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**ANTHROPOMETRIC PROFILE OF PATIENTS LIVING WITH HIV/AIDS IN LVIV REGION**A.Ya. Orfin<sup>1,2</sup>, M.A. Mazepa<sup>1</sup><sup>1</sup>*Lviv State University of Physical Culture named after Ivan Bobersky, Department of physical therapy and occupational therapy, Lviv, Ukraine,**ORCID ID: 0000-0002-5374-1246, e-mail: aorf87@gmail.com,**ORCID ID: 0000-0002-2199-4791, e-mail: mrmazepa@ukr.net;*<sup>2</sup>*"Lviv Regional Infectious Diseases Clinical Hospital", Lviv, Ukraine*

**Abstract.** The body of PLHIV undergoes profound anthropometric changes in adipose tissue distribution, which develop under the influence of pathogenetic mechanisms caused by HIV and due to impaired side effects of ART. ART leads to the development of lipoatrophy / lipohypertrophy syndrome. This phenomenon is described as a syndrome characterized by the loss and/or accumulation of fat and has three types: lipohypertrophy, lipoatrophy, and mixed lipodystrophy. These changes in body shape are very important to determine because they are associated with negative disease dynamics and high mortality. Therefore, it is extremely important to detect this syndrome early to ensure a better quality of life for this population, as the clinical approach is not easy. Potential approaches to treatment, including lifestyle changes, with adequate eating habits, exercise, and some medical interventions, showed little effect in PLHIV. In this case can be effectively reduced through exercise. Despite the existence of established exercise guidelines, the effective dosage of exercise to reduce HRT requires verification.

**The aim.** Study the anthropometric parameters in PLHIV and establish the relationship between the parameters and the degree of viral load (HV) of HIV, the level of CD4 + T-lymphocytes.

**Materials and methods:** 60 patients aged 18 to 60 years were examined. We used standard methods of measuring the following anthropometric indicators: body weight, height, chest circumference, waist and hips. The waist-to-thigh ratio index was also determined. The calculation of the body mass index was performed according to the standard formula by dividing body weight (in kilograms) by the square of height (in square meters). The indicator 18.5-24.9 is considered normal. The level of CD4 + T-lymphocytes was determined by flow cytometry. The viral load of HIV was determined by real-time PCR. Statistical indicators, median, Pearson's coefficient, Student's t-test, were calculated using Microsoft Excel 2016.

**Results.** The average waist circumference was smaller in both the men of the experimental group ( $74.5 \pm 10.3$  cm) and the women of the experimental group ( $61.9 \pm 11.0$  cm) than in the control groups of men ( $90.4 \pm 9.4$  cm) and women ( $67.5 \pm 7.3$  cm ( $p < 0.05$ )). The average ratio of waist circumference to hip circumference in the group of male PLHIV was  $0.94 \pm 0.08$  cm in the control group of men -  $0.97 \pm 0.8$  cm ( $p < 0.05$ ). In the group of female PLHIV, this indicator reached  $0.86 \pm 0.1$  cm, and in the control group -  $0.75 \pm 0.3$  cm ( $p < 0.05$ ). The mean forearm circumference was lower in the two research groups. However, in men with HIV ( $18.5 \pm 3.1$  cm) this figure was lower than in women with HIV ( $19.9 \pm 3.9$  cm ( $p < 0.05$ )). Also, the circumference of the tibia was larger in female PLHIV ( $26.9 \pm 3.9$  cm) than in male PLHIV ( $20.8 \pm 3.8$  cm ( $p < 0.05$ )).

**Conclusions.** PLHIV at the stage of AIDS leads to the recomposition of the body. It is manifested by a decrease in BMI, waist circumference, hip, mid-upper arm, and calf, which indicates lipodystrophy. Increase in the index of the waist circumference to hip circumference ratio indicates a probable redistribution of adipose tissue. BMI cannot be used as an accurate method to determine obesity or lipodystrophy. A positive correlation was found between the value of the anthropometric profile and the level of viral load and CD4 + T-lymphocytes. Early administration of ART and dosed exercise is likely to have a positive effect on the body structure of PLHIV in the AIDS stage, although this requires further research.

**Keywords:** AIDS, HIV, anthropometric profile, CD4+ T-lymphocytes.

**Introduction.** The body of PLHIV undergoes profound anthropometric changes, primarily due to the changes in adipose tissue distribution, which develop under the influence of pathogenetic mechanisms caused by HIV (low-intensity inflammation, oxidative stress, mitochondrial dysfunction, profound metabolic disorders) and due to impaired side effects of ART [1, 2]. ART leads to the development of lipoatrophy / lipohypertrophy syndrome and associated risks of the pathology of the cardiovascular system [3]. This phenomenon is described as a syndrome characterized by the loss and/or accumulation of

fat and has three types: lipohypertrophy (accumulation of fat in the anterior abdominal wall), lipoatrophy (reduction of fat on the periphery of the body mainly in the face and lower extremities), and mixed lipodystrophy (association of lipoatrophy with lipohypertrophy) [2]. These changes in body shape are very important to determine because they are associated with negative disease dynamics and high mortality [4]. In addition, the subjective feeling of the change in the body image in PLHIV deepens the negative self-esteem and leads to a decrease in quality of life [5]. Therefore, it is extremely important to detect this

syndrome early to ensure a better quality of life for this population, as the clinical approach is not easy. Several trials attempted to find a way to treat these body changes, but so far, no single solution was found. Potential approaches to treatment, including lifestyle changes, with adequate eating habits, exercise, and some medical interventions, showed little effect in PLHIV [7,8].

It is also known from the literature that visceral adipose tissue (VAT) is harmful fat deposits in the human body that can be effectively reduced through exercise [9]. Despite the existence of established exercise guidelines, the effective dosage of exercise to reduce HRT requires verification.

**Justification of the research.** Among the non-drug interventions that could affect the improvement of anthropometric changes in the body of PLHIV, in addition to a balanced diet and individually selected diet, the positive effect of therapeutic exercises is expected [10]. The analysis of randomized controlled trials (RCTs) found in 9 databases showed that only high-intensity interval training and aerobic exercise of moderate intensity were useful for reducing body fat accumulation [11].

Anthropometric indicators can be used as markers of the effectiveness of therapeutic exercises, so before developing an individual rehabilitation program, it is advisable to conduct a detailed study of the main indicators of the structure of the body of PLHIV. Thus, the problem of changes in the anthropometric profile and its correction in PLHIV remains relevant.

**The aim:** to study anthropometric parameters in patients with PLHIV at the stage of HIV/AIDS and to establish a relationship with the degree of viral load (HV) of HIV, the level of CD4 + T-lymphocytes.

**Materials and methods.** Achieve the objective, we examined 60 patients treated at the Lviv Regional Infectious Diseases Clinical Hospital. Criteria for inclusion in the study were the written voluntary informed consent, the absence of severe comorbidities, mental and cognitive disorders, age from 18 to 60 years. The exclusion criteria were: children and adolescents, pregnancy, nursing mothers with HIV-positive status, and refusal to participate in the research.

The research was performed in compliance with the basic provisions of the Ethical Principles and Guidelines for Research Involving Human Subjects approved by

the Declaration of Helsinki (1964-2013), ICH GCP (1996), EEC Directive № 609 (from 24.11.1986), orders of the Ministry of Health of Ukraine № 690 dated 23.09.2009, № 944 dated 14.12.2009, № 616 dated 03.08.2012.

Socio-demographic data was obtained by analyzing the records in medical cards.

We used standard methods of measuring the following anthropometric indicators: body weight, height, waist and hip circumference, legs, forearms. The index of the ratio of waist circumference to hip circumference was also determined. The calculation of body mass index was performed with the standard formula: body weight (in kilograms) divided by the square of height (in square meters). The indicator 18.5-24.9 is considered normal. Cardiovascular risk and abdominal obesity were determined by calculating the ratio of waist/hip circumference to waist circumference.

The level of CD4 + T-lymphocytes was determined by flow cytometry. The viral load of HIV was determined by real-time PCR.

Statistical indicators, median, Pearson's coefficient, and Student's t-test were calculated using Microsoft Excel 2016.

**Results.** Patients were divided into two research groups based on gender: group I included 20 women, group II - 40 men. Descriptive data for both groups is displayed in Table 1. The mean age of patients in group I was  $39 \pm 7.5$  years, group II -  $39 \pm 7.7$  years. At the time of selection for the research, the majority of patients from group I and group II were married: 30 (75%) and 14 (70%), respectively. In group I, 25 (63%) patients lived in urban areas, and in group II - 12 (60%) patients. The vast majority of HIV patients had higher education.

During the collection of data on patients, it was found that in the male group, the number of employed participants was lower (16 (40%)) than the unemployed (24 (60%)). Among female PLHIV, 4 (20%) were unemployed and 16 (80%) were employed. Among PLHIV, 10% were involved in heavy manual labor such as construction or mine work. The control group included 50 relatively healthy residents of the Lviv region. Their age range was 19 - 50 years, with the average age of women  $34 \pm 4.7$  years and men -  $41 \pm 4.2$  years.

Table 1

Socio-demographic characteristics of patients

Characteristic		Group I, n = 40 (men)	Control group n = 30 (men)	Group II n = 20 (women)	Control group n = 30 (women)
Age		$39 \pm 7,5$	$41 \pm 4,2$	$39 \pm 7,7$	$34 \pm 3,5$
Education	Secondary	12 (30%)	10	8 (40%)	7
	Higher	28 (70%)	20	12 (60%)	23
Marital status	Married	30 (75%)	16	14 (70%)	18
	Unmarried	8 (20%)	14	3 (15%)	12
	Widow / widower	2 (5%)	0	3 (15%)	0
Employment	Employed	16 (40%)	25	16 (80%)	26
	Unemployed	24 (60%)	5	4 (20%)	4
Place of residence	Urban	25 (63%)	22	12 (60%)	17
	Rural	15 (37%)	8	8 (40%)	13

Clinical and laboratory characteristics of HIV/AIDS are presented in Table 2. The main route of HIV transmission was sexual (heterosexual and unprotected promiscuous sexual behavior) in 74% of patients enrolled in the research. The average level of CD4 + T-lymphocytes in both experimental groups was below 200 cells / ml: in group I the number of CD4 + T-lymphocytes was  $138.2 \pm 101.6$  cells / ml, and in group II -  $141.5 \pm 136.7$  cells / ml ( $p \leq 0.05$ ). Thus, according to the HIV

classification, 100% of PLHIV had an irreversible condition known as AIDS.

Among male PLHIV, 43% received ART, and the mean duration of ART was  $2.6 \pm 0.8$  years. In the female PLHIV group, more participants received ART - 70%, and the duration of specific therapy was  $2.9 \pm 0.3$  years.

The viral load was high in both groups: women -  $443693.2 \pm 446814$  copies / ml, men -  $311209.7 \pm 241191.7$  copies / ml.

Table 2

Clinical and laboratory characteristics of the patients

Sign		Group I, n = 40 (men)	Group II, n = 20 (women)
ART	Received	17 (43%)	14 (70%)
	did not received	23 (57%)	6 (30%)
The average duration of ART		$2.6 \pm 0.8$ years	$2.9 \pm 0.3$ years
Stage of the disease	AIDS	40 (100%)	20 (100%)
Live with HIV		$9.4 \pm 1.7$ years	$8.9 \pm 0.7$ years
The average level of CD4 + T-lymphocytes		$138.2 \pm 101.6$ cells/ml	$141.5 \pm 136.7$ cells/ml
HIV viral load		$311209.7 \pm 241191.7$ copies/ml	$443693.2 \pm 446814$ copies/ml

Table 3 shows the results of anthropometric measurements performed in the experimental and control groups. It should be noted that non-genetically determined indicators, namely BMI and contours of the waist, hips, forearms, legs were lower in the research groups than in controls. The average height of PLHIV (genetically determined) in the first experimental group was  $180.0 \pm 0.04$  cm, in the second experimental group  $164 \pm 0.05$  cm, and in the first and second control groups -  $182 \pm 0.9$  cm and  $165 \pm 0.09$  respectively ( $p \leq 0.05$ ). The mean body weight of HIV-infected men was higher ( $64.7 \pm 10.1$  kg) than that of HIV-infected women ( $50.7 \pm 7.03$  kg), ( $p \leq 0.05$ ).

However, the mean body weight in both experimental groups was lower than in both control groups, namely in healthy men  $79.4 \pm 8.3$  kg and in healthy women  $65.3 \pm 2.6$  kg ( $p \leq 0.05$ ).

The average BMI in the first experimental group was  $20.02 \pm 3.1$  kg / m<sup>2</sup>, which was lower than in the control group -  $23.6 \pm 1.7$  kg / m<sup>2</sup>. In the female PLHIV group, the mean BMI was significantly lower than in the control group -  $19.01 \pm 2.6$  kg / m<sup>2</sup> and  $23.1 \pm 1.9$  kg / m<sup>2</sup>, respectively. No statistically significant differences were found between the comparison groups ( $p \leq 0.05$ ).

Table 3

Anthropometric indicators of the studied patients

	Men n = 40		Control (men) n=30		p	Women n=20		Control (women) n=30		p
	Mean $\pm$ SD	Range	Mean $\pm$ SD	Range		Mean $\pm$ SD	Range	Mean $\pm$ SD	Range	
Height (cm)	$180.0 \pm 0.04$	172 - 191	$182 \pm 0.9$	72 - 191	p 0,02	$164 \pm 0,05$	154 - 172	$165 \pm 0,09$	156 - 177	p 0,03
Weight (kg)	$64.7 \pm 10,1$	41 - 94	$79.4 \pm 8,3$	65,1 - 98,4	p 0,04	$50,7 \pm 7,03$	38 - 72	$65,3 \pm 2,6$	59 - 72	p 0,05
BMI (kg/m <sup>2</sup> )	$20,02 \pm 3,1$	13,5 - 28,5	$23,6 \pm 1,7$	20,1 - 24,7	p 0,03	$19,01 \pm 2,6$	14,5 - 25,5	$23,1 \pm 1,9$	19,8 - 24,4	p 0,02
Waist circumference (cm)	$74,5 \pm 10,3$	52,3 - 100,5	$90,4 \pm 9,4$	84,5 - 101,2	p 0,05	$61,9 \pm 11,0$	40,1 - 79,2	$67,5 \pm 7,3$	58,2 - 76,1	p 0,03
Hip circumference (cm)	$79,3 \pm 7,6$	65,3 - 98,6	$92,4 \pm 8,7$	89,2 - 110,3	p 0,03	$71,7 \pm 10,3$	47,7 - 85,4	$93,8 \pm 4,2$	77,8 - 99,7	p 0,04
Waist-hip ratio (cm)	$0,94 \pm 0,08$	0,78 - 1,12	$0,97 \pm 0,8$	0,8 - 1,0	p 0,05	$0,86 \pm 0,1$	0,66 - 1,05	$0,75 \pm 0,3$	0,7 - 0,9	p 0,05
Mid-upper arm circumference measure (cm)	$18,5 \pm 3,1$	14,0 - 24,5	$28,7 \pm 2,4$	25,2 - 29,7	p 0,01	$19,9 \pm 3,9$	13,5 - 27,3	$26,4 \pm 3,1$	23,7 - 28,5	p 0,02
Calf circumference (cm)	$20,8 \pm 3,8$	6,3 - 30,1	$31,2 \pm 2,9$	24,5 - 33,8	p 0,02	$26,9 \pm 3,9$	20,5 - 34,1	$33,5 \pm 2,7$	28,9 - 35,3	p 0,04

The average waist circumference was smaller in both men in the experimental group ( $74.5 \pm 10.3$  cm) and women in the experimental group ( $61.9 \pm 11.0$  cm) than in the control groups of men ( $90.4 \pm 9.4$  cm) and women ( $67,$

$5 \pm 7.3$  cm ( $p \leq 0.05$ )). The average ratio of waist circumference to hip circumference in the male PLHIV group was  $0.94 \pm 0.08$  cm compared to the male control group with  $0.97 \pm 0.8$  cm. In the female PLHIV group, the ratio

reached  $0.86 \pm 0.1$  cm, and in the control group –  $0.75 \pm 0.3$  cm ( $p \leq 0.05$ ). The mean mid-upper arm circumference measure was smaller in the two research groups. However, in men with HIV ( $18.5 \pm 3.1$  cm) this figure was lower than in women with HIV ( $19.9 \pm 3.9$  cm ( $p \leq 0.05$ )). Also, the calf circumference was larger in female PLHIV  $26.9 \pm 3.9$  cm than in male PLHIV  $20.8 \pm 3.8$  cm. However, these figures were lower than in the control groups. No statistical difference was found between the groups ( $p \leq 0.05$ ).

The correlation between the indicators studied in the male PLHIV group is shown in Table 4. There was a positive direct correlation between CD4 + T lymphocytes and body weight, BMI, waist circumference, waist / hip circumference index (ITI), mid-upper arm circumference measure, and negative direct correlation with hip circumference.

The viral load had a direct negative correlation with body weight, BMI, waist, hip, mid-upper arm circumference measure, and calf circumference.

Table 4

**The correlation between CD4 + T-lymphocyte levels, viral load (VL), height, body weight, BMI, waist circumference (WC), hip (HC), mid-upper arm (MUAC), calf (CC), and WHR in male PLHIV**

Characteristic	Height	Body weight	BMI	WC	HC	WHR	MUAC	CC
T-lymphocyte levels	$r = 0,004$ $p = 0,0001$	$r = 0,16$ $p = 0,002$	$r = 0,19$ $p = 0,02$	$r = 0,04$ $p = 0,002$	$r = -0,1$ $p = 0,002$	$r = 0,17$ $p = 0,0008$	$r = 0,11$ $p = 0,0002$	$r = 0,11$ $p = 0,0001$
VL	$r = 0,16$ $p = 0,03$	$r = -0,01$ $p = 0,001$	$r = -0,02$ $p = 0,0001$	$r = -0,12$ $p = 0,03$	$r = -0,1$ $p = 0,02$	$r = 0,13$ $p = 0,0001$	$r = -0,13$ $p = 0,06$	$r = 0,01$ $p = 0,002$

Among the women with HIV-positive status, all the indicators, except for the index of the waist to hip circumference ratio, had a direct positive correlation with the level of CD4 + T-lymphocytes. However, the level of viral

load was negatively related to the body weight, BMI, waist, hip, mid-upper arm, and calf circumference but had a positive correlation with the waist to thigh ratio. The summary data is shown in Table 5.

Table 5

**The correlation between CD4 + T-lymphocyte levels, viral load (VL), height, body weight, BMI, waist circumference (WC), hip (HC), mid-upper arm (MUAC), calf (CC), and WHR in female PLHIV**

Characteristics	Height	Body weight	BMI	WC	HC	WHR	MUAC	CC
CD4 + T-lymphocyte levels	$r = -0,18$ $p = 0,001$	$r = 0,4$ $p = 0,0003$	$r = 0,52$ $p = 0,02$	$r = 0,54$ $p = 0,0001$	$r = 0,5$ $p = 0,0002$	$r = 0,2$ $p = 0,03$	$r = 0,38$ $p = 0,002$	$r = 0,35$ $p = 0,001$
VL	$r = 0,08$ $p = 0,002$	$r = -0,25$ $p = 0,001$	$r = -0,3$ $p = 0,02$	$r = -0,44$ $p = 0,004$	$r = -0,55$ $p = 0,003$	$r = 0,1$ $p = 0,0001$	$r = -0,4$ $p = 0,002$	$r = -0,41$ $p = 0,003$

**Discussion.** This research is dedicated to determining the anthropometric profiles of PLHIV at the stage of AIDS. The evidence that waist circumference, waist-to-height ratio, and waist to hip ratio are independent predictors of cardiac risk and metabolic syndrome and are, therefore, important for HIV / AIDS patients receiving antiretroviral therapy, dictated the choice of anthropometric parameters. [12].

The average age of the patients included in the research was  $39 \pm 7$  years, according to the report of the Public Health Center of Ukraine. 78.7% of HIV-infected people in Ukraine are between 29 and 49 years old [13]. Our research showed that the main route of infection was sexual transmission. These results are consistent with the data from the Central Committee of Ukraine (71% heterosexual and 3% homosexual) and data from researchers in Canada and India (87.4% heterosexual and 1.3% homosexual) [1,13,14]. In our research, we determined the anthropometric profile and its relationship with the levels of viral load and CD4 + T-lymphocytes in the HIV-infected patients at the AIDS stage. We found that all the anthropometric measurements are positively and significantly correlated with the amount of CD4 ( $P < 0.05$ ), which coincides with the results of other researchers [1,15].

In most researches, participants were HIV-positive, however, in stable remission and with CD4 + T cell levels of 400 cells/ml and above [11,14,15]. Our research focused on PLHIV at the stage of AIDS with low levels of CD4 + T-lymphocytes ( $138.2 \pm 101.6$  cells/ml in men and  $141.5 \pm 136.7$  cells/ml in women).

The mean BMI in our research was  $20.02 \pm 3.1$  in men and  $19.01 \pm 2.6$  in women. Similar results were demonstrated by the researchers from France -  $22.1$  [16]. However, a significantly higher BMI ( $40.2$ ) was demonstrated in a study conducted in Australia [17]. The researched patients at the stage of AIDS had smaller waist circumferences (men  $74.5 \pm 10.3$ , women  $61.9 \pm 11.0$ ), hip (men  $79.3 \pm 7.6$ , women  $71.7 \pm 10.3$ ), mid-upper arm (men  $18.5 \pm 3.1$ , women  $19.9 \pm 3.9$ ) calf (men  $20.8 \pm 3.8$ , women  $26.9 \pm 3.9$ ) compared to the group of people with HIV negative status [18, 19]. Such changes can be explained by abnormal redistribution of adipose tissue: accumulation of fat in the anterior abdominal wall, [18, 20, 21] increase in dorsocervical fat masses [9,22], loss of fat on arms and legs, face and buttocks [23,24]. Because belly fat is a long-term side effect of ART, we expected to get higher waist circumference values. Our results can be explained by the fact that some PLHIV did not receive ART, or the duration of admission was 6 months or less. The researchers

studying adipose tissue distribution obtained the following results: the prevalence of lipoatrophy / lipohypertrophy syndrome was 33% among women and 59% among men. [3]. In contrast, low contour rates in our research may indicate a probable protein-energy deficiency among PLHIV, which may be associated with low levels of work capacity and high unemployment among the researched patients. We found that the index of the waist circumference to hip circumference ratio in the HIV-positive men was  $0.94 \pm 0.08$ , which does not differ from the control group. In female PLHIV, this figure was higher ( $0.86 \pm 0.1$ ) than in the control group, which coincides with data from other researches [25, 26]. The researchers explain this phenomenon by the redistribution of fat caused by the long-term use of ART, namely the increase in adipose tissue in the abdomen and thighs [27,28].

**Conclusions.** Based on the findings, we can conclude that PLHIV at the stage of AIDS leads to the recomposition of the body. It is manifested by a decrease in BMI, waist circumference, hip, mid-upper arm, and calf, which indicates lipodystrophy. However, an increase in the index of the waist circumference to hip circumference ratio indicates a probable redistribution of adipose tissue, with a predominant accumulation in the abdomen and hips. Thus, despite the decrease in BMI, we see an increase in the index of the waist circumference to hip circumference ratio. Therefore, BMI cannot be used as an accurate method to determine obesity or lipodystrophy in PLHIV at the AIDS stage. A positive correlation was found between the value of the anthropometric profile and the level of viral load and CD4 + T-lymphocytes. Therefore, early administration of ART and dosed exercise is likely to have a positive effect on the body structure of PLHIV in the AIDS stage, although this requires further research.

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### АНТРОПОМЕТРИЧНИЙ ПРОФІЛЬ ПАЦІЄНТІВ, ЩО ЖИВУТЬ З ВІЛ, НА СТАДІЇ СНІДУ У ЛЬВІВСЬКІЙ ОБЛАСТІ

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**Резюме. Цілі:** вивчити антропометричні показники у пацієнтів з ЛЖВ на стадії ВІЛ/СНІДу і встановити зв'язок зі ступенем вірусного навантаження (ВН) ВІЛ, рівнем CD4+ Т-лімфоцитів.

**Матеріали і методи:** обстежено 60 пацієнтів. Виміряно антропометричні показники, рівень CD4+ Т-лімфоцитів і вірусне навантаження.

**Результати.** Середній обвід талії був меншим як у чоловіків дослідної групи  $74,5 \pm 10,3$  см, так і у жінок дослідної групи  $61,9 \pm 11,0$  см, ніж у контрольних групах чоловіків  $90,4 \pm 9,4$  см та жінок  $67,5 \pm 7,3$  см ( $p < 0,05$ ). Середній показник співвідношення обводу талії до обводу стегон у ЛЖВ чоловічої статі  $0,94 \pm 0,08$  см, а у контрольній групі чоловіків –  $0,97 \pm 0,8$  см ( $p < 0,05$ ). У ЛЖВ жіночої статі цей показник сягав  $0,86 \pm 0,1$  см, а у контрольній групі –  $0,75 \pm 0,3$  см ( $p < 0,05$ ). Середній обвід передпліччя був нижчим у двох дослідних групах. Але у чоловіків з ВІЛ  $18,5 \pm 3,1$  см він був меншим, ніж у жінок з ВІЛ  $19,9 \pm 3,9$  см ( $p < 0,05$ ). Обвід гомілки був більшим у жінок з ВІЛ  $26,9 \pm 3,9$  см, а у чоловіків з ВІЛ –  $20,8 \pm 3,8$  см ( $p < 0,05$ ).

**Висновки.** У ЛЖВ на стадії СНІДу відбувається рекомпозиція тіла. Це проявляється зменшенням ІМТ, обводів талії, стегон, передпліччя та гомілок. Збільшення індексу співвідношення обводу талії до обводу стегон вказує на ймовірний перерозподіл жиру, з переважним накопиченням на животі і стегнах. Також спостерігається збільшення індексу співвідношення обводу талії до обводу стегон. Тому ІМТ не може використовуватися для точного визначення ожиріння чи ліподистрофії. Виявлено позитивну кореляцію між

величиною антропометричного профілю та рівнем вірусного навантаження і CD4+ Т-лімфоцитів. Тому раннє призначення АРТ та дозованого фізичного навантаження можуть позитивно впливати на будову тіла ЛЖВ на стадії СНІДу.

**Ключові слова:** ВІЛ/СНІД, антропометричний профіль, CD4+ Т-лімфоцити.

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### АНТРОПОМЕТРИЧЕСКИЙ ПРОФИЛЬ ПАЦИЕНТОВ, ЖИВУЩИХ С ВИЧ, НА СТАДИИ СПИДа ВО ЛЬВОВСКОЙ ОБЛАСТИ

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**Резюме. Цели:** изучить антропометрические показатели у пациентов с ЛЖВ на стадии ВИЧ/СПИДа и установить связь со степенью вирусной нагрузки (ВН) ВИЧ, уровнем CD4+ Т-лимфоцитов.

**Материалы и методы:** обследовано 60 пациентов. Измерено антропометрические показатели,

уровня CD4+ Т-лимфоцитов и вирусную нагрузку ВИЧ.

**Результаты.** Средний обвод талии был меньше как у мужчин опытной группы  $74,5 \pm 10,3$  см, так и у женщин опытной группы  $61,9 \pm 11,0$  см, чем в контрольных группах мужчин  $90,4 \pm 9,4$  см и женщин  $67,5 \pm 7,3$  см ( $p < 0.05$ ). Средний показатель соотношения обводов талии к обводу бедер у ЛЖВ мужского пола  $0,94 \pm 0,08$  см, в контрольной группе мужчин –  $0,97 \pm 0,8$  см ( $p < 0.05$ ). У ЛЖВ женского пола этот показатель был  $0,86 \pm 0,1$  см, а в контрольной группе –  $0,75 \pm 0,3$  см ( $p < 0.05$ ). Средний обвод предплечья был ниже в двух опытных группах. Однако у мужчин с ВИЧ  $18,5 \pm 3,1$  см он был меньше, чем у женщин с ВИЧ  $19,9 \pm 3,9$  см ( $p < 0.05$ ). Также обвод голени был больше у ЛЖВ женского пола  $26,9 \pm 3,9$  см, чем у ЛЖВ мужского пола  $20,8 \pm 3,8$  см ( $p < 0.05$ ).

**Выводы.** У ЛЖВ со СПИДом происходит композиция тела. Она проявляется уменьшением ИМТ, обводов талии, бедер, предплечья и голени. Увеличение индекса соотношения обводов талии к бедрам указывает на вероятное перераспределение жировой ткани с преимущественным накоплением на животе и бедрах. Несмотря на уменьшение ИМТ, наблюдается увеличение индекса соотношения обвода талии к обводу бедер. Поэтому ИМТ не может использоваться для точного определения ожирения или липодистрофии в ЛЖВ со СПИДом. Выявлена положительная корреляция между величиной антропометрического профиля и уровнем вирусной нагрузки и CD4+ Т-лимфоцитов. Поэтому раннее назначение АРТ и дозированной физической нагрузки могут положительно влиять на телосложение ЛЖВ со СПИДом.

**Ключевые слова:** ВИЧ/СПИД, антропометрический профиль, CD4+ Т-лимфоциты.

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