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# Sarcopenic obesity: epidemiology and cut-off values in the Ukrainian population

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*Sarcopenic obesity is a term increasingly used to describe the loss of muscle mass (sarcopenia) and obesity associated with aging and chronic disease. There is still no commonly accepted definition of sarcopenic obesity and its diagnostic criteria, which affects the determination of its prevalence, assessment of clinical significance, and negative health consequences. The aim of the study was to assess the fat and lean mass cut-off values for sarcopenic obesity in the Ukrainian population. We used the Zoico method (60th percentile) in a cohort of 3095 subjects (2666 women and 429 men) aged 20-90 years old for assessment of the fat-percentage cut-off values. Cut-off values for lean mass were calculated as –2 SD in 770 healthy subjects (385 females and 385 males) aged 20-39 years old. The fat and lean mass parameters were assessed using dual-energy X-ray absorptiometry (DXA, Hologic, Discovery). The use of different diagnostic criteria for sarcopenic obesity demonstrated its wide variability in men (0-6.5%) and women (0.1-10.5%), which justifies the need to determine Ukrainian population cut-off values. Zoico cut-off values for fat mass were >41% for females and >28% for males. The cut-off values for the ratio of appendicular lean mass to body weight were <22% for women and <28% for men. Our study revealed that the frequency of sarcopenic obesity in the Ukrainian population aged 20-90 years old, using our cut-off values consisted of 9.8% for women and 9.6% for men.*

*Key words: epidemiology; sarcopenic obesity; sarcopenia; fat mass; lean mass.*

## INTRODUCTION

Sarcopenic obesity is a state of the body, characterized by a combination of obesity and sarcopenia against the background of aging or chronic diseases [1, 2]. This term first time was proposed by Baumgartner [3]. Today, it was demonstrated that these two diseases share common pathophysiological mechanisms, including lifestyle features, and hormonal, and immunological factors, which may go in with and have adverse health consequences, particularly among the population of elderly people.

Skeletal mass is decreasing with age, mainly due to type II fibers, but this does not fully explain the parallel decrease in muscle function, because the reduction in strength occurs two to five times faster than would be predicted based on the reduction only in muscle mass [4].

Unlike muscle and bone tissue, fat tissue increases up to a certain age and decreases only in old age [5]. However, a more important transformation of fat tissue associated with aging is its redistribution in the body. Long-term loss of subcutaneous fat tissue with age is accompanied by an increase in visceral obesity due to an increase in the number of adipocytes and the accumulation of lipids in various depots, in particular, in the bone marrow, liver, skeletal muscles, etc. [6, 7]. In addition, obesity can independently lead to the loss of muscle mass and function through the negative influence of metabolic disorders dependent on fat tissue, such as oxidative stress, inflammation, and insulin resistance, which negatively affect muscle mass [8]. On the other hand, sarcopenia can directly contribute to the accumulation of fat by reducing total energy consumption, so obesity and sarcopenia can reinforce each other with a

false cycle of fat tissue increase and muscle loss due to reduced physical activity [9, 10]. The loss of skeletal muscle mass and function with age, which is accompanied by a relative or absolute increase of fat in the body, contributes to the potential development of sarcopenic obesity.

For today, there is no consensus on the relevant cut-off values for the definition of sarcopenia. R.N. Baumgartner defined sarcopenia on the base of the appendicular lean mass (ALM) index (ALMI = ALM/height$^2$) [11]. Janssen et al. [12] used skeletal muscle mass adjusted by weight measured by bioimpedance analysis. Newman et al. [13] in the Health, Aging and Body Composition Study (Health ABC Study) have evaluated two definitions of sarcopenia and reported that the definition proposed by Baumgartner, was highly correlated with body mass index (BMI) and therefore could identify few individuals with sarcopenic obesity.

According to the consensus of the EWGSOP2 Working Group (2019), sarcopenia is a progressive generalized skeletal muscle disease associated with an increased risk of falls, fractures, motor activity disorders, and mortality [6]. The EWGSOP2 experts focused special attention on low muscle strength as the main parameter of sarcopenia and recommended to use the skeletal muscle mass assessment (based on dual-energy X-ray absorptiometry (DXA)) to confirm the diagnosis of sarcopenia, while for the assessment of sarcopenia severity was suggested to use walking speed test or Timed Up and Go test.

Obesity is a chronic metabolic disease, characterized by increased fat reserves in the body, which, as a result, increases the risk of metabolic and cardiovascular diseases, as well as mortality. As in the case of sarcopenia, there is currently no consensus on appropriate cut-off values for obesity defining. The World Health Organization (WHO) uses BMI ≥30 kg/m$^2$ to define obesity and 25–29.9 kg/m$^2$ as overweight [14]. The American Association of Clinical Endocrinology [15] recommends using cut-off values of body fat for the diagnosis of obesity >25% in men and >35% in women. However, it should be noted that fat distribution in the body has a better prognostic ability than BMI for the development of the metabolic syndrome and the risk of cardiovascular diseases [16].

In 2020, the European Society for Clinical Nutrition and Metabolism (ESPEN) and the European Association for the Study of Obesity (EASO) conducted a systematic review aimed at analyzing the available scientific literature on the definition and diagnostic criteria of sarcopenic obesity [17]. Its results confirmed substantial heterogeneity in definitions and diagnostic approaches due to various definitions of obesity and sarcopenia, differences in methodology for assessing body composition and function, and different limit values that were used.

The most important thing is that the lack of definitions causes difficulties in establishing an accurate diagnosis, conducting epidemiological studies and developing strategies for the prevention and treatment of this disease. For today, studies have been conducted in Ukraine on determining the cut-off values for sarcopenia [18], but no studies have been conducted on the criteria and assessment of the epidemiology of sarcopenic obesity. Thus, the aim of our study was to determine the fat-percentage cut-off values for the diagnosis of sarcopenic obesity in the Ukrainian population.

## METHODS

To determine the frequency of sarcopenic obesity and cut-off values of fat mass at the Department of Clinical Physiology and Pathology of the Musculoskeletal System of the SI «D.F. Chebotarev Institute of Gerontology of the NAMS of Ukraine», and the Ukrainian Scientific and Medical Center of Osteoporosis, a cohort of 3,095 subjects at the age from 20 years old up to 90 years old had been examined, among them 86.1% (n = 2666) were women and 13.9% (n = 429) were men. Females were older than males (58.7 ± 12.7 and 52.0 ± 16.2 years, respectively; t = 9.7; P < 0.0001), had

lower height (162.4 ± 6.4 and 177.0 ± 7.6 cm; t = 42.6; P < 0.0001), body weight (BW, 72.8 ± 15.6 and 83.4 ± 18.7 kg, respectively; t = 12.8; P < 0.0001), and higher BMI (27.6 ± 5.7 and 26.6 ± 5.5 kg/m$^2$; t = 4.7; P < 0.0001). In order to create the cut-off values of lean mass, which according to the literature data, are determined on the parameters of young healthy subjects, 385 men (average age 30.3 ± 6.1 years; BMI 24.4 ± 2.7 kg/m$^2$), and 385 women (average age 31.4 ± 5.4 years; BMI 23.2 ± 2.9 kg/m$^2$) were selected.

According to the decision of the Ethics Committee of the Institute (protocol No. 4 of March 12, 2020), our research fully met the ethical, moral, and legal requirements in accordance with the order of the Ministry of Health of Ukraine No. 281 of November 1, 2000, the Helsinki Declaration of the World Health Organization association on the ethical principles of conducting scientific medical research with human participants. All participants had signed an informed consent to participate in the study.

The sample size was calculated using the calculator available on the website https://sociolab.vntu.edu.ua/download/Calculator.html, where the population of Ukraine as of January 1, 2022, was chosen as the general population of 40997698 people, of which 19006979 were men and the number of women was 21990719 (https://ukrstat.gov.ua/, access mode 01.05.2022). The cohort, which consisted of 3,095 subjects, including 429 men and 2,666 women, was sufficient to determine the frequency of sarcopenic obesity separately for men and women.

Exclusion criteria were previous oncological pathology, unstable course of somatic pathology, in particular cardiovascular, endocrine, and respiratory one, movement disorders against the background of diseases of the nervous system (stroke, Parkinson's disease, etc.), and persons who at any period of life took drugs or had any diseases with a proven influence on the muscular system.

The next methods were used: questionnaires, clinical and orthopedic surveys, as well as instrumental methods. The main anthropometric indices (height, BW) were measured using routine methods, BMI (kg/m$^2$) was calculated in accordance with the Quetelet index formula (BMI = mass (kg)/height (m)$^2$).

Skeletal muscle mass and other body composition components have been assessed using dual-energy X-ray absorptiometry (DXA, DISCOVERY Wi, Hologic, Inc., USA). The fat and lean mass of the total body and separate areas, expressed in kg, had been evaluated. Fat mass (FM: fat mass/body weight, %), appendicular lean mass (ALM: limb lean mass, kg) and appendicular lean mass index (ALMI: ALM / height$^2$, kg/m$^2$) were also calculated [19-21]. Cut-off values for lean mass indices were defined as the mean value –2 SD.

According to current knowledge, for diagnosis of sarcopenic obesity, a combination of two parameters is necessary: low muscle mass (strength) and obesity [24]. As there are no unified diagnostic criteria for any of them, we have chosen the following:

I. To determine the increased content of fat mass:

1. BMI ≥30 kg/m$^2$ (according to WHO classification);

2. FM ≥40% for women and ≥30% for men [22];

3. FM depending on age (cut-off values for Caucasian population):

a) >39% for women and >26% for men at the age of 20-39 years old;

b) >41% for women and >29% for men at the age of 40-59 years old;

c) >43% for women and >31% for men at the age of 60-79 years old [23].

II. To determine the lean mass state:

1. cut-off values proposed by EWGSOP2: ALM <20 kg for men, <15 kg for men and ALMI <7.0 kg/m$^2$ and <5.5 kg/m$^2$ for women.

2. ratio of ALM to body weight (ALM/BW):

a) <25.7% of men and <19.4% for women in the subjects aged over 60 years old [24];

b) <28.27% for men and <23.47% for women in the subjects aged 18-65 years old [25].

In addition, to determine the cut-off values for FM, we used the method Zoico (60th percentile), which was used to calculate this index by other researchers [17, 26].

Statistical analysis was performed using Statistica 10.0 program packages Copyright© StatSoft, Inc. 1984-2001, Serial number 31415926535897 and SPSS Statistics 17.0 Copyright© Silver Egg Technology 2001. The sample was checked for normality of distribution by the Shapiro-Wilk test. The presentation of the data for continuous variables was performed corresponded to their distribution: for the normal one in the form of the average value (M) and standard deviation (SD), for the different one from a normal distribution – in the form of the median (Me) and interquartile range [Q1-Q3], for quantitative variables – in n (%). Also, we calculated –2 SD for parameter of lean mass and 60th percentile for fat mass index (with a 95% Confidence interval (CI)). In order to compare the two independent samples, we used Student's t-test for independent samples. The null hypothesis was rejected at $P < 0.05$ for each of the used tests.

## RESULTS AND DISCUSSION

According to WHO criteria, obesity was diagnosed in 86 men (20.0%) and 814 women (30.5%), which coincided with the results of the STEPS study in Ukraine, conducted in 2019 [27]. This study demonstrated that obesity (BMI ≥30 kg/m$^2$) in Ukraine affects almost a quarter of the population - 24.8% (20.1% of men and 29.8% of women), which indicates the representativeness of our sample. However, it should be noted that our cohort included subjects aged 20-90 years old, while the STEPS study included persons aged 18-69 years old.

Sarcopenia according to the ALM parameter (<20 kg for men, <15 kg for women) was determined in 31 (7.2%) of men and 362 (13.6%) of women, and according to the ALMI (<7.0 kg/m$^2$ in men and <5.5 kg/m$^2$ in women) in 50 (11.7%) of men and 188 (7.1%) of women, respectively.

Using these criteria (ALM and BMI), sarcopenic obesity was not detected among the examined men, and it was diagnosed only in 3 women (0.11%). In the case of using the ALMI as a diagnostic criterion for sarcopenia, sarcopenic obesity was not detected in either men or women.

At the next stage of our study, FM ≥40% for women and FM ≥30% for men was used as a criterion for obesity [22]. When using these criteria, the frequency of obesity was 29.4% (126 subjects) in men and 48.2% (1,286 persons) in women. The frequency of sarcopenic obesity using the ALM was 0.9% (4 subjects) in men and 3.5% (92 persons) in women, and using the ALMI – 3.0% (13 subjects) and 2.0% (53 persons), respectively.

Using other cut-off values of FM (>43% for women, >31% for men at the age of 60-79 years old and >41% for women and >29% for men at the age of 40-59 years old, >39% for women and >26% for men at the age of 20-39 years old [23]) did not significantly affect the change in the frequency of obesity in men (28.2%, 121 subjects), but the frequency of obesity in women became lower by 14.0% (34.2%, 912 subjects). Accordingly, the indices of sarcopenic obesity also have changed. In men, the frequency of using ALM was 0.7% (3 subjects), and ALMI – was 2.6% (11 persons). In women, 2.8% (75 subjects) used ALM and 3.8% (100 persons) used ALMI.

At the next stage of our study, other criteria for assessing muscle mass were selected and the ratio of ALM / BW was used. Two cut-off values depending on age were used – <25.7% for men and <19.4% for women in the population aged over 60 years old [24] and <28.27% for men and <23.47% for women under 60 years old [25].

According to these criteria and FM ≥40% for women and ≥30% for men, the frequency of sarcopenic obesity in men was 6.5% (28 subjects), in women – 10.5% (281 persons), using the cut-off values FM >43% for women and >31% for men at the age 60-79 years old and >41% for women and >29% for men at the age

40-59 years old, the frequency was 6.5% in men (28 subjects), in women – 10.2% (272 persons).

So, using different diagnostic criteria for sarcopenic obesity, it was found that its frequency varies from 0 to 6.5% in men and from 0.1 to 10.5% in women.

Since the indices of fat and lean mass, as criteria of sarcopenic obesity, are calculated indices that differ depending on the population in which these indices have been determined, significant ethnic differences in body structure prompt the determination of specific cut-off values of the content of fat and lean mass for the Ukrainian population with the application of single principles.

At the next stage of the study, the 60th percentile was used as a criterion for sarcopenic obesity to determine the cut-off values for the content of FM. This index for women was 41.4% (95% CI [41.2–41.7]), and for men it was 28.3% (95% CI [27.7–28.9]). Our results indicate that the application of the Zoico method registered a higher percentage of subjects with obesity (40%) in the sample compared to the WHO criteria (20.1% for men and 30.5% for women).

FM in women significantly increased with age and reached maximum values in the age group of 60-69 years old persons (Table 1). The cut-off values obtained for the population, in general, were within the confidence intervals for the age groups of 50-59, 70-79, and 80-89 years old, which proves the possibility of using single points for these age groups. For the persons aged 60-69 years old, the cut-off value was higher by 1.1%, but for the subjects aged 20-29, 30-39, and 40-49 years old, the cut-off values were lower by 8.6, 6.2, and 2.4%, respectively. The expediency of allocation of age-specific cut-off values requires further research, as their use will lead to the absence of age-related differences in the frequency of obesity, which requires additional research.

Changes in the FM in women with age had similar trends to changes in BMI (Fig. 1).

In men, the parameters of FM differed. The lowest indices were among the persons

**Table 1. The content of fat mass (%) in the examined subjects depending on gender**

| Age group | Women | | | Men | | |
|---|---|---|---|---|---|---|
| | n | Me [Q1-Q3] | 60th percentile [95% CI] | n | Me [Q1-Q3] | 60th percentile [95% CI] |
| 20-29 | 79 | 31.49 [26.77-37.52] | 32.83 [31.16-34.5] | 49 | 21.30 [16.40-25.43] | 22.25 [20.09-24.41] |
| 30-39 | 155 | 33.43 [29.01-38.35] | 35.25 [34.2-36.3] | 53 | 25.28 [19.99-30.69] | 28.16 [25.92-30.4] |
| 40-49 | 307 | 36.33 [31.71-41.30] [a b] | 38.57 [37.84-39.3] | 80 | 27.46 [22.65-32.15] [a] | 28.58 [27.09-30.07] |
| 50-59 | 742 | 40.38 [36.58-43.77] [a b c] | 41.58 [41.16-42.0] | 84 | 26.20 [22.25-30.27] [a] | 27.52 [26.17-28.87]. |
| 60-69 | 892 | 41.12 [36.75-44.57] [a b c] | 42.54 [42.15-42.93] | 99 | 27.82 [24.22-30.87] [a] | 29.07 [27.91-30.23]. |
| 70-79 | 417 | 40.49 [35.67-43.74] [a b c] | 42.03 [41.45-42.61] | 49 | 26.81 [23.58-31.55] [a] | 29.31 [27.67-30.95] |
| 80-89 | 72 | 39.46 [33.65-42.92] [a b d] | 40.76 [39.31-42.21] | 15 | 25.56 [21.03-26.97] | 25.63 [22.96-28.3] |

Notes: a – significant differences compared to the age group of 20-29 years old, b – significant differences compared to the age group of 30-39 years old, c – significant differences compared to the age group of 40-49 years old, d – significant differences compared to the age group of 50-59 years old.

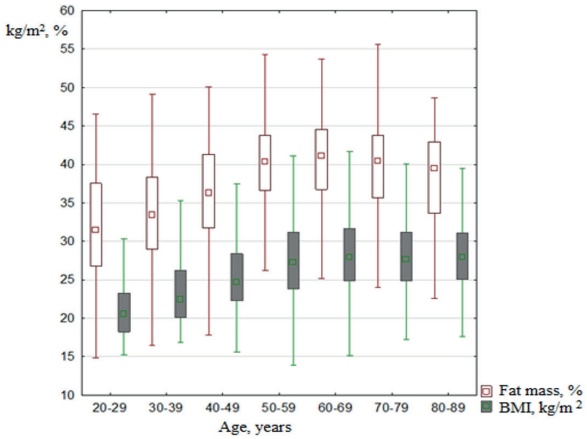


Fig. 1. Changes with age in the fat mass and BMI in women

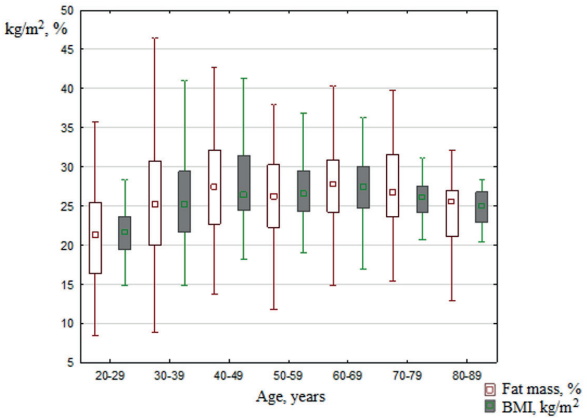


Fig. 2. Changes with age in the fat mass and BMI in men

aged 20-29 years old, in other subgroups they significantly did not differ (Table 1). The cut-off values of all groups, except for men at the age of 20-29 years old, were within the confidence interval for the entire examined cohort. The parameters of FM and BMI had similar trends of age changes (Fig. 2).

So, the cut-off values of the fat mass for the women were 41.4% (95% CI [41.2–41.7]), for the men – 28.3% (95% CI [27.7–28.9]). Our results were similar to the data of other researchers: >38% for the women and >27% for the men [11]; >40.7% for the women and >27.3% for the men [26]; >40.9% for the women and >30.33% for the men [28]; >25% for the men and >32% for the women [2]. For the convenience of the calculations, we have rounded the cut-off values to the whole numbers. For the women, the index was >41%, and for the men >28%.

The indices of ALM, ALMI, and ALM/BW in a sample of young healthy individuals are presented in Table 2.

Our cut-off values of ALM and ALMI obtained in a sample of young healthy persons did not significantly differ from the adopted sarcopenia criteria according to EWGSOP2. The values of ALM <20 kg and ALMI <7.0 kg/

**Table 2. Indices of lean mass in healthy persons aged 20-39 years old (n = 385)**

| Indices | Women | | Men | |
|---|---|---|---|---|
| | Me [25Q–75Q] | M ± SD | Me [25Q–75Q] | M ± SD |
| ALM, kg | 18.38 [17.68 – 19.36] | 18.51 ± 1.66 | 26.38 [24.44 – 28.76] | 26.79 ± 3.29 |
| ALMI, kg/m$^2$ | 6.53 [6.22 – 6.85] | 6.53 ± 0.51 | 8.39 [7.89 –9.00] | 8.44 ± 0.75 |
| ALM/body weight, % | 28.5 [26.0 – 30.8] | 28.5 ± 3.2 | 34.8 [31.9 – 37.5] | 34.8 ± 3.7 |

Notes (here and in Table 3): ALM is appendicular lean mass; ALMI is an appendicular lean mass index.

**Table 3. Cut-off values of lean mass indices in healthy subjects at the age of 20-39 years old (n = 385)**

| Cut-off values | Women | Men |
|---|---|---|
| ALM, kg | 15.2 [14.9 – 15.5] | 20.4 [19.8 – 20.6] |
| ALMI, kg/m$^2$ | 5.5 [5.43 – 5.57] | 6.9 [6.82 – 7.04] |
| ALM/body weight, % | 21.9 [21.6 – 22.5] | 27.5 [26.8 – 27.9] |

Note: Data are presented in the form of cut-off values and their confidence intervals.

$m^2$ for the men and ALM <15 kg and ALMI <5.5 kg/$m^2$ for the women were within the CI of our results, which confirms the expediency of using the EWGSOP2 criteria for the Ukrainian population.

The frequency of sarcopenic obesity in the studied population, using the cut-off values for fat and lean mass that we had selected, was 9.56% in men and 9.79% in women.

In a 14-year prospective study of elderly persons older than 60 years (n = 4652), conducted by the National Health and Nutrition Examination Survey (NHANES) III, the prevalence of sarcopenic obesity was higher – 27.3% and 12.5% as defined by ALM and 19.1% and 33.5% in men and women using the ALM/BMI criterion, respectively. The prevalence of sarcopenic obesity increased with age based on both definitions, but the prevalence rate differed according to the sarcopenia definition criteria for both sexes. The prevalence of sarcopenic obesity as defined by ALM/BMI was lower in women than in men, but if using ALM, the prevalence, on the contrary, was higher in women [29]. In a meta-analysis of 50 studies published in 2021, the prevalence of sarcopenic obesity was about 11%. It was higher in people ≥75 years old (23%), residents of South America (21%), and North America (19%) [30]. The our results of the frequency of sarcopenic obesity are similar to the literature data if used similar diagnostic criteria. Thus, the frequency of sarcopenic obesity using the criterion of obesity: body fat percentage was 10% (8%, 12%). [30]. Also, the prevalence of sarcopenic obesity has significant geographical differences. In particular, for the European population it was 6% (4%, 7%), and for the Asian population – 12% (9%, 15%) [30]. According to the study results conducted by our Polish colleagues, sarcopenia, obesity and sarcopenic obesity were diagnosed in 10% (7.9% of women and 13.1% of men), 32.7% (26.7% of women and 41.7% of men) and 7.1% of participants (7.9% of women and 6% of men), respectively. At the same time, the percentage of sarcopenia and sarcopenic obesity was higher in the older age group (75+) [31]. Italian scientists, Perna et al. a comprehensive geriatric examination of 639 elderly people (196 men, 443 women) with an average age of 80.90 ± 7.77 years was conducted. Among the examined, 15.8% were diagnosed with sarcopenia (55 women (12.42%) and 46 men (23.47%)), and 12.5% had sarcopenic obesity (36 women (8.13%) and 44 men (22.45%)) [32]. A study evaluating the prevalence of sarcopenic obesity among healthy elderly women in Korea found that the prevalence of sarcopenic obesity was 2.3% in women aged 65 years and older. However, in this study, the researchers used ALM adjusted for height and BMI as a criterion for sarcopenic obesity, which may have led to a lower prevalence of sarcopenic obesity compared to other studies [33].

Such fluctuations in prevalence and changing trends depending on the assessment methods again emphasize the need to develop unified criteria for the diagnosis of sarcopenic obesity.

## CONCLUSIONS

The use of different diagnostic criteria for sarcopenic obesity demonstrated its wide variability in men (from 0 to 6.5%) and women (from 0.1 to 10.5%), which justifies the need to determine the Ukrainian population cut-off values.

Cut-off values of fat mass (Zoico method) were >41% for women, and >28% for men; cut-off values of ALM were <22% for women and <28% for men, respectively.

The frequency of sarcopenic obesity in the Ukrainian population at the age of 20-90 years old, using these cut-off values, was 9.8% in women and 9.6% in men.

*The authors of this study confirm that the research and publication of the results were not associated with any conflicts regarding commercial or financial relations, relations with organizations and/or individuals who may have been related to the study, and interrelations of co-authors of the article.*

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## САРКОПЕНІЧНЕ ОЖИРІННЯ: ЕПІДЕМІОЛОГІЯ ТА МЕЖОВІ ЗНАЧЕННЯ У НАСЕЛЕННЯ УКРАЇНИ

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Саркопенічне ожиріння – термін, який усе частіше використовують для опису втрати м'язової тканини (саркопенія) та ожиріння на тлі старіння та хронічних захворювань. Однак досі відсутнє загальноприйняте визначення саркопенічного ожиріння та його діагностичні критерії, що впливає на визначення поширеності, оцінку клінічної значущості та вивчення негативних наслідків для здоров'я. Метою дослідження було визначення межових значень жирової та знежиреної маси тіла для діагностики саркопенічного ожиріння в українській популяції. Для оцінки жирової маси ми використали метод Zoico (60-й перцентиль) у когорті 3095 осіб (2666 жінок і 429 чоловіків) віком від 20 до 90 років. Межові значення щодо показників знежиреної маси були оцінені, як –2 SD, у 770 здорових осіб (385 жінок і 385 чоловіків) віком 20–39 років. Жирову та знежирену масу тіла досліджували за допомогою двоенергетичної рентгенівської абсорбціометрії (Hologic, Discovery). Використання різних критеріїв діагностики саркопенічного ожиріння демонструє широку його варіабельність у чоловіків (0–6,5%) та жінок (0,1–10,5%), що обґрунтовує необхідність визначення українських популяційних межових значень. Межові значення вмісту жирової тканини, визначені методом Zoico, сягали > 41% для жінок та > 28% для чоловіків.. Межові значення відношення апендикулярної знежиреної маси до маси тіла становили менш як 22% для жінок та 28% – для чоловіків. Частота саркопенічного ожиріння в українській популяції віком від 20 до 90 років з використанням виділених нами межових значень сягала 9,8 і 9,6% у жінок та чоловіків відповідно.

Ключові слова: епідеміологія; саркопенічне ожиріння; саркопенія; жирова маса; знежирена маса.

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