

VARIABILITY OF BODY CONTENT PARAMETERS AS AN INDICATOR OF BIOLOGICAL AGE IN HUMANS: INTRA- AND INTER-GROUP ASPECTS

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Biological age assessment is a commonly used method for investigation of ageing processes in contemporary populations. In our study, we have used the method suggested by Gorelkin A.G. and Pinkhasov B.B. (2008) based on parameters of the stature, with the help of which, using the multiple regression equation, individual determination of the biological age and ageing rates in men and women can be performed. Anthropometric examination (total body sizes and body mass components) of 423 people (239 men and 184 women) at the age from 52 to 104 years old has been carried out in the three cities (Moscow, Barnaul, Tiraspol) with different ecological and socioeconomic conditions. Moscow is a megalopolis with population density maximal for Russia (more than 11.5 mln people). Barnaul is an administrative and scientific (research, medical, educational) center of Altai Region, one of the largest Siberian cities (633,000 people). Tiraspol is a capital of Trans-Dniester Moldavian Republic (in the south-east of Europe) with the population about 156,000 people. When biological age parameters (BA) were compared with the calendar age (CA), groups with slowed ($BA < CA - 7$ years), medium ($BA = CA \pm 7$) and accelerated ($BA > CA + 7$) ageing rates have been detected in the examined subjects. In women and men with the slowed ageing rates, lower values of body mass index (BMI), decreased amount of total body mass and higher level of specific metabolism (kcal/m^2) have been seen. Fat accumulation in the area of hips is more characteristic for women (based on the ratio of waist/hips circumferences), and for men – on the trunk. All long-livers (36 women) appeared in the group with slowed ageing rates in accordance with their stature and based on biological age. In the group with accelerated ageing rates, disharmonic variants of fat topography have been observed: for women – android, for men – gynoid. Regional differences in the distribution of prevalence of different versions of ageing rates have been revealed: in Moscow, a slowed variant of development of involution age-specific changes is the most common (both in men and women). The study has been performed at financial support of the Russian Foundation for Basic Research, grant #12-06-00265.

Key words: *stature, body composition, biological age, ageing rates, long-livers*

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ALLOSTATIC LOAD AND FRAILTY MEASURES AMONG POLISH URBAN AND RURAL 55+ SUBJECTS

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During life span human body is exposed to numerous stressors, which force changes in internal environment, in order to adapt to present conditions. Allostatic load concept was created to measure the cumulative effect of those stressors on the body. The aim of the study was to compare allostatic load (AL) and indicators of frailty between urban and rural elderly from Greater Poland province. In all 216 female and male individuals aged ≥ 55 years were enrolled into the study. To determine AL following variables were measured: WHR, diastolic and systolic blood pressure, ratio of total to LDL cholesterol, HDL cholesterol, glycated hemoglobin, serum dihydroepiandrosterone-sulfate, overnight urinary cortisol, adrenaline and noradrenaline. Measures

of frailty included time to walk 15 feet and maximal grip strength. Results were analyzed and compared between eight groups according to: place of residence, gender and age subgroups. In general, rural elderly were characterized by higher AL values compared to their urban peers, and males had greater AL values compared to females. Significant gender-related differences were noted among rural individuals (55–69 years: 3.43 males vs 2.18 females; ≥ 70 years: 2.88 males vs 2.52 females). It was observed that younger urban and rural females had lower AL values compared to their older peers, opposite relation was noted in case of male participants. It was noted that rural females in both age subgroups had significantly stronger hand grip than urban peers. However, rural females needed more time to walk 15 feet compared to urban females. No age- or place of residence-differences in grip strength and time to walk 15 feet were found in case of males. To conclude, conditions of life and exposure to external stressors seemed to vary in a great extent between females and males from rural area, but not urban area. Differences in physical performance due to the place of residence were pronounced only in studied females.

Key words: *allostatic load, frailty, Polish elderly, urban, rural*

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EVALUATION OF PHYSICAL FITNESS BY USING SENIOR FITNESS TEST AND THE ANALYSIS OF BODY COMPOSITION IN SENIOR WOMEN OF U3V

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Optimal physical fitness is an important factor which limits the progression of senior fragility and contributes to the prevention of falls. Body composition, together with the optimal growth of muscle strength and bone density, contribute to the prophylaxis of senior fragility and accident prevention for seniors. The research group consisted of senior women attending University of the Third Age at the Faculty of Physical Culture of Palacký University in Olomouc. The research sample was divided into groups according to age (≤ 60 years; > 60 years). Physical fitness was assessed by a set of "Senior Fitness Test", which includes six tests: chair and stand test, arm curl test, step test, chair sit and reach test, back scratch test and walk test. Muscle strength was evaluated in the flexors of the arm, forearm and hand by digital pinch grip (MIE Medical Research). Body composition was determined according to the method of bioelectrical impedance by InBody 720. Out of the characteristics of body composition, the health indicators of obesity will primarily be used for evaluation of the health risks – Body Fat Mass (kg), Body Fat Mass Index (kg/m^2), Fat Free Mass (kg), Fat Free Mass Index (kg/m^2), Skeletal Muscle Mass (kg), Body Cell Mass (kg) and the amount of visceral fat (cm^2) indicative of the risk of abdominal obesity. Bone density was determined at the heel and wrist area by local densitometer (EXA 3000). Visceral fat in the younger group of women was on average lower than in the older women, but both groups exceeded the value of risk (100 cm^2). Values in amount of Body Fat and Fat Free Mass between the groups did not differ significantly. In Senior Fitness Test, both groups of women achieved similar results, the difference was significant only in step test (better results in the older group), and in walk test (better results in the younger one).

Key words: *senior population over 60 years, body fat mass, fat free mass, senior fitness test, bone mineral density, maximum muscle strength, risk of falls*

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