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Review article

BASIC ANTHROPOMETRIC AND BODY COMPOSITION CHARACTERISTICS IN AN ELDERLY POPULATION: A SYSTEMATIC REVIEW*

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Abstract. *The aim of this study was to determine the basic anthropometric characteristics and body composition of elderly individuals between 60 and 80 years of age on the basis of collected data and analyzed papers published between the years of 1990 and 2011. The literature search was conducted using the following databases: MEDLINE, Google Scholar, Kobson and DOAJ. The selection was based on criteria related to the age group the participants belong to (60-80 years), rather than to body composition and anthropometric parameters, while participants with a chronic disease were not included. The study included 28 studies which met all the criteria for selection. The body composition of the elderly aged between 60 and 80 years could be influenced by genetic potential, early growth and development, differences in socio-economic status, health status, as well as by geographic region and ethnic group affiliation. Aging is associated with a higher percentage of body fat and body fat redistribution. Redistribution of fat, predominantly from lower-body to subcutaneous fat in the abdominal and visceral section is quite frequent among the elderly despite an apparent decrease in the BMI. This phenomenon mainly occurs due to changes in total adiposity and changes in body weight.*

Key words: *aging, body mass index, weist to hip ratio, fat mass, elderly.*

INTRODUCTION

The rapidly increasing number of elderly individuals represents a demographic characteristic of modern life around the world. Anthropometric and nutritional characteristics

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are related to genetic, environmental, sociocultural conditions and to lifestyle, health and functional status (Perissinotto, Pisent, Sergi, & Grigoletto, 2002). Anthropometry is an essential tool in geriatric nutritional assessment used to evaluate underweight and obesity conditions, which are both important risk factors for severe diseases and disability among the elderly (Jensen & Rogers, 1998; Visser et al. 1998). Anthropometric measurements used to assess the elderly are usually easy to obtain and measure and are noninvasive and inexpensive (Kuczmarski, Kuczmarski, & Najjar, 2000). The main measurements are weight, height, girths, and skin folds (Menezes & Marrcui, 2005). Arm circumference can be efficiently used to classify the nutritional risk and/or status of an individual and calf circumference has been referenced as a sensitive indicator of lean mass loss among the elderly (WHO, 1997). The process of aging itself involves a great number of physiological and nutritional changes such as an increase in body weight and height loss. Furthermore, this leads to a reduction in fat-free mass, which is closely associated with increased fat mass. In fact, the reduction or stability in body weight may mask an increase in body fat mass as a result of aging and the loss of muscle mass in people. Therefore, the assessment of lean body mass and body fat mass, and their relationship is of great importance for people over the age of 60. Changes in the total or peripheral muscle mass and adipose tissue can be a good indicator of the risk factors for many diseases.

The accumulation of body fat is usually located in the area of the trunk and visceral sites.It is well known that being overweight and obesity are closely linked to an increased risk of cardiovascular disease, as well as with chronic disorders and disabilities (Musta, Spadano, Coakley, Field, Colditz, & Dietz, 1999). Both the body mass index and waist circumference have been used as markers of obesity and adiposity to study their relation to chronic diseases (Janssen, Katzmarzyk, & Ross, 2004). Waist size is a marker of abdominal fat depots responsible for the occurrence of insulin resistance. It was found that males that have a waist circumference over 94 cm are at increased risk, and over 102 cm at very high risk for the development of comorbidity, especially of the cardiovascular system. An increased risk of developing these complications was determined in the case of females with a waist size over 80 cm, and a strongly increased risk in the case of females with a waist size of over 88 cm (WHO, 1997).

Several cross-cultural studies show that there are significant statistical differences in body composition between different ethnic groups of people while the difference was much smaller when it comes to aged-related inter-population, where the homogeneity of a large group is more obvious (Campbell, Gray, & Leslie, 2005; Coqueiro, Barbosa, & Borgatto, 2009; Ghosh, Bose, & Das Chaudhuri, 2001; Ghosh, 2004). Reduced capacity in the elderly is due to the reduction of muscle mass, bone mass, changes in functionally, endocrine and cognitive status. The primary goal of geriatrics and gerontology represents a clear definition of state variability of body composition with special emphasis separating the physiological from the pathological.According to the scientific facts determined during the last decades of the XX century, there has been a significant increase in the number of research studies regarding older people. Nevertheless, the subject matter of these studies is far from the subject matter that is considered popular science. There is no doubt that mankind would have much more use of a deeper study of the last stage of human life. In fact, a lack of data and the heterogeneity of the experimental design and measurement techniques in the evaluation indicate the need for a meta-analysis. The need is reflected in order to define the current state information based on research that would connect body composition and aging. This paper aims to review the current state of knowledge on body composition in the population aged between 60-80 years old.

METHODS

Literature search

Literature search was conducted using the following bases: MEDLINE, Google Scholar, Kobson, DOAJ. For a closer search and selection of the research papers, the authors have limited the studies according to key words that are the problem of this research: elderly, anthropometry, body mass index, circumference, diameters. The study was limited to research papers published in the period from 1990 to 2011. In addition, the references of all the studies were examined in order to find more studies with the same or similar research problems.

Study selection and data collection

The selection was based on several criteria of which the age of the participants was the most important one and at the same time represented the primary goal. The second requirement for accepting a study was that it was related to anthropometrics and body composition of the participants regarding the variables recommended by the International biological Program (IBP). After the study selection, 3 groups of research studies were selected based on content: 1) body height, body weight, the body mass index and body fat percentage; 2) body circumferences; 3) skin fold thickness (subcutaneous adipose tissue). All of the categories are presented in the table because of better visibility.

Theoretical approach

For the collection and review of previous research, the descriptive method was used parallel with the theoretical analysis. The study included 28 research studies closely associated with the anthropological status of people aged 60-80 who were carefully analyzed and also met all the criteria for selection. The initial literature search identified 105 references which fulfilled some of the criteria of the study. However, 77 were eliminated on the basis of selection and other criteria (Figure 1). Only the studies in which subjects were between the ages of 60 and 80 were considered. If the range of age was not specified in the article, only studies where the average age of the subjects was greater than 60 by one standard deviation away from the mean were included.

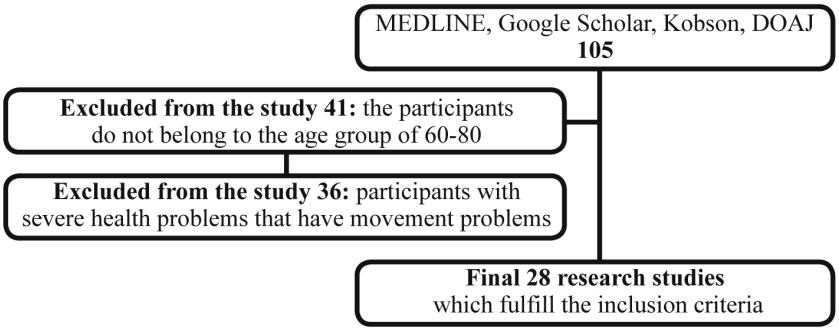

Fig. 1 Summary of literature search

Anthropometric measurement is the most common method and also the cheapest for the estimation of body composition. It includes a longitudinal dimension, transversal dimension, the body mass index (BMI, derived from the ratio of the height and weight of the respondents), body fat percentage (obtained by an indirect method of measurement), waist circumference (WC) and waist-to-hip ratio (WHR). Measures such as the BMI are good for the assessment of excessive weight or obesity, while WC and WHR are good indicators of abdominal fat.

The collected and analyzed studies are shown in Tables 1, 2 and 3. In Table 1, each study is shown with the following parameters: years of research, gender, sample size, age of subjects, height, body weight, BMI, body fat percentage. Table 2 shows following parameters: years of research, gender, number of participants, age of the subjects, waist circumference, hip circumference, waist to hip circumference ratio, upper arm circumference, thigh circumference and calf circumference. Table 3 is represented by: years of research, gender, sample size, age of the participants and skin folds (biceps, triceps, subscapularis and suprailiaca).

The number of participants has varied from study to study so that the minimum number of participants (45) was found in study conducted by Alhamada (2004) and the largest number of participants (2458), in the study conducted by Perissinotto et al. (2002). As for the sample, it could not be strictly separated into categories of men or women because it mainly included studies involving both sexes.

RESULTS

Body composition among the elderly people could be influenced by genetic potential, early growth and development, differences in socio-economic status, health status, as well as by geographic region and ethnic group affiliation. The prevalence of excessive weight among the elderly was high for both men and women. A longitudinal study carried out by Guo, Zeller, Chumlea, & Siervogel (1990) showed that total body weight increased by 0.30 to 0.55 kg per year among white men and women between the ages of 60 and 66. In contrast, a second longitudinal study (Visser et al., 2003) has showed that body weight decreased among elderly white man and women after the age of 60. Body weight and height are significantly different between men and women (body weight: 70.3 vs. 62.7 kg) (body height: 163 vs. 152 cm) according to study carried out by Sanchez-Garcia et al. (2007). This was confirmed by many other studies (Setiati et al., 2010, Reddy & Rao, 2010; Menezes & Marucci, 2005; Kuczmarski et al., 2000).

Many studies have shown that an increase in the BMI leads to the risk of many diseases and disability in people over the age of 60 (Perissinotto et al., 2002; Sanches-Garcia et al., 2007; Pai, 2011, Sternfeld, Ngo, Satariano, & Tager, 2002). The BMI was significantly higher in women than in men aged between 60 and 80 (27.6 vs. 26.4). However, between the sexes it is lower between the ages of 65-75 than between the ages of 75-80 (Perissinotto et al., 2002). The age of 75 was a turning point for the BMI as for the other anthropometric measurements (Perissinotto et al., 2002). According to the BMI values, the prevalence of malnutrition was lower than 5% in both genders, whereas obesity was shown to have a higher prevalence in women than in men (28% vs 16%, p=0.001). The BMI values indicated that 62.3% of the population was overweight, and 73.6% of the women and 16.5% of the men had high fat tissue distribution (Sanches-Garcia et al., 2007).

Table 1. The asic descriptive parameters of the body mass index (BMI), body height, body mass and percentage of body fat (Mean ± SD)

References	Year of reserach	Gender	Number of subjects	Age of the subjects	Body height (cm)	Body mass (kg)	Body mass index (kg/m^2)	Percentage of body fat (%)
Svendsen et al.	1991	Male	23	75.0±0.0	170.3±7.7	72.9±13.3	25.0±3.4	15.1±7.1
		Female	23	75.0±0.0	158.9±6.9	65.5±11.6	25.9±4.3	21.7±8.8
Visser et al.	1994	Male	76	71.0±5.9	175.2±5.5	76.5±9.6	24.9±2.6	
		Female	128	70.2±5.3	161.6±6.1	68.1±9.5	26.1±3.6	
Delarue et al.	1994	Male	70	65-69	169.2±3.2	79.6±10.4	27.9±3.4	
		Male	32	70-74	168.5±6.1	80.4±13.5	28.4±4.1	
		Male	34	75-79	167.3±7.2	73.7±12.6	26.4±4.0	
		Female	72	65-69	158.2±6.6	67.1±12.2	26.9±5.1	
		Female	50	70-74	157.4±5.3	66.6±12.8	26.9±4.3	
		Female	34	75-79	154.7±6.4	61.2±10.6	26.9±4.5	
Visser et al	1995	Male	32	73.0±6.0	175.0±0.0	78.0±11.1	25.4±3.4	30.1±5.2
		Female	71	72.0±5.0	161.0±0.6	66.9±9.4	25.8±3.8	38.6±6.0
Baumgartner et al.	1995	Both	17	60-70	174.8±4.7	82.0±10.7	26.9±3.7	28.1±5.4
			79	70-80	173.1±6.9	75.8±10.2	25.3±3.2	26.0±6.9
Kim et al.	1996		78	60-64	151.0±5.0	58.2±6.8	25.3±3.0	27.3±6.0
		Female	94	65-69	150.7±4.7	57.5±7.4	25.2±3.2	25.9±6.6
			80	70-74	150.1±4.3	55.3±6.6	24.5±6.6	24.0±6.1
			38	75-79	149.6±5.0	55.9±8.2	24.9±3.2	24.1±6.3
Schuit et al.	1998	Male	229	60-80	170.0±0.86	73.7±9.1	25.4±2.7	35.3±5.9
		Female						
Neuhäuser-Berthold et al.	2000	Male	82	69±5	173±6.4	77.9±9.3	26.0±2.6	
		Female	122	69±6	160±5.2	67.0±9.7	26.3±3.6	
Santana et al.	2001	Male	97	71.80±2.12	170.1±0.07	78.90±11.57	27.30±3.55	28.38±5.96
Sternfeld et al.	2002	Male	708	69.5	174.7±6.6	83.7±13.4		
		Female	947	69.3	160.8±6.7	67.8±13.0		
Perissinotto et al.	2002	Male	466	65-69	167.1±7.5	74.6±11.2	26.8±4.2	
		Male	451	70-74	166.3±6.4	74.4±11.9	27.0±3.9	
		Male	392	75-79	163.8±6.6	69.5±10.7	26.0±3.6	
		Female	418	65-69	154.1±6.7	66.2±12.0	28.0±5.2	
		Female	370	70-74	152.3±6.5	64.8±12.5	27.9±5.0	
		Female	361	75-79	150.6±6.4	61.1±10.6	27.1±5.8	
Alhamadan	2004	Both	45	69.4±0.77			24.2±0.85	
Huges et al.	2004	Male	54	<60	175.5±5.9	77.2±8.1	25.1±2.6	23.8±6.4
		Female	75		162.2±5.6	65.0±11.1	24.7±3.7	33.5±7.6
Thomas et al.	2005	Both	207	68.8±2.9			24.0±3.2	
Wannamethee et al.	2005	Male	2744	68.2±5.5	172.6±6.48	80.1±9.1	26.63±3.51	34.5±8.0
Martins et al.	2005	Male	699	60-70	167±0.61	70.5±1.0	25.2±0.32	
		Female		60-70	155±0.48	63.7±0.84	26.3±0.33	
		Male		70-80	165±0.73	67.6±1.25	24.5±0.42	
		Female		70-80	153±0.72	60.2±1.02	25.5±0.41	
Petersen et al.	2006	Male	193	71.0±4.5	175.6±6.5	79.3±10.3	25.7±2.8	
		Female	206	71.3±4.5	163.3±6.5	71.1±10.5	26.7±3.7	
Sánchez et al.	2007		688	60-64	158.5±8.8	67.8±12.6	26.9±4.4	
		Both	528	65-69	159.4±9.6	68.6±12.0	26.9±4.1	
			358	70-74	158.6±10.0	66.6±12.3	26.4±4.3	
			243	75-79	157.3±10.5	64.1±13.2	25.8±4.8	
Rech et al.	2008	Male	60	60-81	167.2±7.4	74.2±10.6	26.5±2.7	23.1±5.8
		Female	120		154.5±5.7	65.6±11.1	27.4±3.9	37.3±6.9
Rosnah et al.	2009	Male	129	<60	162.3±7.5	66.6±11.3		
		Female	101		149.0±5.8	60.0±13.8		
Reddy et al.	2010	Male	82	72.7±7.3	165.7±6.0	59.2±11.2	21.4±3.1	
		Female	65	69.6±5.3	155.0±5.3	52.4±7.7	21.8±2.9	
Rahman et al.	2010	Male	129	68-80	158.8±7.1	54.2±10.7	21.8±3.5	
		Female	188		148.6±6.4	46.7±10.3	21.1±4.4	
Setiati et al.	2010		156	60-64	158.02±6.76	58.72±8.47	23.52±3.11	
		Both	234	65-69	159.01±7.28	58.19±9.33	22.97±2.99	
			164	70-74	159.67±7.57	56.59±8.96	22.27±2.96	
			96	75-79	158.99±7.47	54.79±10.17	21.64±3.58	
Cicioglu	2010		203	60-64	170.3±5.5	79.1±10.8	27.1±3.3	
		Male	278	65-69	169.9±6.2	77.4±11.1	26.7±3.4	
			210	70-74	168.5±6.8	74.9±9.8	26.3±3.3	
			107	75-79	168.1±6.4	74.6±12.7	26.4±4.3	
Wyka et al.	2010	Male	70	<60	170.1±6.0	77.8±12.5	26.2±3.5	
		Female	150		157.2±6.5	67.3±12.2	27.1±4.4	
Pai	2011	Both	210	60-85	158	56	23.1	

It is interesting to compare the risk of malnutrition between the elderly who live in the community and those who live in old age homes. Pai (2011) found that the elderly living in old age homes have significantly lower values of BMI ($p<0.01$) and a higher risk of malnutrition, so it is important to increase the monitoring of the nutritional status among the residents of old age homes. The waist circumference and waist to hip ratio was significantly increased in younger than in older men (65-75 vs. 75-80 years), in comparison to women where the waist to hip ratio was higher in older than in younger women (Perissinotto et al., 2002). Almost 50% of all the women in all the age groups had a waist circumference and a waist-to-hip ratio outside the normal range. Among the men, these percentages were approximately 40% for waist circumference and 20% for the waist-to-hip ratio. This fact leads us to the conclusion that the visceral redistribution in the elderly mainly affects women.

Table 2 The basic descriptive parameters of body circumference (Mean±SD)

References	Year of reserach	Gender	Number of subjects	Age of the subjects	Circumferences					
					Waist (cm)	Hip (cm)	Waist to hip ratio (cm)	Upper arm (cm)	Calf (cm)	Thigh (cm)
Side et al.	1991	Male	126	75±4	88.3±9.6	99.9±9.4	0.88±0.05	28.1±7.6		
		Female	134	76±4	84.9±11.1	98.4±11.2	0.86±0.06	26.3±4.2		
Baumgartner et al.	1995	Both	17	60-70	99.6±9.7	102.5±6.0		32.9±2.3	37.3±2.4	50.7±4.0
			79	70-80	97.0±9.4	99.5±6.1		31.0±2.7	36.3±2.5	47.7±3.6
Neuhäuser-Berthold et al.	2000	Male	82	69±5			0.95±0.04			
		Female	122	69±6			0.83±0.04			
Santana et al.	2001	Male	97	71.80±2.12	95.93±9.15		0.97±0.06			
Perissinotto et al.	2002	Male	466	65-69	98.1±10.2	100.6±8.4	0.97±0.05			
		Male	451	70-74	98.5±11.1	101.0±9.6	0.97±0.06			
		Male	392	75-79	96.4±10.7	99.6±8.9	0.96±0.05			
		Female	418	65-69	97.2±13.2	1045±11.5	0.93±0.06			
		Female	370	70-74	97.4±12.9	104.0±10.7	0.93±0.07			
		Female	361	75-79	96.2±12.4	102.3±10.4	0.94±0.07			
Martins et al.	2005	Male	699	60-70	89.9±1.08		0.93±0.01	29.9±0.30		
		Female		60-70	86.7±0.88		0.85±0.01	30.0±0.30		
		Male		70-80	90.1±1.28		0.94±0.01	29.1±0.40		
		Female		70-80	85.2±1.09		0.87±0.01	29.2±0.35		
Petersen et al.	2006	Male	193	71.0±4.5	96.3±8.3	99.4 ±5.1	0.97±0.06			
		Female	206	71.3±4.5	89.4±10.9	103.1±7.6	0.87±0.07			
Sánchez-García et al.	2007	Both	688	60-64	94.5±12.9	102.8±11.9	0.92±0.08	30.7±4.0	35.5±8.1	
			528	65-69	95.8±12. 2	102.8±11.2	0.93±0.06	30.1±4.3	35.3±8.8	
			358	70-74	94.5±11.3	101.1±10.5	0.93±0.08	29.7±4.0	34.4±8.5	
			243	75-79	93.0±12.2	99.9±10.6	0.93±0.07	28.8±4.1	33.8±8.9	
Reddy et al.	2010	Male	82	72.7±7.3	81.7±11.8	90.7±12.1	0.90±0.04			
		Female	65	69.6±5.3	71.9±8.0	84.5±7.7	0.85±0.05			
Rahman et al.	2010	Male	129	68-80	80.4±10.5	87.0±9.1				
		Female	188		72.2±12.8	86.3±10.4				
Setiati et al.	2010	Both	156	60-64	83.85±8.3	94.9±17.61		27.0±3.4	32.6±15.3	43.73±4.8
			234	65-69	82.86±9.1	93.94±7.81		26.9±3.8	33.0±15.9	43.22±4.7
			164	70-74	81.69±8.6	92.79±7.37		25.8±3.7	31.8±15.5	42.21±4.8
			96	75-79	81.25±9.8	91.78±8.75		25.1±4.1	31.1±15.1	40.77±4.9
Pai	2011	Both	210	60-85	71.2±2.1	78.6±3.2				

The waist circumference may be a more reliable measure of determining the risk of mortality than the BMI (Visscher et al., 2003) but also the measure that would indicate the possibility of the transition from normal to obese. In addition, many believe that the waist circumference is a better indicator of obesity among the elderly than the BMI (Visscher et al., 2003; Petersen et al., 2006). The common characteristic of patients, male or female, is that their functions are greately reduced if their BMI or waist circumference are increased. The central distribution of adipose tissue was negatively correlated with the lung function among men aged between 60 and 80, while the amount of muscle mass has showed a high correlation (r=0.686) with lung function (Santana et al., 2001). Since with aging, human functional abilities decline, this could be a key component in sustaining the viability and functional status of the elderly between the age of 60 and 80. The correlation between the waist circumference and mortality was found in both, men and women, no matter what race they belong to and whether they were smokers or nonsmokers (Koster et al., 2008). Among the people who have a normal BMI but increased waist circumference (men, over 102 cm and women, over 88 cm) the risk of mortality was 20% higher (Koster et al., 2008) than in patients who have a normal BMI and waist circumference. This indicates how important it is to include all the anthropometric parameters in order to gain a complete picture of the health status of the elderly and ther risk because certain parameters may conceal the true situation. Changing the lifestyle and early diagnosis of the elderly risk groups, especially with regard to being overweight is the message that appears in almost all of the analyzed studies as a prevention of later complications. This primarily refers to changes in living habits regarding the nutrition of elderly people because they mainly ingest saturated fatty acid - 14% and carbohydrates - 52%, which is accompanied by the low intake of fruits and vegetables, cereal products and dietary fiber, vitamins and minerals (Wyka, Biernat, & Kiedik, 2010).

Table 3. The basic descriptive parameters of skinfold thickness (Mean±SD)

References	Year of reserach	Gender	Number of subjects	Age of the subjects	Biceps (mm)	Triceps (mm)	Subscapularis (mm)	Suprailiaca (mm)
Visser et al.	1994	Male	76	71.0±5.9	6.4±2.2	12.5±3.3	17.4±5.5	17.9±6.2
		Female	128	70.2±5.3	11.8±4.5	19.8±5.1	19.8±7.5	19.8±8.0
Baumgartner et al.	1995	Both	17	60-70		13.9±5.3	21.4±7.4	
			79	70-80		11.1±4.0	17.8±7.1	
Manandhar et al.	1997	Male	138	60-64	4.6±2.1	10.2±4.1	16.0±7.5	14.3±6.6
		Female	151	60-64	5.6±3.0	14.1±6.5	20.9±10.6	19.4±9.9
		Male	83	65-69	4.7±2.1	10.8±5.0	16.0±7.3	13.6±5.8
		Femal	72	65-69	5.3±2.3	13.3±5.3	21.0±9.9	19.9±8.4
		Male	69	<70	4.3±1.8	9.6±4.2	13.9±6.3	12.3±5.9
		Female	86	<70	4.5±2.4	10.8±5.7	15.5±9.6	15.3±8.7
Martins et al.	2005	Male	699	60-70		17.0±0.70	20.1±0.63	
		Femal		60-70		25.0±0.59	23.4±0.62	
		Male		70-80		18.1±0.94	20.3±0.86	
		Femal		70-80		23.1±0.75	21.9±0.74	
Setiati et al.	2010	Both	156	60-64	11.45±1.71	19.59±0.86	20.65±0.62	23.79±0.66
			234	65-69	10.66±1.69	18.81±0.82	19.52±0.69	22.40±0.77
			164	70-74	10.28±1.72	18.07±0.72	18.59±0.63	21.01±0.69
			96	75-79	9.65±1.67	17.39±0.61	16.44±0.66	19.24±0.75

CONCLUSION

In addition to total body fat mass, a key role in the development of comorbidity can also be found in its distribution. The accumulation of fat in the abdominal area, or android or central obesity carries a high risk of complications especially for people between the ages of 60 and 80. Using anthropometric measurements, it was determined that the distribution of body fat has significant effects on glucose metabolism and insulin levels and that abdominal adipose tissue has an important role in the pathogenesis of metabolic syndrome (Zamboni et al., 1994; Fecal et al., 1995).

The obtained data indicate that the measurements of peripheral, subcutaneous fat better reflect the level of leptin compared to the more general parameters such as BMI. According to that fact, they may be included as a part of the basic anthropometric measurements as a simple and useful parameter for a more precise assessment of the risks associated with increased fat mass and leptin. This further indicates that with the analysis of fat mass as a risk factor, apart from abdominal fat mass, the impact of subcutaneous fat must be precisely evaluated, because the obesity in women is associated with the deposition of fat more in the subcutaneous than in the intra abdominal area.

Aging is associated with a higher percentage of body fat and body fat redistribution. The redistribution of fat, predominantly from lower-body to subcutaneous fat in the abdominal and visceral part is the most frequent kind among the elderly despite an apparent decrease of BMI. The apparent decrease in BMI occurs at the expense of losing muscle mass and an increase in waist circumference and hip circumference. This phenomenon mainly occurs due to changes in total adiposity and changes in body weight. It has not yet been fully clarified and defined how all these changes are affected by sex, ethnicity or geographical region. Based on these facts, it is necessary to include more sophisticated methods and equipment in order to have a fuller and clearer picture, and with prevention try to reduce the risk of many disease. All of the mentioned factors clearly contribute to the deterioration of health and the development of many diseases among people aged between 60 and 80.

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KOMPOZICIJA TELA I ANTROPOMETRIJSKE KARAKTERISTIKE STARIH OSOBA. PREGLED ISTRAŽIVANJA

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Cilj ovog preglednog rada bio je da utvdi osnovne antropometrijske karakteristike i kompoziciju tela osoba izmedju 60 i 80 godina starosti na osnovu prikupljenih i analiziranih radova objavljenih u periodu od 1990-2011. Medline/PubMed, Kobson, DOAJ and Google scholare su korisceni za pretragu literature i identifikaciju radova. Radovi su odabrani na osnovu kriterijuma vezanih za starosnu dob kojoj ispitanici pripadaju (60-80 godina) zatim da se studije odnose na sastav tela i antropometrijske parametre i da se ne radi o ispitanicima sa hronicnim oboljenjem nakon ogranicenja u pretrazi identifikovano je 28 radova koji su razmatrani. Na antropometrijski sastav tela kod starih osoba izmedju 60 i 80 godina moze da utice genetski potencijal, rani rast i razvoj, razlike u socio-ekonomskom statusu, zdravstveno stanje kao i geografsko podrucije i pripadnost etnickoj grupi. Starenje je takodje povezano sa povecanjem udela masnog tkiva i preraspodele telesne masti. Preraspodela masti pretezno iz donjeg dela tela u potkozno masno tkivo na trbuhu i u visceralnom delu je najčesce zastupljena kod starih osoba uprkos prividnom smanjenju BMI. Najcesce do ove pojave dolazi zbog promene u ukupnom adipozitetu i promene u telesnoj tezini.

Ključne reči: *proces starenja, body mass index, mišićna masa, stare osobe, masno tkivo*