conditions often underlie disability among older population and contribute significantly to the total health burden [8]. OW and OB are a reflection of the combination of a variety of factors including a range of demographic, socioeconomic factors and lifestyle [9–14].

In Serbia, the concern about OB among adults is growing. The results obtained from the National Studies on Health of the Population of Serbia, aged 20 years and above which were carried out in 2000 and 2006 did not show any significant changes in the prevalence of OB and OW. But, the changes were noticed in a survey conduced in 2013 showing a statistically significant increase of OB compared with 2006 (21.2% *vs* 17.3%, respectively) but also no significant changes in the prevalence of OW. Current findings also reveal that OW is more present in men than in women (42.2% *vs* 29.5%, respectively) while there are no significant differences in OB, regardless gender. The similar trend was noticed in 2013 [15]. A significant increase in OW and OB is recorded in the age 45 and over, with the highest proportion in the age 55–74 years [16, 17].

The disease burden attributable to OB in Serbia increases with age and the highest rates are at the age 55–64 in both males and females [18]. At the same time, Serbia goes through a rapid ageing of the population. Current projection estimates that the participation of each 5 years of age group after 55 years in women and 50 years in men in total population will continue to increase [19]. It is expected that ageing of the population of Serbia combined with the increase in OB is likely to result in an increase of older obese population followed with sociomedical and economic consequences.

The focus of this study is on adults aged 50 years and more. According to our knowledge, we do not have studies in which the association of demographic, socioeconomic status and lifestyle with OW and OB at the age 50 years and above was surveyed and evaluated whether they could explain the difference in Serbia. The main reason to select this age group is that a large number (67%) of adults aged 50 years and over have body mass index (BMI) $\geq$ 25 kg/m^2. Every fourth of them (25.8%) have BMI $\geq$ 30.0 kg/m^2. This age group is also interested as many today's obese are in their 50's and 60's and its health effects are more likely to develope in the middle age [20]. This is the age of a significant increase in the number of chronic diseases [21, 22]. The increase in OB and OB-related chronic diseases in the current context of population ageing is likely to increase disability among older population in the future [23]. On the other hand, the generalizations from the total population may be inaccurate for predicting health consequences of OB in elderly adults [22]. Population trends regarding adults can mask considerable differences within age groups and such sorts of information are important for planning and evaluating preventive and management strategies.

The aim of this study was to analyze the prevalence of OW and OB in the population aged 50 years and above and its association with demographic and socioeconomic factors and lifestyles.

Methods

The 2006 National Health Survey of the population of Serbia database was analyzed. The study was cross-sectional and nationally representative for health examination of noninstitutionalized population aged $\geq$ 50. A stratified two-stage sample of the population was used. A total sample of people aged $\geq$ 50 was 7,522. For this purpose, we analyzed data for 7,036 persons (93.5%) to whom weight and height were measured. A number of underweight subjects (n = 104; 1.5%) was excluded due to the small number of measured persons, which could affect analysis and results (sample contamination). Therefore, the finall sample included 6,932 adults aged 50 and over.

Measures

The hight was measured to the nearest 0.1 cm, without shoes, using a mounted metal cm ruler. Body weight measurement was performed using a decimal scale in kg with accuracy of 100 g, after the removal of shoes and excess clothing.

BMI was calculated as weight in kg, divided by height in m squared. BMI classification of WHO was used: normal weight (NW) (18.5–24.9 kg/m^2), OW (25.0–29.9 kg/m^2) and OB ($\geq$ 30.0 kg/m^2) [1].

Demographic and socioeconomic variables

Individuals were grouped by age: 50–59 years, 60–69 years and 70 years and above. The level of education was categorized as primary, secondary and postsecondary, marital status as married and single (unmarried, divorced or widowed). In order to present data by the type of settlement, were used the so-called administrative-legal criteria, according to which settlements were divided into “urban” (those that have obtained this status through a legal act of the respective local self-government unit) and into “other” (rural). Socioeconomic status was measured by Demographic and Health Survey Wealth Index (Wealth Index). Its calculation included variables related to examinees assets. According to the Wealth Index, respondents were classified into five soci-

oeconomic groups or quintiles with the same number of individuals in each: poorest (first level), poor (second level), middle class (third level), wealthy (fourth level) and wealthiest (fifth level) [24].

Behaviours

Smoking status included and determined in 3 categories – non-smoker, former smoker and current smoker. Alcohol intake was determined by three categories: non-drinker (no alcohol use or former drinker), no risk drinker and heavy drinker. Two criteria were used to identify risky drinkers (heavy drinkers): an average daily consumption that exceeds the upper limit of two alcoholic beverages for men or one alcoholic beverages *per* day for women, and reporting ≥ 12 binge drinking episodes (consumption of five or more alcoholic beverages in a single day) during the previous year [25]. Physical activity during leisure time was graded in three levels based on questionnaire designed by Saltin and Grimby [26] with minor modifications. More vigorous and highly vigorous activity were combined into one category – vigorous activity, so the level of physical activity was defined as follows: sedentary (reading, watching television, etc.); light physical activity (walking, biking, fishing, etc.) for at least 4 h *per* week; vigorous activity (running, swiming, playing ball, heavy gardering, compettitive sports, etc.) for at least 4 h *per* week. Level 1 was defined as physical inactivity (lack of physical activity). Breakfast consumption, fruits and vegetables intake were classified in two categories: everyday and less than seven times *per* week.

Statistical analysis

The obtained data were statistically processed using SPSS version 17.0. Differences in frequency were tested by χ^2 test. Any variable whose univariate test has a *p*-value < 0.05 was candidate for the multivariate model. Multivariate analysis of logistic regression was used to assess the association between BMI and potential risk factors. All analyses presented were performed separately for OW as dependent variable (Model 1: OW = 1, NW = 0) and OB as dependent variables (Model 2: OB = 1, NW = 0) for men and women. The final model was obtained using forward selection. The importance of each variable included in the model was verified by examination of the Wald statistics. In interpreting these associations we applied the odds ratio (OR), with 95% confidence interval (CI). All reported *p*-values are two-tailed.

Results

The prevalence of OW and OB according to sociodemographic characteristics in men and women were presented in Table 1. Out of 6,932 analyzed people aged 50 and over, 3,216 (46.4%) were men and 3,716 (53.6%) were women. The prevalence of OW and OB were 44.3% and 19.7% in men and 38.6% and 31.0% in women, respectively. The prevalence of OW and OB among men and women, according to their lifestyle choices were presented in Table 2. The results of univariate analysis indicate that breakfast consumption habit was significantly associated with OW and OB only

Table 1

Prevalence of overweight and obesity among males (M), and females (F) according to the demographic and socioeconomic characteristics

Characteristics	Total (n) M/F	Normal weight (%) M/F	Overweight (%) M/F	Obesity (%) M/F	$p^{\dagger}$-values
Age (years)					
50–59	1,343/1,430	31.1/28.9	45.5/41.3	23.4/29.8	< 0.001/0.001
60–69	967/1,116	34.6/24.9	44.5/39.2	20.9/35.8	
70 and over	906/1,170	44.6/37.4	42.3/34.5	13.1/28.0	
Type of settlement					
urban	1,546/1,929	33.5/30.5	46.4/39.3	20.1/30.2	0.016/0.481
rural	1,670/1,787	38.3/30.3	42.3/37.8	19.4/32.0	
Marital status (n = 3,207/3,702)					
married	2,635/2,247	33.9/27.2	45.2/40.3	20.9/32.5	<0.001/<0.001
unmarried	572/1,455	45.5/35.1	40.0/36.1	14.5/28.8	
Educational level					
primary	1,465/2,480	42.9/29.0	39.5/37.6	17.5/33.5	<0.001/<0.001
secondary	1,234/927	30.1/30.9	46.8/41.4	23.1/27.7	
postsecondary	517/309	30.4/40.5	51.6/37.9	18.0/21.7	
Household wealth					
poorest	843/951	47.2/33.6	37.1/35.5	15.7/30.8	< 0.001/0.001
poor	719/777	35.5/29.7	43.0/38.5	21.6/31.8	
middle	692/822	33.2/25.3	44.4/40.1	22.4/34.5	
wealthy	503/597	28.6/30.0	49.9/38.5	21.5/31.5	
wealthiest	459/569	28.3/33.6	53.2/41.5	18.5/25.0	
Total					
n	3,216/3,716	1,157/1,129	1,424/1,433	635/1,154	
%	100.0/100.0	36.0/30.4	44.3/38.6	19.7/31.0	

$p^{\dagger}$ – values calculeted by χ^2 test.

Table 2

Prevalence of overweight and obesity among males (M) and females (F), according to the lifestyle risk factors

Parameters	Total (n) M/F	Normal weight (%) M/F	Overweight (%) M/F	Obesity (%) M/F	$p^{\dagger}$-values
Everyday breakfast consumption					
no	524/747	33.6/28.6	39.7/40.3	26.7/31.1	
yes	2,679/2,965	36.5/30.8	45.1/38.1	18.4/31.1	< 0.001/0.451
total	3,203/3,712	36.1/30.4	44.2/38.5	19.7/31.1	
Everyday fruits intake					
no	1,962/2,055	36.5/31.6	43.8/37.7	19.7/30.7	
yes	1,236/1,641	35.2/28.8	45.2/39.4	19.6/31.8	0.697/0.181
total	3,198/3,696	36.0/30.4	44.3/38.4	19.7/31.2	
Everyday vegetables intake					
no	1,382/1,520	37.9/33.0	43.1/36.8	19.0/30.2	
yes	1,834/2,196	34.5/28.6	45.2/39.8	20.3/31.6	0.137/0.016
total	3,216/3,716	36.0/30.4	44.3/38.6	19.7/31.0	
Physical activity					
lack	2,193/2,916	36.5/30.2	43.9/38.5	19.7/31.3	
light	627/491	31.4/29.9	48.2/42.4	20.4/27.7	0.055/0.106
vigorous	377/289	40.3/31.5	40.8/33.2	18.8/35.3	
total	3,197/3,696	35.9/30.3	44.4/38.6	19.7/31.1	
Smoking					
non-smoker	1,131/2,072	30.9/26.5	49.0/40.5	20.2/33.0	
former smoker	688/252	25.3/28.2	48.1/38.5	26.6/33.0	< 0.001/< 0.001
regular or periodical smoker	884/553	44.5/40.5	38.2/34.7	17.3/24.8	
total	2,703/2,878	33.9/29.3	45.2/39.2	20.9/31.5	
Alcohol drinking					
non-drinker	1,040/2,204	34.3/28.9	46.3/38.5	19.4/32.7	
no risk drinker	1,150/504	33.5/32.1	46.4/41.5	20.1/26.4	0.088/0.091
heavy drinker	388/44	34.8/29.5	39.9/43.2	25.3/27.3	
total	2,578/2,752	34.0/29.5	45.4/39.1	20.6/31.4	

***$p^{\dagger}$* – values calculated by χ^2-test.**

in men. Fruits intake was not associated with OW and OB regardless of gender, while vegetables intake was significantly associated with OW and OB only in women. Data revealed that smoking was significantly associated with OW and OB in male and female. Drinking habit of men and women were not associated with OW and OB. Contrary to expectation, there was no statistically significant difference in body weight according to the level of physical activity regardless to gender.

Independent variables that were significantly associated with OW and OB in univariate analysis, were included in multivariate logistic regression (Table 3), with the dependent variable OW (Model 1) and OB (Model 2). Models were analyzed separately for men and women. Age, level of education and smoking were significantly associated with OW and OB, regardless gender. Men were less likely to be OW if they are 70 years and older compared with those who are under 60 years old (OR = 0.71; 95% CI, 0.56–0.89), similar as women of the same age (OR = 0.66; 95% CI, 0.51–0.86). Additionally, marital status was significantly associated with OB, regardless of gender and it was significantly associated with OW only in women. Single men and women were less likely to be obese compared to married ones and single women were also less likely to be OW. Women with higher levels of education were less likely to be OW (for postsecondary level of education OR = 0.62; 95% CI, 0.46–0.84) or OB (OR = 0.42; 95% CI, 0.30–0.59), contrary to obtained results in men. Men with no breakfast consumtiom everyday were more likely to be obese (OR = 1.74; 95% CI, 0.1.31–2.31). Men and women smokers are less likely to be OW or obese, compared with non-smokers. Male former smokers were more likely to be obese compared to non-smokers (OR = 1.46; 95% CI, 1.11–1.93).

Discussion

The results of this study reveal the magnitude of the problem of OW and OB in Serbian population of 50 years and above. Nearly two-third of this population were OW or obese. Obesity affect every fifth of men and almost every third of women aged 50 years and over. Among men, 44.3% and among women 38.6% were OW. A recent study carried out in 10 European countries indicate that among males, the prevalence of OW is 49.8% and 16.2% of OB. For females, the prevalence of OW is 36.1% and 19.8% of them are obese [22].

Multivariate analysis revealed a strong association between OW and OB and age. The analyses show that the risk to be OW and obese decreases with age, regardless gender. These findings are in accordance with the results of various other studies [15, 22]. The literature states that weight loss is due to reduction in appetite and food intake, changes in body composition, loss of skeletal muscles. The most obvious changes associated with ageing concern body composition. Ageing is associated with decrease in total and lean body mass. It is known that body weight increases until 60 years of age and decreases progressively thereafter. Muscle mass

Table 3

Adjusted odds ratio (OR) for overweight – OW (Model 1) and obesity –OB (Model 2) among adults aged 50 and over

Explanatory variables	Men		Women	
	Model 1‡, OR (95% CI)	Model 2§, OR (95% CI)	Model 1‡, OR (95% CI)	Model 2§, OR (95% CI)
Age				
50–59	1.00	1.00	1.00	1.00
60–69	0.83 (0.67,1.03)	0.70 (0.54, 0.91)**	0.90 (0.72, 1.13)	1.07 (0.85, 1.36)
70 and older	0.71 (0.56, 0.89)**	0.41 (0.30, 0.56)**	0.66 (0.51, 0.86)**	0.68 (0.52, 0.89)**
Marital status				
married		1.00	1.00	1.00
single		0.65 (0.47, 0.88)**	0.79 (0.65, 0.97)*	0.81 (0.65, 0.99)*
Educational level				
primary	1.00	1.00	1.00	1.00
secondary	1.43 (1.17, 1.75)**	1.42 (1.11, 1.81)**	0.91 (0.73, 1.12)	0.74 (0.59, 0.93)*
postsecondary	1.55 (1.21, 2.00)**	1.10 (0.79, 1.52)	0.62 (0.46, 0.84)**	0.42 (0.30, 0.59)**
Everyday breakfast consumption				
yes		1.00		
no		1.74 (1.31, 2.31)**		
Smoking				
non-smoker	1.00	1.00	1.00	1.00
former smoker	1.11 (0.88, 1.39)	1.46 (1.11, 1.93)**	0.91 (0.65,1.28)	1.10 (0.77, 1.56)
smoker	0.47 (0.38, 0.58)**	0.44 (0.34, 0.58)**	0.53 (0.42,0.67)**	0.53 (0.41, 0.69)**

†NW – normal weight; CI – confidence interval; ‡Logistic regression model. Dependent variable was overweight (OW = 1, NW = 0); §Logistic regression model. Dependent variable was obesty (OB = 1, NW = 0); *$p < 0.05$, **$p < 0.01$.

declines with age and is gradually replaced by fat mass. Furthermore, fat location changes over time, with fat mass tending to increase around the abdomen as we age, which can often lead to serious metabolic consequences [10, 27].

There have been opposing reports about the association of marital status and OB. Some studies show a positive association [28] although some others do not find any association [29]. We observed that married men and married women were more likely to be obese than those who were single. The exact mechanism linking OB and marital status is not fully understood. Some longitudinal studies explain that married couples eat more regular meals, richer and denser foods and that married couples, especially women, are no longer concerned about attracting a partner. Marital role obligations often discourage exercise [30].

Review of the literature show that a higher socioeconomic status in developed countries is directly associated with OB among men and women [31], while in developing countries there is an increased association between socioeconomic status and OB, where the highest rate of obesity and type 2 diabetes are being observed among the most disadvantaged groups, notably the poor and minorities [32]. Although the results of the univariate analysis indicate that household wealth and education are associated with OB and OW, we decided to include only education in multivariate logistic regression. The first reason for this was that education and socioeconomic status are highly correlated, so that those with greater wealth are more likely to have higher education. The second reason was that while the level of education could be considered a fixed category because it can only increase, wealth status is variable, particularly in our country with a high unemployment and social stress [33].

We found that educational level has been associated with body weight. Men with higher level of education were more likely to be obese or OW compared to men with lower level of education. However, we observed that in women OW and OB were inversely associated with educational level. Women with higher levels of education are less likely to be OW or obese, contrary to the obtained results in men. Our results are in consonance with other epidemiological studies [28, 31], although some studies found the inverse association in both genders [34]. Reasons for the association between OB and education level in women could be explain by the fact that women with a higher education level express a higher interest in caloric intake and OB. Higher educational attainment through increased knowledge enables an individual to make healthy choices and integrate healthy behavior into a coherent lifestyle, giving them the sense of control over their health [35]. Social pressure to be slim is probably more pronounced in educated women than men [28]. When we look at type of settlement we notice no association of the prevalence of OW and OB with the type of settlements. The explanation could be found in the fact that Serbia is faced with unfavorable socioeconomic situation expressed through the low rate of employment, poverty, especially among children and people aged 60 and over, and low gross domestic product (GDP) [36]. We hypothesize that it have an impact on less protective health behavior and its impact on OW and OB among people, regardless the type of settlements. In survey carried out in ten European countries on those aged 50–79 years, the authors explain that high GDP of this European countries diminishes the differences between urban and rural areas [37].

We observe that men and women who were smokers are less likely to be OW and OB compared to non-smokers, while men who were former smokers are more likely to be obese compared to non-smokers. The association between

cigarette smoking and BMI is not completely understood. It was believed that mean BMI tended to be lower in current smokers than in non-smokers, but recent data do not report so [38]. In current smokers, nicotine speeds up human metabolism, which could explain why smokers tend to have lower body mass. When the person quits smoking, his\her metabolism slows down and weight is gained even though a person is not eating more food. When someone quits smoking, they can usually feel more hungry and food has better flavor and taste [39]. On the other hand, it has been reported that heavy smokers have greater body weight than do light smokers and non-smokers. One of the explanations could be that heavy smokers are more likely to adopt behaviors contributing weight gain (*eg* unhealthy diet, physical inactivity, high alcohol intake). There is, also increasing evidence that smoking affects body fat distribution and that is associated with central obesity [40]. Nevertheless, further research in this field should be conducted.

Previous epidemiological studies revealed association between alcohol consumption and OB [41]. Some studies describe positive association in men and null association in women [13]. Data from the present analyses showed no significant association between alcohol consumption and OB, regardless of gender. The exact relationship should be elucidated, but in assessing the association between alcohol consumption and OB drinking frequency and drinking pattern should be taken into account [42]. As the relationship between OB and alcohol consumption is complex and may be confounding with other types of behavior like smoking, dietary intake, and levels of physical activity more studies are needed to describe their association.

The findings from our study show that skipping the breakfast is associated with the increased likelihood of OB in men. One of the hypotheses is that individuals who do not eat early in the morning tend to be hungry later on and that they may consume a greater number of calories during the evening hours than individuals who eat consistently through the day. Greater energy intake may result in greater fat storage and this may be one of the factors leading to increase in body weight [43].

Changes in dietary habits and physical activity have been implicated as potential cause of OB. But, we did not find any association between physical activity and OW or OB in men and women engaged in this study. These findings are in line with the literature [44]. The problem in interpretation of our obtained data is that self-reported physical activity is not very precise measure of physical activity. Besides that, our study included only leisure time physical activity, and not work related and transportation physical activity, so we had no insight into overall physical activity. Such sort of information requires application of tests for more precise measurement of physical working capacity which is difficult to implement in national representative cross-sectional study.

Some limitations must be considered in interpreting our results. First, our study was cross-sectional, not longitudinal. Thus, no conclusion could be drawn about causal relationships of OW and OB and socioeconomic factors and lifestyle. Second, OW and OB are assessed using BMI as a measure of overall adiposity, although, the waist circumference is more appropriate anthropometric index of abdominal OB. But, waist circumferences were not included in the survey. Despite the fact that BMI is not ideal method for assessment of nutritional status, there is still much controversy which requires more research in this field to define specific cut-off points for elderly. Our results are based on self-reported data about sociodemographic status and health behaviors. Some of them, do not always reflect the real situation, as alcohol abuse which is negatively valued in our society, especially in women or self-reported financial situation.

The baseline information obtained from the pooled data from the Serbian Health Survey, 2006 is used to look at the prevalence of OW and OB at targeted population and to understand factors associated with them. The obtained information should be used as a base for increase investments in effective-based OB-prevention programs, especially regarding the fact that the 2013 Survey points to a statistically significant OB increase. Emphasis should be put to health promotion strategies for adults – middle aged and older population.

Conclusion

The health of adults aged 50 years and over in Serbia presents an important medical, social and economic challenge. Ageing of the population of Serbia in combination with the increase in obesity is likely to result in an increase of older obese population followed with its negative effects on health status of the population and social and economic consequences. This study revealed the prevalence of overweight and obesity in Serbian adults aged 50 years and over and its association with demographic, socioeconomic status and lifestyle. Based on body mass index (BMI) measurements, one fifth of adults over 50 were obese and more than two fifths were overweight. Higher proportion of women were obese than men, while more men than women were overweight. Age, level of education and smoking were significantly associated with overweight and obesity, regardless gender. Marital status was significantly associated with obesity, regardless gender and with overweight only in women. Breakfast consumption habit was significantly associated with obesity only in men. There was no significant association of overweight and obesity with the type of settlement, drinking alcohol and physical activity, regardless gender.

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