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ANALYSIS OF BODY FAT PERCENTAGE OF RESIDENTS OF REPUBLIC OF SERBIA USING THE MULTICHANNEL BIOIMPEDANCE METHOD

Milivoj Dopsaj[1], Stefan Marković[2], Anastasija Kocić[2], Aleksandra Domanović, Miloš Milošević, Aleksandar Pajkić, Faris Ćurkić, Aleksandar Vićentijević, Marko Erak, Branislav Božović

[1]Faculty of Sports and Physical Education, University of Belgrade, Serbia
[2]Faculty of Sports and Physical Education, University of Belgrade, DAS student, Serbia

SUMMARY

The goal of this study was to define the population parameters of the body fat percentage of residents of the Republic of Serbia. The sample was a total of 8145 respondents, of which 3051 (37.5%) were women with an average age of 32.0 ± 9.8 years, and the rest of 5094 (62.5%) were men with an average age of 32.9 ± 11.3 years. The average value of PBF for the women subsample was 28.46 ± 9.19% and 18.00 ± 7.98% for the men subsample. The results of factorial variance analysis have shown that there is a statistically significant difference ($p<0.001$) of PBF values regarding sex ($F=1243.719$) and respondent's age ($F=508.469$) as well as the interaction of factors „age“ and „sex“ ($F=22.593$). The regression analysis has shown that age explains 82.09% of variance regarding the age function for women and 85.08% of variance regarding the age function for men, taking into consideration that the function that best describes the variance PBF for women is linear and polynomial for men. Both sex and age are determined as factors that influence over-increasing the values of PBF, while the most critical groups where PBF crosses critical values are the groups of women over 50 years of age (the average prevalence of overweight and obese is 37.81% and 23.89% respectively) and men over 60 years of age (the average prevalence of overweight and obese is 25.48% and 38.36% respectively).

Keywords: OVEREATING / OBESE PREVALENCE / TREND OF CHANGE / PREVENTION

Correspondence with the author: Milivoj Dopsaj, E-mail: milivoj.dopsaj@fsfv.bg.ac.rs

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INTRODUCTION

Radical social changes under the influence of accelerated development of digital technologies have had an impact on basic life habits (Milošević et al., 2020), and a general trend of decrease in physical activity and an increase of sedentary way of life (Harbin et al., 2006) can be seen. It is estimated that 60% of the world population is not moving enough. (WHO. 2009). More and more people are reliant on using automobiles and automatized production which reduces the need for moving (Mišigoj – Duraković, 2000). By diminishing the energy consumption in activities in the workplace, total energy consumption during the day is also diminished (Torres et al., 2007), while having an increased intake of high – calories and easily available food (Popović et al., 2019) average daily energy intake is increased as well. The result of this is an increase in obesity, a state of overeating, or the state of the organism where the percent of body fat is increased to the point where health is compromised (WHO, 2009). Nowadays, the trend of an increased number of obese and people that overeat is more and more present (Gallagher et al., 2000; Harbin et al., 2006). It is estimated that by the year 2030. nearly one-third of the world population will be overweight which will impact people's working ability (Kelly et al., 2008). When the effects of increased stress at the workplace are added to obesity (Ilić et al., 2020) the results are the most common causes of metabolic diseases to increased risk of diabetes, cardiovascular diseases as well as death (Deckelbaum & Williams, 2001).

Overweight or obesity is diagnosed by calculating the body mass index (BMI) and/or by measuring the percent of body fat (PBF). However, BMI doesn't give enough sensitive information about the body composition of the individual, for example, if increased BMI indicates the fact that the person has surplus fat in its organism or if it has surplus muscle mass (Pribis et al., 2010). More and more available precise measuring instruments for measuring PBF, which is calculated by dividing the total body fat mass with total body mass, in percents, allows for this variable to be used as a more precise indicator for determining obesity (Flegal et al., 2009; HoonLee et al., 2017; Rakić et al., 2019). The bioelectric impedance method is one of the most efficient methods that are used for these kinds of assessments with more than satisfactory reliability (Karaba - Jakovljević, 2016; Dopsaj & Dimitrijević, 2013; Kukić et al., 2020). Border values of PBF for obesity are found in different ranges regarding sex and age (Gallagher et al., 2000).

Studies conducted so far show that the level of physical activity is inversely related to BMI, waist circumference, and PBF in both sexes (Choi et al., 2016; Kukić et al., 2020). Also, it is important to track PBF in different age categories because, it is different than other segments of body composition and it shows the tendency for an increase during the lifespan of the person (Mott et al., 1999; Milošević, & Čolović, 2019; Rakić et al., 2019). The first significant increase of body fat happens at the transition period from adolescence to adulthood (Irwin, 2004; Milošević & Čolović, 2019; Rakić et al., 2019), after which PBF progressively increases with age (Knapik et al., 1983).

It was determined that the trend of increasing body fat happened in the period from 1996. until 2008. Which shows a linear increase of 0.513% annually for men and 0.654% for women of age 19 to 24 (Pribis et al., 2010; NCD-RisC, 2016). As so, average values of body fat percentage of American working population that were measured in the period from 1990 to 1992 have been 22.37% ± 7.36%, while in the period of 2000 to 2002 have been 38.63% ± 4.90%, or said in another way, in the period of 10 years they were statistically significantly higher (Harbin et al., 2006). This negative trend was also found in European countries as well. The study that was conducted across Europe, encompassed the working population of 5 cities from 3 different countries. In Maastricht, the average values were 30.00 ± 8.40% body fat for women and 20.50 ± 8.40% for men, while in Wageningen the values for women were very similar (30.50 ± 6.70%) but it was slightly lower for men (16.20 ± 6.60%)

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(Deurenberg et al., 2001). It was determined that in Italy, the values of PBF were slightly higher, which can be attributed to a different diet. For the women that live in Milano, the values are 31.70 ± 7.20% while they are lower for men and are 19.60 ± 7.10% (Deurenberg et al., 2001). Also, the population of Rome was included in this study, and the values were significantly higher than the other European cities that were included in the study and they were 39.70 ± 8.90% for women and 23.20 ± 8.80% for men population (Deurenberg et al., 2001). Nevertheless, it is important to mention that there are differences between groups of different ethnic origins as well as an economic factor (Deurenberg et al., 2001). The average values for PBF in Tampere for the working population were 29.10 ± 5.30% for women and 22.90 ± 5.90% for men (Deurenberg et al., 2001). The finding that the women spend more time sitting during their working hours (48.3%) than man (38.7%) (Rakić et al., 2019), which additionally explains sex differences between different working populations (Dopsaj & Dimitrijević, 2013; Choi et al., 2016; Kukić et al., 2020), is very important for understanding this phenomenon.
In the study that was conducted across Serbia, where the sample was comprised of 1924 women aging from 18 to 69 years, it was determined that the average values for PBF of the whole sample were 28.51 ± 9.26%, with the range of 23.81 - 39.94% (Rakić et al., 2019). An alarming fact is that every tenth child from ages of 5 to 19, in the Republic of Serbia, has some form of obesity while 29.5% of the population older than 18 years has increased blood pressure (WHO, 2020). In the light of these findings, it is important to mention that in the Republic of Serbia it was only in 2017 when the World Health Organisation defined several strategies and action plans for regulating cardiorespiratory diseases, diabetes, alcohol overuse as well as reducing the number of physically inactive population. Unfortunately, based on the reports of the World Health Organisation (WHO, 2020), there are still no defined strategies for regulating the intake of saturated fats and trans – fats in the Republic of Serbia.

Based on the findings so far, organizing systemical controls of body composition with the goal of following the state and determining the trends of change, represents one of the most important tools for regulating public health (Dopsaj et al., 2018). Taking into consideration described negative trends of increasing PBF for adults in the world as well as in Europe during the last decades, as well as the need for regular tracking and defining the current state of the population regarding the given problem, it is necessary to set precise research goals which have not been fulfilled so far regarding the population of the Republic of Serbia.

The goal of this study is to define the values of population parameters for PBF for residents of the Republic of Serbia, taking into consideration sex and age stratum. Result analysis will provide official records of the current quantitative characteristics, in other words, of the level of body composition regarding the definition of body fat percentage for the adult population of the Republic of Serbia.

METHOD

This study had a non – experimental and transversal properties. In regards to the nature of measurement, it is regarded as laboratory testing.

Sample

The sample was comprised of 8145 adult respondents with an average age of 31.4 ± 9.9, of which 5049 (62.5%) were men with an average age of 32.5 ± 11.5 and 3051 (37.5%) of women with the average age of 32.5 ± 11.5 years. Respondents were divided into subsamples in regards to age and sex, where there were five subsamples for men and women each. Basic descriptive measures for the men subsample were BH = 182.10 ± 7.21cm and BW = 87.55 ± 14.75kg, while they were BH = 168.55 ± 7.26 cm and BW = TM = 67.97 ± 13.78kg for women. All respondents were residents of the Republic of Serbia and that of: from the area of Belgrade and its surroundings (27.575%)), from

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Vojvodina (26.57%), Central Serbia (19.53%), South and East Serbia (13.36%) as well as from West Serbia (12.97%). Also, all respondents were properly informed of the goals of this study and gave their voluntary consent to take part in it. The study approach was conducted following the postulates of the Helsinki declaration and was approved by the Ethical Committee of Faculty of Sports and Physical Education, University of Belgrade (ethical committee permit number 484 – 2).

Measurement methods

All measurements were conducted in the period of 2011 – 2020 in the premises of the methodical – research laboratory (MIL) „Sloboda Jarić“ of the Faculty of Sports and Physical Education, University of Belgrade. Measurements were conducted by standardized procedures, using the electric multichannel (1, 5, 50, 250, 500, 1000 kHz) bioimpedance (MBI), with the help of body structure analyzer – InBody 720 (Biospace Co., Ltd, Seoul, Korea). Body height measurement (BH) was conducted with the anthropometer (GPM, Swiss-made) while body weight (BW) measurement was conducted on the before mentioned apparatus InBody 720 in accordance with the standard procedures (Gaba et al., 2015). Measurement of BH and body status was realized by experienced personnel. In accordance with WHO recommendations, the subsample of age categories was defined with corrections for the first age group as follows: 18 - 29.9; 30 - 39.9; 40 - 49.9; 50 - 59.9; 60 – 67.0 years (Dopsaj et al., 2018).

Variables

Body fat percentage (PBF) is the only indicator of health that is directly related to body composition disregarding body height or weight. Classification of PBF values was taken from existing standards of Sport Science and World Health Organization regarding both sexes (Gallagher et al., 2000; WHO, 2009; WHO 2020). Referent values of body fat percentage are defined in 4 groups: insufficient, normal, overweight, and obese where the referent value criteria are different regarding sex and age (Gallagher et al., 2000).

Statistical analysis

Gathered data were analyzed by methods of analytical and descriptive statistics. All relevant measures of central tendency and data dispersion MEAN, SD, MIN, MAX, KURT, SKEW, SEM, SEM%, CV%.) were calculated regarding sex and age. Standardized non – parametric test Колмогоров-Смирнов (K-S Z) was used for determining the normality of data distribution. Factorial variance analysis (Factorial ANOVA) was used for testing the differences on a general level in regards to sex and age as well as a combination of these two factors. Partial differences between the subsamples were found by using posthoc tests with Bonferroni correction. The limit for statistical significance was on the level of probability of $p \leq 0.05$. Models of trend change of examined variable (PBF) in the function of age were defined by using regression analysis. Also, prevalence categories of nutrition were calculated with standard procedures and expressed in relative values or percentages (Dopsaj et al., 2018). Statistical analysis of data was done by using the software packages Excel 2016 and IBM SPSS v.26.

RESULTS

Results of descriptive statistics are shown in tables 1 and 4 as well as in charts 1 and 2. Results of difference analysis defined by Factorial analysis of variance are shown in tables 2 and 3 while the results of models of linear and polynomial regression analysis are shown on charts 1 and 2.

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Table 1. Base descriptive results of the examined variable on total sample and subsample regarding sex.

Descriptive indicators for variable: PBF [%]												
Group	**N**	**Mean**	**Std. Error Mean**	**Std. Error Mean %**	**SD**	**cV%**	**Min**	**Max**	**Skew**	**Kurt**	**K-S Z**	**K-S p**
Total	8145	21.92	0.11	0.50	9.00	41.06	3.00	56.00	0.59	0.10	0.048	0.000
Women	3051	28.46	0.17	0.58	9.18	32.24	5.82	55.75	0.49	-0.29	0.060	0.000
Women, 18.0-29.9 age	1476	25.20	0.20	0.81	7.86	31.17	5.82	55.28	0.85	0.83	0.076	0.000
Women, 30.0-39.9 age	800	29.04	0.32	1.12	9.17	31.58	7.04	55.75	0.35	-0.36	0.056	0.000
Women, 40.0-49.9 age	470	31.94	0.38	1.20	8.32	26.06	9.24	55.18	0.20	-0.30	0.055	0.001
Women, 50.0-59.9 age	215	36.36	0.54	1.49	7.97	21.91	13.58	51.96	0.07	-0.56	0.062	0.046
Women, 60.0-67.0 age	90	39.72	0.87	2.19	8.27	20.81	12.54	55.15	-0.64	0.67	0.088	0.079
Men	5094	18.00	0.11	0.62	7.98	44.33	2.92	54.33	0.65	0.52	0.045	0.000
Men, 18.0-29.9 age	2517	13.93	0.13	0.95	6.67	47.89	2.92	54.33	1.36	3.33	0.083	0.000
Men, 30.0-39.9 age	1575	21.22	0.18	0.86	7.24	34.11	4.13	50.70	0.66	0.95	0.060	0.000
Men, 40.0-49.9 age	734	22.58	0.25	1.10	6.73	29.82	4.46	50.61	0.34	0.89	0.043	0.002
Men, 50.0-59.9 age	201	24.26	0.42	1.71	5.88	24.23	9.97	45.34	0.66	1.27	0.104	0.000
Men, 60.0-67.0 age	67	26.53	0.91	3.41	7.41	27.92	13.87	48.93	0.68	0.39	0.073	0.200

Based on the shown results (Table 1), it can be determined that the data for variable do not belong to the category of the homogeneous congregation because the variance coefficient for the total sample is on the level of 41.06%, that is, it is in the range of 21.81 for PBF values for the women subsample of ages 60 – 67 up to 47.89 for men subsample of ages 18 – 30. Also, it should be emphasized that the direction of the slope, for all groups, is asymmetrical, with mixed (SKEWNESS in the range of -0.64 for women subsample of ages 60 – 67 up to 1.36 for men subsample of ages 18 – 30). Measures of flatness of distribution are found in the relative lower limits and move from -0.56 for women subsample of ages 50 – 60 up to 3.33 for men subsample of ages 18 – 30.

Table 2. Results of factorial analysis of variance for the examined variable PBF in regards to sex and age of respondents

Results of factorial analysis of variance regarding sex and age of the respondents							
Dependant variable: PBF							
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta^2	Observed Power
Sex	6.858	1.000	6.858	1243.719	0.000	0.133	1.000
Age	11.215	4.000	2.804	508.469	0.000	0.200	1.000
Sex • Age	0.498	4.000	0.125	22.593	0.000	0.011	1.000

Results of factorial analysis of variance (Table 2) show that there is a statistically significant difference of PBF regarding sex ($F=1243.719$, $p<0.001$), regarding age ($F=508.469$, $p<0.001$) and they indicate that there is a significant interaction of factors „sex – age“ ($F=22.593$, $p<0.001$). It can be

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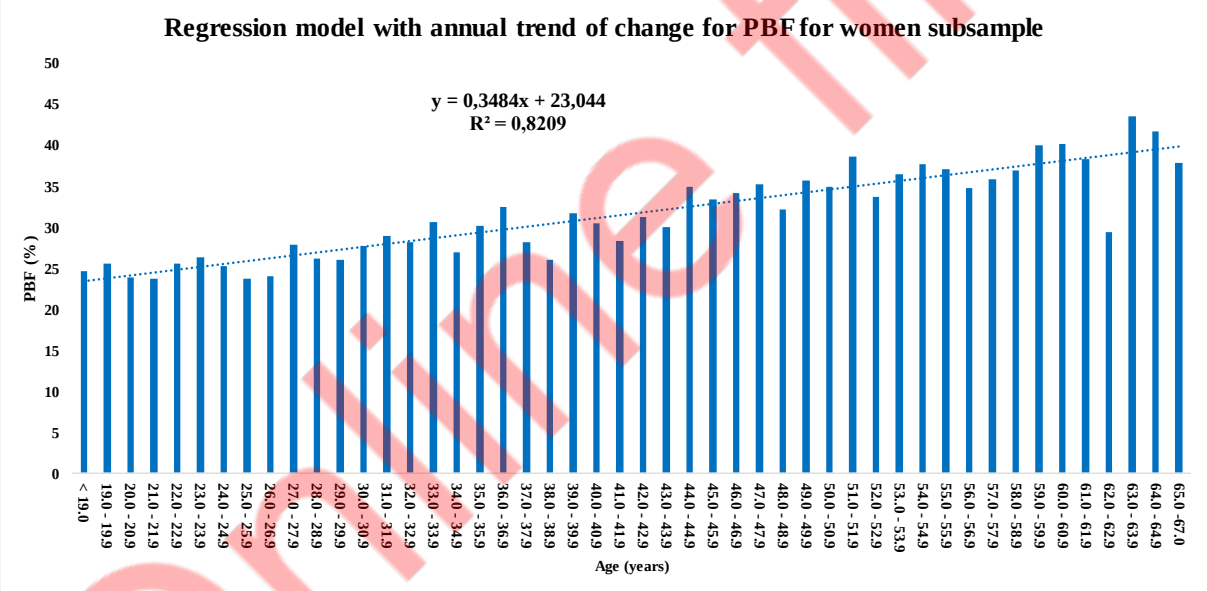
concluded that the effect of age is very high (Partial $Eta^2 = 0.200$), the effect of sex is moderate (Partial $Eta^2 = 0.133$), while the effect of interaction is lower than the two former criteria (Partial $Eta^2 = 0.011$), while all conducted comparisons have very high power statistical inference (Observed Power = 1.000).

Table 3. Partial statistical differences between the age groups in functions of sex.

Partial statistical differences between the age groups in functions of sex

Dependant variable: PBF					
Age	Group		Mean Difference	Std. Error	Sig.
18.0-29.9	Women	Men	11.3	0.243	0.000
30.0-39.9	Women	Men	7.8	0.322	0.000
40.0-49.9	Women	Men	9.4	0.439	0.000
50.0-59.9	Women	Men	12.1	0.729	0.000
60.0-67.0	Women	Men	13.2	1.198	0.000

Results of posthoc test series – Bonferroni (Table 3) have shown that there are statistically significant differences ($p<0.001$) with values for PBF by age for all age groups.



Graph 1. A regression model with the trend of change for PBF for women subsample.

Graphs 1 and 2 show the models of dependence change in body fat percentage (PBF) as a function of the age of the respondents. Based on the graphical presentation of the given dependencies, it can be argued that the change in the percentage of body fat as a function of age in women is linear concerning men in whom the growth line has a nonlinear or slightly curved – polynomial shape. With defined models, age in women explains 82.09 and in men 85.08 percent of the variance of the average PBF.

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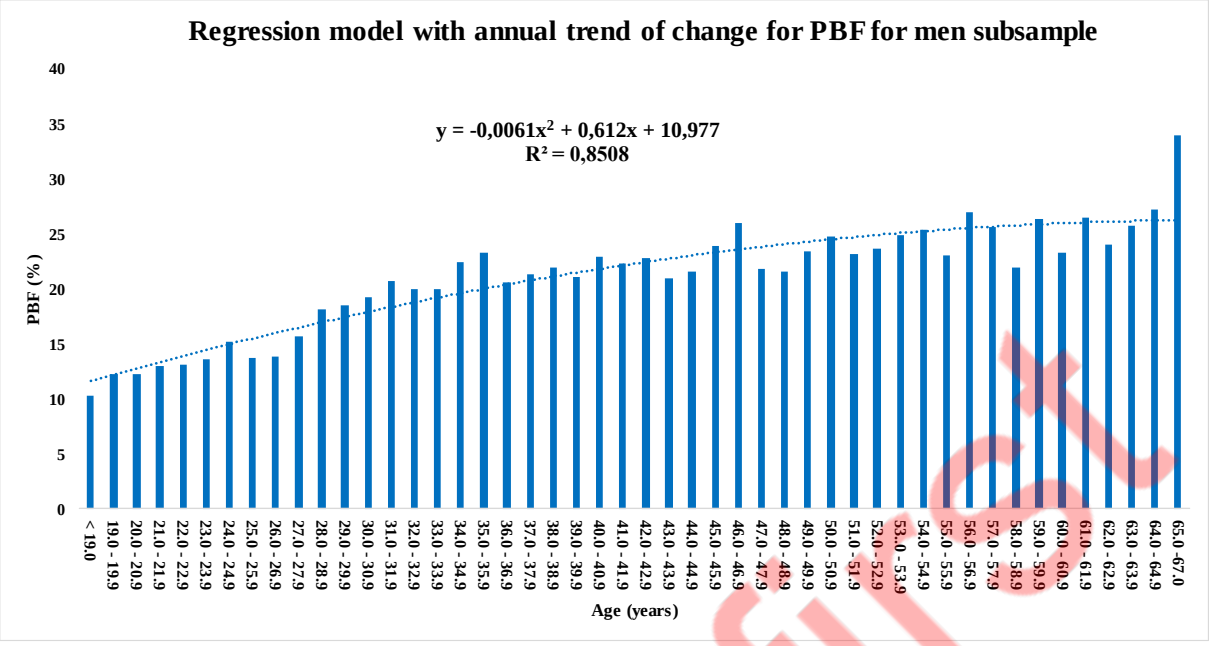

Graph 2. A regression model with the trend of change for PBF values for a subsample of able working men.

Table 4 shows the prevalence concerning the values of PBF as a function of gender and age of the examined subsamples.

Table 4. Prevalence concerning the values of PBF related to gender and age of examined subsamples

PBF – Prevalence [%]				
Group	insufficient	normal	overweight	obese
Women, 18.0 - 29.9	17.44	67.02	9.69	5.84
Women 30.0 - 39.9	1.71	43.05	30.41	24.83
Women 40.0 - 49.9	4.90	43.05	33.92	18.12
Women, 50.0 - 59.9	1.00	32.34	45.77	20.90
Women, 60.0 - 67.0	0.00	43.28	29.85	26.87
Men, 18.0 - 29.9	28.25	56.78	8.81	6.17
Men, 30.0 - 39.9	20.13	48.25	16.38	15.25
Men, 40.0 - 49.9	13.62	45.96	22.55	17.87
Men 50.0 - 59.9	4.19	38.14	26.51	31.16
Men, 60.0 - 67.0	3.33	26.67	24.44	45.56

* class criterium for PBF was taken in accordance with Gallagher et al., 2000.

The results are showing to have the highest prevalence of overweight and obese PBF categories in both men and women of older age groups (50.0–59.9 and 60–67.0 years) (Table 4).

DISCUSSION

The goal of this study was to examine and description of body fat percentage (PBF) indicators in the population of the Republic of Serbia, with respect to sex and age characteristics. Based on the average results, in general, it can be concluded that the total average values (Table 1, Total = 21.92 ± 9.00%), average values for subsamples of men and women (Table 1, Women = 28.46 ± 9.18%, Men =

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18.00 ± 7.98%), as well as the majority of age categories of both sexes are in the limits of normal, according to previously defined health recommendations (Gallagher et al., 2000).

However, in addition to the results of the average values, the results of the dispersion measure values, that is, the general value of the variation coefficient which represents the measurement of the variability of the entire sample of 41.06% points out the fact that this sample can be characterized as heterogeneous, which speaks about the high degree of population diversity towards the research occurrence, respectively PBF.

Current researches suggest that the limit values of body fat percentage for obesity differently defined in relation to persons' gender and age (Gallagher et al., 2000), and so, every age category was individually observed. Acquired mean values of PBF's entire sample (Table 1 – 21.92%) point out that the residents of Serbia do not belong to the obese population. However, observing women separately (Table 1 – 28.46 ± 9.18%) and men (Table 1 – 18.00 ± 7.98%), a fact in relation to these values can be noticed, which shows that women as a group are closer to the limit of obesity than men. The average value of women within this sample is in accordance with the range characteristical for countries of the European region (Branca et al., 2007), while this subsample has a lesser PBF than the population of the USA and Germany (Kukic & Dopsaj, 2016). When the obtained results are compared with the results of the research conducted in Europe (Deurenberg et al., 2001), it can be comprehended that the average values of the women population in the Republic of Serbia fall among the lowest in the beforementioned, but with the biggest variation, while the male population is on the second place in relation to other European countries with slightly lower variation compared to that of women. This type of finding can be primarily explained by the difference in the socio-economical population status in different countries, as well as the fact that the nutrition of the population is different in relation to the climate (Deurenberg et al., 2001).

Observing the age categories of both genders, it can be noticed that PBF increases with age (Table 1, Chart 1 and 2), which is in the accordance with the findings of similar earlier studies (Knapik et al., 1983; Mott et al., 1999; Irwin, 2004; Pribis et al., 2010; NCD-RisC, 2016; Milošević & Čolović, 2019; Rakić et al., 2019). In males, a big difference in the average value and the value at the age from 18-20 years is expressed, as well as the sudden increase of this value in the period around 30 years of age. In females, there is no sudden increase, but the biggest difference in comparison to the average values can be noticed at age of around 50 years.

The results of the applied factor analysis of variance indicate the existence of statistically significant differences in PBF values at the general level, both between the sexes and in relation to the age categories of respondents, and the interaction of given factors (Table 4), which is consistent with previous research (Campisi et al., 2015; Bredella, 2017). The results showed that women have a statistically significantly higher level of PBF than men, regardless of age group, and that this difference is greatest in the age stratum of 60.0-67.0, 50.0-59.9, and 18.0-29.9 years (Table 3, $p = 0.000$, Mean Difference 13.2,12, and 11.3, respectively). Although obesity is more common in women in most countries (Deurenberg et al., 2001), there are also countries where obesity is more common in men. These countries include Croatia, Denmark, Estonia, Ireland, Italy, Spain, and Switzerland (Mascie-Taylor & Rie, 2007). Regarding the population of the Republic of Serbia, the situation is similar to that described in most countries where women are more prone to obesity (Deurenberg et al., 2001). Observing men of the same age categories, one can notice differences in the values of deviations from the average values. These differences are far greater in females (11.26%) than in males (8.53%), which confirms the findings of previous research that women are more prone to obesity, i.e. that they have a significantly higher percentage of body fat than men (Deurenberg et al., 2001). In relation to the average values of PBF (Table 1) in the category of obese, most men enter around the age of 50, while in women this period occurs earlier, around the age of 40, which is in line

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with the research from 2013 which states that most obese at the age of 45-84 (Institute of Public Health of Serbia "Dr. Milan Jovanovic Batut", 2013). However, when interpreting gender differences, one should take into account the morphological differences between the male and female organisms, as well as that PBF, which represents obesity in men, is not considered obesity in women. This is especially important when it comes to the results of gender analysis variance (Tables 3 and 4).

Monitoring changes in body composition that occur with age can be useful because such variations are associated with physical abilities, health status, and eating habits (Boyko et al., 2000; Bastawrous et al., 2019). The values obtained in this paper indicate that in both sexes there is a significant increase in PBF with age (Chart 1 and 2). Such an increase can cause poorer physical performance in the elderly (Shin et al., 2011). An increase in PBF was also observed in men and women (45–65 years) from the United States who had an annual increase of 0.37 kg (0.34%) and 0.52 kg (0.47%, respectively), respectively (Siervogel et al., 1998). These changes in body composition are associated with an increased risk of insulin resistance, type 2 diabetes, and coronary artery disease (Fujimoto et al., 1999; Boyko et al., 2000; Kwon et al., 2017). As the mentioned diseases belong to the category of chronic, i.e. the category of serious health diseases, in future research of this type, in the territory of the Republic of Serbia, attention should be paid to the relations between PBF and certain health problems. The most common practice conducted by other countries of the world is to determine the cut-off points of PBF (Cut off points) which identify persons at increased risk of a certain disease (Bastawrous et al., 2019; Macek et al., 2020).

Although PBF increases with age in both sexes, significant differences have been observed between them. Higher PBF values appeared in women of all ages compared to men. These results are confirmed by some other studies (Campisi et al., 2015; Carvalho et al., 2019; Deurenberg et al., 2001). Accordingly, more attention should be paid to females in order to prevent and actively correct increased PBF in order to minimize the possible negative effects of a given health risk factor. On the other hand, studies have shown that adipose tissue distribution has a greater impact on cardiometabolic diseases compared to total PBF. Men are more likely to accumulate fat tissue around the torso and abdomen, while women usually accumulate fat tissue around the hips and thighs, and it is precisely the distribution of fat characteristic of men that is associated with an increased risk of cardiometabolic diseases (Bredella, 2017).

In accordance with the results of the prevalence of obesity defined in relation to age and sex (Table 4), the results showed that in women the lowest prevalence of obese and obese persons aged 18.0 - 29.9 years (15.53% in total, respectively 9.69 and 5.84%, respectively), and the highest in total at the age of 50.0-59.9 (45.77% in total, i.e. 45.77 pre-obese and 20.90% obese). The highest prevalence of obese women was found at the age of 60.0-67.0 years and was 26.87% (percentage of body fat of over 42.0% - Gallagher et al., 2000).

The lowest prevalence of overweight and obese persons in men (Table 4) was found at the age of 18.0 - 29.9 years (14.98% in total, respectively 8.81 and 6.17%, respectively), and the highest in the age of 60.0-67.0 (70.00% in total, i.e. 24.44 and 45.56%, respectively).

According to the results of this study, both sex and age can be interpreted as risk factors that have an impact on the excessive increase in PBF, while women older than 50 and men older than 60 are the most common risk group in which excessive PBF values are most prevalent (Table 4).

These data should be kept in mind when planning preventive nutrition and physical activity programs with the aim of reducing obesity in the population and preventing related diseases. Also, the next longitudinal research of the examined variable, as the most sensitive information on the state of obesity of a person, would be very important in the future and would be of great importance in terms of continuous control of the given indicator for the needs of the system of continuous monitoring of health status of the population of the Republic of Serbia.

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CONCLUSION

Based on the analyzed data, it can be concluded that the tested sample of the population of the Republic of Serbia according to PBF in relation to the average values belongs to the category of persons with normal body fat levels. However, this optimistic data should be taken with strings attached because this study showed that there is a significant part of the population that according to PBF belongs to the group of obese (29.93% in women and 19.74% in men, summarized for the subsample in relation to gender) or the group of obese people. (19.31% in women and 23.20% in men, observed in total for the subsample in relation to gender). In other words, in relation to the tested sample of respondents and the examined variable - PBF, as many as 49.24% of women and 42.94% of men belong to obese and obese people. Negative trends in PBF increase with age were also found.

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