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SKINFOLD THICKNESS IN UKRAINIAN MEN AND WOMEN WITH MULTIPLE SCLEROSIS

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Annotation. *Abnormalities in adipose tissue metabolism often accompany the progression of neurodegenerative disorders. Anthropometric body measurements may serve as additional markers of disease severity and disease course. Studying these measurements may provide a deeper understanding of the systemic changes that occur in the setting of demyelination. The aim of the study is to determine the characteristics and sex differences of skinfold thickness in young Ukrainian men and women with multiple sclerosis with varying degrees of disability. Skinfold thickness was determined in 35 Ukrainian men and 59 women with multiple sclerosis with mild, moderate and moderately severe impairments. The initial skinfold thickness measurements of 82 practically healthy Ukrainian men and 101 women of similar age were taken from the data bank of the National Pirogov Memorial Medical University, Vinnytsya Research Center. Statistical analysis was performed in the licensed package «Statistica 6.0» using nonparametric evaluation methods. When comparing skinfold thickness between practically healthy and multiple sclerosis men or women, numerous significant or trends of differences were established: in all groups of sick men and women – lower skinfold thickness values on the shin and at the lower angle of the scapula and higher skinfold thickness values on the chest; in most groups of male patients – higher values of skinfold thickness on the thigh and on the side and lower values of skinfold thickness on the back of the shoulder; in most groups of patients and women control group – higher values of skinfold thickness on the forearm and on the thigh and lower values of skinfold thickness on the abdomen. There are practically no reliable or trends in skinfold thickness differences between groups of patients with multiple sclerosis, men or women. Manifestations of sexual dimorphism between patients with multiple sclerosis are established mainly for skinfold thickness on the extremities (higher values in women). The multidirectional discrepancies in skinfold thickness on the thigh and lower leg and at the lower angle of the scapula and on the chest established between practically healthy and patients with multiple sclerosis are manifestations of a subpathological constitutional type in this disease.*

Keywords: *nervous diseases, multiple sclerosis, skinfold thickness, practically healthy and sick men and women, sexual differences.*

Introduction

Multiple sclerosis (MS) is a chronic autoimmune disease of the central nervous system, characterized by demyelination, neuroinflammation, and progressive degeneration of nerve fibers. The pathogenesis of MS is complex and multifactorial: genetic predisposition, environmental influences, immune dysregulation, infectious triggers, and alterations in the microbiome play key roles [15]. The main risk factors for the development of the disease include female gender, heredity, vitamin D deficiency, smoking, obesity in adolescence, and viral infections, including Epstein-Barr virus [2, 15]. MS manifests itself with a wide range of neurological symptoms, including motor disorders, sensory disorders, cognitive dysfunction, depression, fatigue, and pelvic organ dysfunction [2, 18]. Complications of MS include disability, loss of work capacity, reduced quality of life, and the development of comorbid psychiatric and somatic conditions [17, 18]. Treatment of the disease includes immunosuppressive, immunomodulatory, and symptomatic therapy, but complete recovery is not yet possible [2, 15].

Over the past decades, there has been a steady increase in the prevalence and incidence of MS in many countries around the world. According to a global analysis presented in the Atlas of MS, the number of patients worldwide has exceeded 2.8 million people, which is a significant increase compared to previous estimates. The average global prevalence of MS is about 35.9 per 100,000 population, but these figures vary significantly depending on geographical region, ethnicity, and the level of diagnostic capabilities [27]. In Canada, which has one of the highest rates, the incidence of MS reaches 266 per 100,000 population, and the incidence for the period 1991-2010 was 10.2 per 100,000 per year [14]. Similar trends are observed in European countries. For example, in Norway, over 80 years of observation, a clear increase in both incidence and prevalence of MS was noted – from 20 to over 200 cases per 100,000 population [10].

In Poland, which is geographically and ethnoculturally close to Ukraine, the increase in incidence is also a stable trend: in 2015, the prevalence was 133 per 100,000 population, which indicates the need for constant epidemiological monitoring [3]. In the Middle East, an increase in indicators has also been recorded. For example, in Tehran, Iran, the prevalence reached 101.4 per 100,000 and the annual incidence was 6.02 per 100,000 population [6]. Data from a large-scale national study in Iran indicate an overall incidence of 5.87 per 100,000 population over the past decade, demonstrating a general upward trend not only in countries with traditionally high rates of diagnosis but also in regions with moderate prevalence [13].

It is important to note that the increase in MS prevalence is partly due to improved diagnostics, improved criteria for early detection of the disease, and increased life expectancy due to modern therapeutic approaches [24]. In addition, the

aging population is contributing to a change in the demographic structure of patients, with more patients reaching old age, which adds new challenges to the management of the disease and assessment of its course [22].

The significant impact of MS on the mental health of patients has been reflected in numerous epidemiological studies. A systematic review by Marrie R. A. et al. [18] showed that the frequency of depression among patients with MS reaches 25-50 %, anxiety disorders – 20-40 %, and cognitive dysfunction is detected in 40-70 % of cases. The presence of comorbid conditions significantly complicates the course of the disease, reduces the effectiveness of treatment and worsens the prognosis [17].

It is important to emphasize that the study of anthropometric indicators in patients with MS is relevant given the features of systemic metabolic changes that accompany chronic inflammation, impaired physical activity and treatment with glucocorticoids or other immunosuppressive drugs [2]. The study of indicators such as skin-fat fold thickness allows for a deeper assessment of the metabolic aspects of the course of MS, their gender characteristics and possible prognostic markers of disease severity. This is especially relevant for the Ukrainian population, where systematized data on the somatotypological characteristics of patients with MS are currently insufficient.

Thus, the study of morphological indicators of body composition in patients with MS is of particular importance in the context of modern epidemiological trends and the need to personalize the management of this complex multifactorial pathology.

The aim of the study is to establish the characteristics and sex differences in skinfold thickness in young Ukrainian men and women with multiple sclerosis with varying degrees of disability.

Materials and methods

At the Department of Nervous Diseases of the National Pirogov Memorial Medical University, Vinnytsya and the **«**Salyutem**»** Medical Center (Vinnytsya), for 35 Ukrainian men and 59 women of young age (25-44 years according to the WHO age periodization, 2015) with multiple sclerosis were determined skinfold thickness [23]: on the posterior surface of the shoulder (GZPL), on the anterior surface of the shoulder (GPPL), on the forearm (GPR), on the thigh (GBD), on the lower leg (GGL), under the lower angle of the scapula (GL), on the chest (GGR), on the abdomen (GG) and on the side (GB).

The study was conducted at the National Pirogov Memorial Medical University, Vinnytsya «Constitutional features of body structure in people with multiple sclerosis and it's impact on the course of the disease», state registration No. 0121U114309.

Committee on Bioethics of National Pirogov Memorial Medical University, Vinnytsya (protocol № **10** from 10.12.2021) found that the studies do not contradict the basic bioethical standards of the Declaration of Helsinki, the Council of Europe Convention on Human Rights and Biomedicine (1977), the relevant WHO regulations and laws of Ukraine.

The diagnosis of multiple sclerosis was established according to the McDonald criteria [25]. The degree of disability was assessed using the Expanded Disability Status Scale. The following distribution of patients was established: with mild impairments (EDSS 2.0-3.0) – 24 men and 26 women; with moderate impairments (EDSS 3.5-4.5) – 7 men and 24 women; with moderately severe impairments (EDSS 5.0-6.5) – 4 men and 9 women.

As a control, used primary indicators of skinfold thickness of 82 practically healthy Ukrainian men and 101 Ukrainian women of similar age were used, taken from the data bank of the National Pirogov Memorial Medical University, Vinnytsya Research Center.

The obtained results were processed in the licensed package "Statistica 6.0" using non-parametric evaluation methods. The averages for each feature and the standard square deviation were determined. The significance of the difference in values was determined using the Mann-Whitney U-test.

The study was conducted at the National Pirogov Memorial Medical University, Vinnytsya "Constitutional features of body structure in people with multiple sclerosis and it's impact on the course of the disease", state registration No. 0121U114309.

Results. Discussion

The results of determining and discrepant skinfold thickness indices on the upper and lower extremities and trunk in men and women with multiple sclerosis with mild, moderate, and moderately severe disorders are presented in Tables 1 and 2.

When analyzing the differences *in skinfold thickness on the limbs between practically healthy men or women and those with multiple sclerosis*, it was found (see Table 1): *in patients with multiple sclerosis, men or women in general, in patients with mild, moderate and moderately severe disorders*, there were significantly ($p<0.01$-0.001) lower values of skinfold thickness on the lower leg (respectively, in male patients by 34.47 % – 32.73 % – 36.38 % – 41.55 %, in female patients by 47.78 % – 46.13 % – 48.25 % – 51.24 %); *in male patients with multiple sclerosis* – in the general group of patients and in patients with moderate disorders, significantly lower skinfold thickness values were found ($p<0.05$ in both cases) on the posterior surface of the shoulder (by 19.18 % and 34.47 %, respectively), and in the general group of patients and in patients with mild and moderately severe disorders, significantly higher skinfold thickness values were found ($p<0.05$-0.001) on the thigh (by 25.10 % – 24.53 % – 30.81 %, respectively); *in female patients with multiple sclerosis* – in the general group of patients, in patients with mild and moderate disorders, significantly ($p<0.05$-0.001) higher values of skinfold thickness were established on the forearm (by 22.63 % – 27.70 % – 18.87 %, respectively) and on the thigh (by 29.70 % – 28.84 % – 34.21 %, respectively).

Table 1. Differences in skinfold thickness on the extremities in practically healthy and multiple sclerosis patients of Ukrainian men and women (M±σ).

Parameters and groups	Men				
	GZPL (mm)	GPPL (mm)	GPR (mm)	GBD (mm)	GGL (mm)
1. Practically healthy	7.848± 2.914	5.592± 2.132	4.173± 1.621	12.80± 3.85	8.982± 2.691
2. Patients in general	6.343± 2.531	4.886± 1.711	4.514± 1.755	17.09± 6.55	5.886± 1.641
3. Patients with EDSS 2.0-3.0	6.792± 2.702	4.792± 1.668	4.542± 1.503	16.96± 6.51	6.042± 1.681
4. Patients with EDSS 3.5-4.5	5.143± 1.574	4.571± 1.618	3.714± 1.496	16.71± 8.24	5.714± 1.799
5. Patients with EDSS 5.0-6.5	5.750± 2.500	6.000± 2.160	5.750± 3.096	18.50± 4.80	5.250± 1.258
p1-2	**<0.05**	>0.05	>0.05	**<0.001**	**<0.001**
p1-3	>0.05	>0.05	>0.05	**<0.01**	**<0.001**
p1-4	**<0.05**	>0.05	>0.05	>0.05	**<0.01**
p1-5	>0.05	>0.05	>0.05	**<0.05**	**<0.01**
p3-4	>0.05	>0.05	>0.05	>0.05	>0.05
p3-5	>0.05	>0.05	>0.05	>0.05	>0.05
p4-5	>0.05	>0.05	>0.05	>0.05	>0.05
Parameters and groups	Women				
	GZPL (mm)	GPPL (mm)	GPR (mm)	GBD (mm)	GGL (mm)
1. Practically healthy	7.870± 2.718	5.736± 1.991	3.921± 1.891	14.56± 3.98**	10.71± 2.79***
2. Patients in general	8.271± 3.778**	6.119± 2.679*	5.068± 2.016	20.71± 5.36**	5.593± 1.849
3. Patients with EDSS 2.0-3.0	9.000± 4.118*	6.385± 2.246**	5.423± 2.139	20.46± 4.99*	5.769± 2.197
4. Patients with EDSS 3.5-4.5	7.875± 3.710*	5.958± 3.127	4.833± 1.880	22.13± 4.78*	5.542± 1.587
5. Patients with EDSS 5.0-6.5	7.222± 2.728	5.778± 2.774	4.667± 2.062	17.67± 6.93	5.222± 1.481
p1-2	>0.05	>0.05	**<0.001**	**<0.001**	**<0.001**
p1-3	>0.05	>0.05	**<0.001**	**<0.001**	**<0.001**
p1-4	>0.05	>0.05	**<0.05**	**<0.001**	**<0.001**
p1-5	>0.05	>0.05	>0.05	>0.05	**<0.001**
p3-4	>0.05	>0.05	>0.05	>0.05	>0.05
p3-5	>0.05	>0.05	>0.05	>0.05	>0.05
p4-5	>0.05	>0.05	>0.05	***=0.066***	>0.05

Notes: in this and the following tables, p – significance of differences in indicators between the corresponding groups of men or women; *, **, *** – significant differences (respectively <0.05, <0.01 or <0.001) of indicators between the corresponding groups of men and women (higher values are indicated).

Table 2. Differences in skinfold thickness on the trunk in practically healthy and multiple sclerosis patients of Ukrainian men and women (M±σ).

Parameters and groups	Men			
	GL (mm)	GGR (mm)	GG (mm)	GB (mm)
1. Practically healthy	13.53± 3.92	4.924± 1.729	12.33± 4.79	10.75± 4.41
2. Patients in general	8.829± 3.111	7.743± 2.627*	13.43± 6.39	14.03± 6.92
3. Patients with EDSS 2.0-3.0	9.167± 2.761	7.417± 2.083	13.42± 6.23	13.67± 7.14
4. Patients with EDSS 3.5-4.5	7.714± 4.030	7.429± 3.690	11.14± 5.87	13.00± 6.68
5. Patients with EDSS 5.0-6.5	8.750± 3.862	10.25± 2.87t	17.50± 7.85	18.00± 6.22
p1-2	**<0.001**	**<0.001**	>0.05	**<0.05**
p1-3	**<0.001**	**<0.001**	>0.05	***=0.091***
p1-4	**<0.01**	**<0.05**	>0.05	>0.05
p1-5	**<0.05**	**<0.01**	>0.05	**<0.05**
p3-4	>0.05	>0.05	>0.05	>0.05
p3-5	>0.05	***=0.053***	>0.05	>0.05
p4-5	>0.05	***=0.089***	>0.05	>0.05
Parameters and groups	Women			
	GL (mm)	GGR (mm)	GG (mm)	GB (mm)
1. Practically healthy	12.59± 3.56	4.603± 1.341	13.88± 5.01*	12.06± 4.57*
2. Patients in general	9.254± 4.229	6.881± 2.492	12.08± 5.40	12.93± 5.87
3. Patients with EDSS 2.0-3.0	9.308± 4.343	6.846± 2.493	11.31± 5.66	12.50± 6.45
4. Patients with EDSS 3.5-4.5	9.542± 4.324	6.708± 1.922	12.88± 5.16	13.29± 5.50
5. Patients with EDSS 5.0-6.5	8.333± 3.969	7.444± 3.812	12.22± 5.54	13.22± 5.65
p1-2	**<0.001**	**<0.001**	**<0.05**	>0.05
p1-3	**<0.001**	**<0.001**	**<0.05**	>0.05
p1-4	**<0.001**	**<0.001**	>0.05	>0.05
p1-5	**<0.01**	**<0.01**	>0.05	>0.05
p3-4	>0.05	>0.05	>0.05	>0.05
p3-5	>0.05	>0.05	>0.05	>0.05
p4-5	>0.05	>0.05	>0.05	>0.05

Notes: t – trends of differences (respectively from 0.051 to 0.070) of indicators between the corresponding groups of men and women (higher values are indicated).

When analyzing *the differences in skinfold thickness on the extremities between male or female patients with multiple sclerosis with different degrees of disability*, only in female patients with moderate disorders was a tendency (p=0.066) to higher values (by 20.15 %) of skinfold thickness on the thigh compared to female patients with moderate-severe disorders (see Table 1).

When analyzing the *sex differences in skinfold thickness on the extremities between patients with multiple sclerosis*, it was found (see Table 1): in female patients of the general group, with mild and moderate disorders, compared with the corresponding groups of male patients, significantly (p<0.05-0.01) higher values of skinfold thickness on the posterior surface of the shoulder (by 23.31 % – 24.53 % – 34.69 %, respectively) and on the thigh (by 17.48 % – 17.11 % – 24.49 %, respectively), as well as in female patients of the general group and with mild disorders, compared with the corresponding groups of male patients, significantly (p<0.05-0.01) higher values of skinfold thickness on the anterior surface of the shoulder (by 20.15 % and 24.95 %, respectively).

When analyzing the differences *in skinfold thickness on the trunk between practically healthy and multiple sclerosis patients*, it was established (see Table 2): *in multiple sclerosis patients, men or women in general, in patients with*

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mild, moderate and moderately severe disorders, there were significantly (p<0.05–0.001) lower values of skinfold thickness at the lower angle of the scapula (respectively in male patients by 34.75 % – 32.25 % – 42.99 % – 35.33 %, in female patients by 26.50% – 26.07 % – 24.21 % – 33.81 %) and significantly (p<0.05-0.001) higher values of skinfold thickness on the chest (respectively in male patients by 36.41 % – 33.61 % – 33.72 % – 51.96 %, in female patients by 33.11 % – 32.76 % – 31.38 % – 38.16 %); *in male patients with multiple sclerosis* – in the general group of patients, in patients with mild and moderately severe disorders, significantly (p<0.05) higher values of skinfold thickness on the side were established (respectively by 23.38 % – 21.36 % – 40.28%); *in female patients with multiple sclerosis* – in the general group of patients and in patients with mild disorders, significantly (p<0.05 in both cases) lower values of skinfold thickness on the abdomen (respectively by 12.97 % and 18.52 %).

When analyzing the differences in *skinfold thickness on the trunk between men or women with multiple sclerosis with different degrees of disability*, only in male patients with moderate-severe impairments were there trends (p=0.053 and p=0.089) to higher values (by 27.64 % and 27.52 %, respectively) of skinfold thickness on the chest compared to male patients with mild and moderate impairments (see Table 2).

When analyzing the *sex differences in skinfold thickness on the trunk between multiple sclerosis patients*, it was found (see Table 2): in male patients of the general group and with moderate-severe impairments, compared to the corresponding groups of female patients, significantly (p<0.05) higher or a trend (p=0.064) to higher values of skinfold thickness on the chest (by 11.13 % and 27.38 %, respectively).

The results of the study demonstrate a relationship between the skinfold thickness in men and women with MS and the characteristics of the course of the disease. The differences in the distribution of adipose tissue may reflect the complex pathogenetic relationships between metabolism, immune regulation and the functioning of the central nervous system in patients with MS. Numerous previous studies have shown that obesity and excessive visceral adipose tissue may act as independent risk factors for the development of neurodegenerative diseases, including MS [1, 4, 7, 19].

One of the key mechanisms of the influence of excessive adipose tissue on the risk of MS is the disruption of the secretion of adipokines – biologically active compounds produced by adipose tissue. Thus, an increase in leptin levels is associated with pro-inflammatory activation of the immune system, in particular, stimulation of Th1 and Th17 cells, which play an important role in the pathogenesis of MS [4, 5]. At the same time, reduced levels of adiponectin, which has anti-inflammatory properties, are also associated with a more severe course of MS [4, 5]. The study by J. Correale and M. Marrodan [4] emphasizes that changes in the balance of adipokines may be one of the central mechanisms of the relationship between obesity and the progression of MS.

The association between excess body weight in childhood and the risk of developing MS in the future has been confirmed by the results of several genetic and epidemiological studies. In particular, a causal relationship has been shown between childhood obesity and the risk of developing MS, where each standard deviation of body mass index (BMI) in childhood increased the risk of MS by 41 % (OR=1.41; 95 % CI: 1.20-1.66) [11]. Similar conclusions were made in another study, which found that overweight in adolescence (BMI≥27 kg/m² at age 20) is associated with a more than twofold increase in the risk of developing MS (OR=2.16; 95 % CI: 1.18-3.94) [12].

In addition, data from a large genetic study confirm the presence of a causal relationship between genetically determined increased BMI and the likelihood of developing MS (OR=1.41; 95 % CI: 1.20-1.66) [8]. Therefore, even before the appearance of the first clinical symptoms, changes in body weight can be an important predictor of the risk of developing the disease.

It should also be taken into account that fat deposits can affect not only the immune system, but also directly the functional state of the brain. An increase in BMI is associated with structural changes in the brain – a decrease in the volume of gray matter, hippocampus and frontal cortex [9]. Such structural changes may enhance the neurodegenerative processes underlying MS. Similar mechanisms are discussed by Al- H. M. Kuraishy et al. (2023), demonstrating that visceral obesity may indirectly contribute to cognitive impairment and accelerate neurodegeneration through chronic inflammation and oxidative stress [1].

The results of our study are consistent with the literature, which shows that obesity is not only a risk factor for MS, but can also affect the activity and severity of the disease. It has been established that patients with increased BMI have higher disease activity in terms of the number of relapses and a higher rate of disability progression (HR=1.45; 95 % CI: 1.11-1.91) [16]. This emphasizes the need to monitor anthropometric parameters of patients with MS at all stages of treatment.

A significant addition is also the work demonstrating the imperfection of traditional BMI in patients with MS. Thus, according to L. A. Pilutti and R. W. Motl (2016), BMI may underestimate the actual level of obesity in such patients, since it does not take into account changes in body composition due to a decrease in muscle mass and an increase in visceral adipose tissue [21]. That is why the study of the thickness of the skin-fat folds is of particular importance, since it is a more accurate indicator of the distribution of adipose tissue, which is especially relevant in patients with MS, where, against the background of hypodynamia, a redistribution of body weight occurs.

The results of studies on the interaction of obesity and dietary factors in patients with demyelinating diseases deserve special attention. In the work of É. S. Paz et al. (2021), which studied patients with neuromyelitis, it was shown that central obesity in combination with a pro-inflammatory diet

significantly increases systemic inflammation and may be associated with a more severe course of the disease ($p<0.01$) [20]. Similar findings can be extrapolated to the MS population, as chronic neuroinflammation plays a leading role in both conditions.

Understanding the relationship between adipose tissue metabolism and nervous system function is also actively discussed in the context of other neurodegenerative conditions. In particular, J. N. Mazon et al. (2017) and Uranga R. M., Keller J. N. (2019) have shown that chronic adipokines activation and metabolic imbalance in obesity contribute to the development of oxidative stress, microglial activation, and impaired neuronal plasticity, which can accelerate degenerative processes in the central nervous system [19, 26].

Overall, the results of the literature review suggest that skinfold thickness assessment is not only a valuable marker of body composition changes in MS patients, but also a potential prognostic criterion for disease activity and progression. Our data complement the existing evidence base and emphasize the importance of comprehensive assessment of the metabolic profile of MS patients for personalizing therapeutic strategies.

Conclusion and prospects for further developments

1. Numerous significant differences in skinfold thickness on the limbs and trunk between practically healthy and multiple sclerosis patients were established. Multidirectional differences in skinfold thickness on the thigh and lower leg, as well as at the lower angle of the scapula and on the chest between practically healthy and multiple sclerosis patients were manifestations of a subpathological constitutional type in this disease.

2. There were practically no significant differences or trends in skinfold thickness between multiple sclerosis patients with mild, moderate and moderately severe disorders, male or female.

3. Among multiple sclerosis patients, pronounced manifestations of sexual dimorphism were established mainly for skinfold thickness on the limbs (larger values in female patients in the general groups, with mild and moderate disorders).

Further study of the features and gender differences of other anthropo-somatotypological indicators in patients with multiple sclerosis with varying degrees of disability of Ukrainian men and women is planned.

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ОСОБЛИВОСТІ ТОВЩИНИ ШКІРНО-ЖИРОВИХ СКЛАДОК В УКРАЇНСЬКИХ ЧОЛОВІКІВ І ЖІНОК, ХВОРИХ НА МНОЖИННИЙ СКЛЕРОЗ

Гунас М. М.

Анотація. *Порушення метаболізму жирової тканини часто супроводжують прогресування нейродегенеративних розладів. Антропометричні показники тіла можуть слугувати додатковим маркером тяжкості захворювання та особливостей його перебігу. Дослідження цих показників дозволяє поглибити розуміння системних змін, що виникають на тлі демієлінізації. Мета дослідження – встановлення особливостей і статевих розбіжностей товщини шкірно-жирових складок в українських чоловіків і жінок молодого віку, хворих на множинний склероз із різним ступенем інвалідизації. Проведено визначення товщини шкірно-жирових складок у 35 українських чоловіків і 59 жінок молодого віку, хворих на множинний склероз із легкими, помірними та помірно-тяжкими порушеннями. Первинні розміри товщини шкірно-жирових складок 82 практично здорових українських чоловіків і 101 жінки аналогічного віку взяті з банку даних науково-дослідного центру Вінницького національного медичного університету ім. М. І. Пирогова. Статистичний аналіз проведений у ліцензійному пакеті «Statistica 6.0» з використанням непараметричних методів оцінки. При порівнянні товщини шкірно-жирових складок між практично здоровими та хворими на множинний склероз чоловіками або жінками встановлені багаточисельні достовірні або тенденції відмінностей: в усіх групах хворих чоловіків і жінок – менші значення товщини шкірно-жирової складки на гомілці й під нижнім кутом лопатки та більші значення товщини шкірно-жирової складки на грудній клітці; в більшості груп хворих чоловіків – більші значення товщини шкірно-жирових складок на стегні й на боці та менші значення товщини шкірно-жирової складки на задній поверхні плеча; в більшості груп хворих і жінок контрольної групи – більші значення товщини шкірно-жирових складок на передпліччі й на стегні та менші значення товщини шкірно-жирової складки на животі. Між групами хворих на множинний склероз чоловіків або жінок практично не встановлено достовірних або тенденцій відмінностей товщини шкірно-жирових складок. Прояви статевого диморфізму між хворими на множинний склероз встановлені переважно для товщини шкірно-жирових складок на кінцівках (більші значення у жінок). Встановлені між практично здоровими та хворими на множинний склероз чоловіками або жінками різнонаправлені розбіжності товщини шкірно-жирових складок на стегні й гомілці та під нижнім кутом лопатки й на грудній клітці є проявами субпатологічного конституціонального типу при даному захворюванні.*

Ключові слова: *нервові захворювання, множинний склероз, товщина шкірно-жирових складок, практично здорови та хворі чоловіки й жінки, статеві розбіжності.*