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FEATURES OF THE ORIGIN OF FATTY LIVER DYSTROPHY IN ADOLESCENTS

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Annotation. *In this article, the influence of clinical-metabolic risk factors on the development of fatty hepatosis and the role of this disease in the deepening of obesity in the conditions of simple (exogenous-constitutional) obesity in 93 adolescents aged 17-30 years were determined. According to the results of the study, it was determined that abdominal obesity, insulin resistance, and stress are the most sensitive risk factors for the development of fatty hepatosis in adolescents. However, high specific risk factors include atherogenic dyslipidemia, hypertriglyceridemia, insulin resistance, inflammatory and prothrombotic conditions, and microalbuminuria. The frequency of fatty hepatosis among teenagers was 22%. We found out that the causes of fatty hepatosis in this age group are lack of energy, poor nutrition, and high consumption of energy products. Thus, taking into account the individual risk factors of adolescents in the early stages of fatty hepatosis, it is recommended to include drugs with hypolipidemic and hepatoprotective properties in the complex therapy for the prevention of fatty hepatosis.*

Keywords: *fatty hepatosis, body mass index, obesity, adolescents, clinical and metabolic risk factors.*

Nonalcoholic fatty liver disease **(**NAJBP)– is a disease characterized by the accumulation of triglycerides in liver cells, which progresses through three stages: fatty hepatosis, steatohepatitis, and cirrhosis. Fatty hepatosis (fatty liver) is a common disease worldwide, affecting approximately one-quarter of the general population. It is caused by poor diet, physical inactivity, diabetes, hormonal imbalances, and genetic factors. This condition can lead to liver inflammation and dysfunction [2,6].

There are no accurate statistics on the incidence of fatty liver disease among young people. However, in connection with the increase in obesity among children and adolescents, the incidence of fatty liver disease is also increasing in this age group. Factors such as obesity, poor diet, and lack of physical activity contribute to the development of fatty liver disease among young people. The prevalence of this disease has increased dramatically in recent decades. Worldwide obesity epidemic This is causing the disease to spread widely not only in adults but also in adolescents. Today, the NAJBP is based on various clinical recommendations part of metabolic syndrome is being considered as [1,8].

NAJBP has several codes (K74.6, K76.0, K73.9, K73.0) according to the International Classification of Diseases (ICD-10), which makes it difficult to account for this disease. There is no single standard for the treatment of this disease in the practice of adolescent medicine. This is mainly due to the lack of scientific studies assessing the effectiveness of drugs in the treatment of NAJBP in children and adolescents [4,10]. The use of modern ultrasound technologies is recommended for the detection of the early stages of NAJBP in adolescents [11,12], and the use of metabolic therapy in treatment is advisable [9,13].

Research objective:

The aim of this study is to determine the frequency of fatty hepatosis in young people, assess the role and influence of the main clinical-metabolic risk factors on its development, and determine its role in the development of obesity.

Research methodology and materials:

The study included 93 adolescents (18–30 years old). The study was conducted in 2024–2025 in an inpatient setting at the Central Polyclinic of the Student Campus, Tashkent city. The average age of the participants was 22 years old. The study was conducted in accordance with the principles of the Declaration of Helsinki.

The study participants were evaluated based on the following criteria:

Age 17–30 years old

Obesity grade 1–2 (Body Mass Index (BMI): +2.0 SDS – +3.0 SDS)

Fatty liver levels

Absence of acute or congenital diseases

Not taking medication in the past month

The diagnosis of steatohepatosis was made based on the following criteria:

During an ultrasound examinationsigns of fatty liver Exogenous-constitutional obesity of I–II degree No signs of liver cell damage

Exclusion of other liver diseases

TMI (kg/m²) and waist circumference (OT, cm) measured, ultrasound examination.

Statistical analysis and discussion of results.

Statistical analysis of the results was performed using Statistica 6.0 (StatSoft, USA) and Microsoft Excel 2007 (USA). Proportion rates between groups were compared using Fisher's exact test and χ^2 (chi-square) test. Correlation was assessed using Pearson's coefficient. Relative risks, their sensitivity and specificity, and reliability ratios (LR+) were also calculated. Results were considered statistically significant at $p<0.05$.

Results and discussion.

Of the 93 young people studied, 22%, or 21, were diagnosed with fatty liver disease. Of the 22 patients with fatty liver disease, 12 had grade 1 fatty liver disease, and 9 had grade 2 fatty liver disease. In the analysis of young people by gender, 46 were men and 47 were women. Of the 46 men, 11 had fatty liver disease, or 5 had grade 1 fatty liver disease, and 6 had grade 2 fatty liver disease. Of the 47 women, 10 had fatty liver disease, or 7 had grade 1 fatty liver disease, and 3 had grade 2 fatty liver disease.

Table 1

Analysis of adolescents by gender

Gender ratio	Sex ratio of adolescents studied	Gender ratio of patients with fatty hepatosis	
		1-degree	Level 2
Male	46	5	6
Woman	47	7	3
Total	93	12	9

Of the 93 adolescents studied, 10 had grade 1 obesity and 8 had grade 2 obesity when their body mass index was measured. Of the adolescents with grade 1 obesity, 9 had grade 1 fatty liver and 1 had grade 2 fatty liver. Of the adolescents with grade 2 obesity, 8 had grade 2 fatty liver.

Table 2

Body mass index	Number	Number of people diagnosed with fatty liver disease	
		Level 1	Level 2
Underweight	13	1	0
Normal body weight	49	0	0
Excess body weight	13	2	0
Obesity level 1	10	9	1
Grade 2 obesity	8	0	8

Note: *1. The risk of developing fatty heptoses is hypertriglyceridemia, low LDL cholesterol, oxidative stress. It is associated with early risk factors such as obesity and late risk factors such as abdominal obesity, insulin resistance, and inflammatory processes.*

2. The risk of insulin resistance is 3.48 times higher, the risk of hypertriglyceridemia is 8.36 times higher, and the risk of inflammation is 3.62 times higher It turned out.

3. Ultrasound and metabolic marker evaluation are important for early detection of NAJBP.

4. Risk factors for the development of obesity-related fatty hepatosis in young children were assessed as follows: factors with high sensitivity (≥0.6), abdominal obesity, insulin resistance, stress, factors with high specificity (≥0.8). Atherogenic dyslipidemia Hypertriglyceridemia Insulin resistance Proinflammatory state Prothrombotic state Microalbuminuria

Research analysis.

The results of the analysis show that: there is a direct relationship between metabolic syndrome markers and liver density. The high relative risks of developing fatty liver disease confirm that these factors lead to liver damage. Insulin resistance, stress and proinflammatory processes are the main pathological mechanisms in fatty liver disease. The liver is a central organ of metabolic diseases and is closely related to these pathological processes. The results confirm the "interrelationship between fatty liver disease and metabolic syndrome."

Treatment and prevention measures.

To prevent fatty hepatosis, it is recommended to take the following measures:

1. Eat a healthy diet: Choose foods that are low in fat, high in unsaturated fats, and high in fiber. Limit sugar and carbohydrates. Eat fruits, vegetables, whole grains, and lean proteins.

2. Physical activity: Get at least 150 minutes of moderate or 75 minutes of vigorous physical activity per week.

3. Avoiding excess weight: Exercise regularly and eat healthily to keep your weight under control or lose excess weight.

4. Avoid alcohol: It is recommended to limit or not drink alcohol at all, as it puts an additional burden on the liver.

5. Take medications with caution: Some medications can have negative effects on the liver, so do not take medications without your doctor's advice.

6. Medical checkups: Get regular medical checkups and monitor your blood fat levels, diabetes, or symptoms of metabolic syndrome.

7. Stress Management: Use relaxation techniques to reduce stress, as excessive stress can increase fat accumulation in the body.

Conclusion:

1. Early risk factors for the development of fatty hepatosis in young people: hypertriglyceridemia, malnutrition, lack of physical activity, atherogenic dyslipidemia (decreased levels of LDL cholesterol, stress

2. Later-stage risk factors: abdominal obesity, insulin resistance, proinflammatory state.

3. In young children, markers of metabolic syndrome (hypertriglyceridemia, insulin resistance, proinflammatory process) are associated with fatty hepatosis, and it is necessary to prescribe hypolipidemic and hepatoprotective drugs in the early stages.

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