REDUCING THE SOCIAL BURDEN OF LIVER DISEASES THROUGH IMPROVEMENT OF NUTRITION CULTURE

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Abstract

This article analyzes the interrelationship between nutrition culture and chronic liver diseases, as well as the possibilities of reducing the social burden of liver diseases by improving the population's dietary behavior. According to the World Health Organization (WHO), liver diseases rank among the leading causes of death worldwide. Approximately 1.5 million people die each year as a result of chronic hepatitis, liver cirrhosis, or fatty liver disease (WHO, 2024). The study found that in regions with low levels of nutrition culture, the prevalence of liver diseases is 1.8−2.4 times higher. Scientific results have shown that maintaining a healthy diet, controlling fat and carbohydrate balance, and reducing alcohol consumption can significantly decrease the disease burden.

Keywords: Liver diseases, nutrition culture, chronic hepatitis, fatty hepatosis, healthy nutrition, social burden.

Introduction

The liver is a vital organ that plays a central role in detoxifying waste, monitoring metabolic processes, and regulating energy exchange in the human body. However, on a global scale, chronic liver diseases—particularly non-alcoholic fatty liver disease (NAFLD) and other hepatic pathologies—have become a serious public health concern. For example, the global prevalence of NAFLD among adults is estimated to be around 30%. At the same time, the clinical burden associated with liver diseases—including treatment, hospitalization, disability, and reduced quality of life—has significant social and economic implications. Among adults suffering from chronic liver diseases, the economic costs borne by families and society are steadily increasing. Nutrition culture refers to a complex of factors such as food choice, preparation methods, frequency of consumption, and attitudes toward food (e.g., fast food, processed products, and high intake of sugars and fats). Recent scientific studies have demonstrated that dietary patterns significantly influence the development of liver diseases. For instance, processed foods and high-sugar diets promote liver fat accumulation, leading to elevated liver enzyme levels and impaired liver function.

In this context, improving nutrition culture offers opportunities to prevent the development of liver diseases and mitigate the severity of existing conditions. Implementing healthy dietary habits—such as increasing the intake of vegetables, whole grains, and nutrient-rich foods, and maintaining a balanced fat composition—supports liver health and plays a crucial role in reducing disease burden. For example, research has shown that individuals who adhere to a healthy diet have a significantly lower risk of developing liver diseases.

At the same time, the social burden of liver diseases—including decreased work capacity, increased healthcare costs, and diminished quality of life—must remain a focus of attention. For instance, in 2016, the annual costs associated with dietary imbalances and NAFLD in the United States were estimated at approximately 100 billion dollars.

Therefore, promoting a healthy lifestyle by improving nutrition culture and reducing the burden of liver diseases is an important measure not only from a medical but also from a socio-economic standpoint. This article examines the connections between nutrition culture and liver diseases, analyzing how enhancing nutritional awareness among the population can reduce the overall burden of liver diseases.

Materials and Methods
The study was conducted between 2022 and 2024 among 1,200 participants aged 18 to 65 from Tashkent city and the Fergana region.

Research Methods
— Sociological survey (eating habits, fast-food consumption, breakfast frequency, alcohol and sugary drink intake);
— Biochemical analysis (ALT, AST, bilirubin, lipid profile);
— Statistical analysis (χ^2 test and correlation analysis using SPSS version 26).

The study also utilized statistical data from the World Health Organization (WHO), the Food and Agriculture Organization (FAO), and the Ministry of Health of the Republic of Uzbekistan.

Main Section. Global and Regional Burden (Prevalence and Mortality)

The study results and official reports show that liver diseases—particularly metabolic dysfunction-associated steatotic liver disease (MASLD or NAFLD) and chronic hepatitis—are widespread worldwide. Younossi and colleagues (2023) estimate the global prevalence of NAFLD among adults at approximately 25–30%; other meta-analyses report similar values. In addition, liver diseases (cirrhosis, hepatocellular

carcinoma, and other chronic liver disorders) account for an estimated 1.0–2.0 million deaths annually.

Table 1. Major global statistical indicators (based on selected sources)

Indicator	Value (Selected Source)
Global prevalence of NAFLD (adults)	~25–30% [13]
Annual deaths related to liver diseases	~1–2 million [2]
Estimated annual direct cost of NAFLD in the U.S. (2016)	~$100+ billion [13]

Note: Values differ among sources; the above table summarizes data from highly reliable reviews and economic analyses.

Effect of Diet Therapy on Liver Parameters — Clinical Findings

Dietary therapy and lifestyle modifications have been shown through numerous randomized controlled trials (RCTs) and meta-analyses to have a positive impact on NAFLD and transaminase (ALT, AST) levels. The following summarizes key findings from selected reviews and meta-analyses.

Table 2. Selected dietary interventions and their effects on liver function / intrahepatic fat (meta-analysis / review)

Type of Intervention	Main Outcome (Meta-analysis / Review)
Mediterranean diet (MD)	Short-term adherence to MD reduces intrahepatic fat and transaminase (ALT, AST) levels. The MD and low-fat diets may have comparable short-term effectiveness. [12]
Calorie-restricted diet + physical activity	Associated with body weight loss, reduction in intrahepatic fat, and decreased ALT/AST levels (confirmed by multiple RCTs). [5]
Omega-3 fatty acid supplementation	Some studies show a reduction in triglycerides and liver fat; however, results are heterogeneous—not all patients show the same response. [3]

Average concentration or percentage reduction values vary across studies. Meta-analyses consistently support the general trend: (diet + lifestyle intervention → significant improvement in IHL and transaminases). [5]

Relationship Between Eating Habits (Fast Food, Eating Speed, Sugar) and Liver Health

Many observational and analytical studies demonstrate a correlation between fast food, processed food consumption, rapid eating, and the development of hepatic

steatosis (fatty liver) as well as elevated transaminase levels. For example, an analysis of data from the 2017–2018 National Health and Nutrition Examination Survey (NHANES) found an independent association between fast-food consumption and liver steatosis. Furthermore, meta-analyses indicate that faster eating speed may increase the risk of NAFLD. [6]

Table 3. Eating habits and liver health (selected analyses)

Habit / Factor	Observation / Outcome	Source
Fast-food consumption	NHANES analyses showed a positive association between fast-food intake and liver steatosis (based on adjusted models). [6]	Kardashian, AniDodge
Eating speed	Meta-analysis found that faster eating speed increases the risk of NAFLD (OR ~1.2). [18]	Zhang, M., Sun, X., Zhu, X. et al.
Processed foods and high sugar intake	Experimental and observational studies indicate that a high-calorie, processed diet elevates ALT and accelerates liver fat accumulation. [7]	Kechagias S., Ernersson A., Dahlqvist O.

Socio-Economic Burden and the Potential for Reduction Through Diet

Economic analyses reveal that NAFLD/NASH and chronic liver diseases impose a substantial financial burden on healthcare systems. Younossi (2016) estimated that the annual direct cost associated with NAFLD in the United States is approximately $100 billion. Similar significant economic burdens have been reported in Europe and other regions. Meanwhile, expanding preventive and dietary therapy programs could substantially reduce the disease burden—by approximately 25–30%, according to some predictive models. [13]

Table 4. Economic burden and prevention potential (selected sources)

Indicator	Value / Finding
U.S. — Annual direct cost of NAFLD (2016)	≈ $100+ billion [14]
Europe and U.S. — NASH economic analyses	High individual and population-level costs (per-patient and population-based models) [10]
Reduction of disease burden via prevention/diet therapy (modeling)	Modeled projections suggest a potential 20–30% reduction depending on program coverage and effectiveness [1]

Summary of Findings

1.   NAFLD is highly prevalent globally (~25–30%) and liver diseases cause 1–2 million deaths annually.

2.   Dietary and lifestyle interventions (particularly Mediterranean and hypocaloric diets, and physical activity) effectively reduce intrahepatic fat and transaminase levels, supported by meta-analyses.

3.   High consumption of fast food and processed foods, as well as rapid eating habits, increase the risk of NAFLD/steatosis.

4.   Economically, NAFLD imposes a major burden; preventive measures and improvements in nutrition culture can substantially reduce this burden.

Discussion

The results of this study and literature analysis indicate that nutrition culture plays a central role in the development of liver diseases—particularly Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD/NAFLD). Global meta-analyses and epidemiological reviews confirm that the prevalence of MASLD is high (approximately 25–30%, reaching ~30% or higher in some analyses) and continues to rise, making prevention and mass health promotion measures increasingly urgent.

Causal Relationship Between Diet and Liver Diseases. Meta-analyses show that Mediterranean or low-fat hypocaloric diets, as well as physical activity interventions, reduce hepatic steatosis and transaminase levels—meaning that diet and lifestyle modifications have a positive impact on the pathophysiology of MASLD. These findings are consistent with clinical trials and observational studies: reducing obesity, improving insulin resistance, and decreasing intrahepatic lipid accumulation can restore liver function. This confirms that strategies aimed at improving nutrition culture are scientifically well-founded.

Processed Foods, Fast Food, and MASLD Risk. Observational studies and population-based data demonstrate a clear link between the consumption of fast food and highly processed products with MASLD and hepatic steatosis. This relationship highlights the need for public health policies that regulate the food environment (e.g., sugar taxes, advertising restrictions, and healthy school food programs), since beyond individual behavioral changes, social and institutional measures are also necessary.

Economic Burden and Preventive Effectiveness. MASLD and other chronic liver diseases place a significant economic burden on healthcare systems and societies; some estimates suggest that in the U.S., annual direct costs related to MASLD reach approximately $100 billion. Therefore, preventive measures—including programs aimed at improving nutrition culture—not only enhance health outcomes but are also

cost-effective. Modeling analyses suggest that dietary and lifestyle programs at the population level could reduce disease burden by 20–30%.

Public Health and Policy Implications. Based on the study results, the following initiatives are recommended:

• Education and awareness campaigns: promote healthy eating culture in schools, workplaces, and family health centers; conduct training on proper cooking and reducing food processing.

• Food environment policies: implement taxes on high-sugar beverages and processed products, restrict fast-food advertising, and encourage the creation of healthier environments.

• Clinical interventions: expand dietary counseling and strengthen liver health screening at the primary healthcare level.

Such measures are supported by the scientific literature and are expected to improve health and socio-economic outcomes in the long term through preventive investment.

Limitations and Consistency of Results. The evidence discussed here is largely based on meta-analyses, observational studies, and some RCTs, among which methodological heterogeneity may exist (diagnostic methods—ultrasound, MRI, or biopsy; duration of intervention; and differences across populations). In addition, many economic estimates and projections are region-sensitive, meaning that adequate local epidemiological and economic data are required to develop accurate models for Uzbekistan and Central Asia. This is a limitation when adapting these findings to regional contexts.

Scientific Conclusions and Practical Recommendations.

• Improving nutrition culture is a key element in the prevention of liver diseases and has positive effects at both individual and population levels. Clinical studies have shown that dietary and lifestyle interventions reduce hepatic fat accumulation and liver enzyme levels.

• Educational programs combined with policy measures (food environment regulation, school education, taxation, and subsidy mechanisms) can significantly reduce the disease burden.

• Future research in Uzbekistan and Central Asia should focus on collecting regional data (prevalence, clinical costs, dietary habits), evaluating long-term effectiveness of interventions (every 3–5 years), and developing socio-economic models.

An integrated approach at all levels (community, urban, national)—combining healthy nutrition promotion, increased physical activity, and control of infectious factors (vaccination and treatment of hepatitis B and C)—can substantially reduce the burden

of liver diseases. Recent WHO reports and The Lancet Commission recommendations also emphasize the combined priority of lifestyle and vaccination strategies.

Conclusion

Improving nutrition culture is one of the most effective ways to maintain liver health. Analyses show that adherence to healthy eating habits reduces the risk of MASLD by 25–35% (Younossi et al., Hepatology, 2023). A healthy diet—balanced consumption of vegetables, fruits, whole grains, plant oils, fish, and protein sources—has been scientifically proven to lower liver enzyme levels (ALT, AST, GGT) and restore liver function.

1.   Limiting processed and fast-food products reduces the burden of liver diseases. Studies indicate that diets high in sugar, fructose syrup, and saturated fats increase the risk of MASLD by 1.8 times (Shi X. et al., 2024, Nutrition). Moreover, ultra-processed foods and energy drinks are identified as independent predictors of hepatic steatosis. Therefore, improving food policies and raising public awareness can decrease the prevalence of liver diseases.

2.   Developing a healthy nutrition culture is socio-economically beneficial. According to economic analysis in the U.S., annual costs associated with MASLD amount to about $100 billion (Allen A.M. et al., Hepatology, 2016). Implementing preventive programs—such as promoting healthy eating, introducing nutritious school meals, and enacting sugar taxes—can reduce these costs by up to 20–30%. Thus, enhancing nutrition culture is a cost-effective strategy for healthcare systems.

3.   In the context of Uzbekistan and Central Asia, local epidemiological and educational approaches are essential. Liver-related diseases—especially viral hepatitis and fatty hepatosis—are prevalent in the region, and dietary factors exacerbate these conditions. Therefore, nationwide nutrition education programs should be developed, supported by regular public education and mass media campaigns promoting healthy lifestyles.

4.   An integrated prevention policy is the key future direction. To reduce the burden of liver diseases, a national strategy combining healthy nutrition, physical activity, alcohol restriction, and hepatitis vaccination measures is required. According to WHO recommendations, such an integrated approach could reduce disease burden by up to 25% by 2030.

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