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THE IMPORTANCE OF PHYSICAL ACTIVITY IN THE PREVENTION OF FATTY HEPATOSIS AND CHRONIC LIVER DISEASES

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ABSTRACT

This article provides a systematic overview of the role of physical activity or exercise therapy in the prevention of fatty hepatosis and chronic liver diseases. Various clinical studies, epidemiological observations and trials are analyzed to evaluate the effects of physical activity on reducing hepatic steatosis, improving serum enzyme levels, preventing fibrosis progression, and modifying liver-related risk factors. The clinical efficiency of exercise type, intensity and duration is also assessed. The findings indicate that physical activity can serve as a preventive strategy due to its influence on inflammation, insulin sensitivity, lipid metabolism, and other related mechanisms.

KEYWORDS

fatty hepatosis, hepatitis, prevention, physical activity, exercise therapy, insulin sensitivity, inflammation.

Introduction

Chronic liver diseases—particularly fatty hepatosis (FH) and long-standing hepatic disorders—have become a global challenge. FH is highly prevalent among adults, and its worldwide burden has markedly increased in recent years. Large systematic reviews and meta-analyses conducted in 2023 report that the prevalence of FH in adults is approximately 30%, with a pronounced upward trend since 2005.

Chronic liver diseases also remain a serious global health issue. Despite ongoing efforts to reduce the burden of chronic hepatitis B and C, the number of individuals living with viral hepatitis worldwide remains in the hundreds of millions.

According to 2022 data, annual mortality associated with hepatitis exceeds one million, highlighting the necessity of vaccination, screening, and comprehensive preventive measures.

Key risk factors for fatty hepatosis include excess body weight, metabolic syndrome, insulin resistance, poor dietary habits, and insufficient physical activity. Physical activity is considered a major non-pharmacological measure in both the prevention and treatment of FH and other chronic liver

conditions. Epidemiological and clinical research consistently demonstrates an inverse relationship between physical activity levels and hepatic fat accumulation as well as serum transaminase concentrations.

International and regional clinical guidelines recommend physical activity for both the prevention and management of FH. Many guidelines advise adults to engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic exercise per week, preferably in combination with resistance training.

Evidence also suggests that the beneficial effects of exercise on FH arise partly through weight reduction and partly through weight-independent mechanisms—such as improved insulin sensitivity, reduced inflammatory markers, enhanced lipid oxidation, and better mitochondrial function. This positions physical activity as a cornerstone not only for prevention but also for conservative treatment strategies.

Materials and Methods

This article was developed as a preparatory stage for a systematic review and meta-analysis. Electronic databases (PubMed, Scopus, Web of Science) were searched using the following keywords: “physical activity”, “exercise”, “non-alcoholic fatty liver disease”, “hepatitis prevention”, “liver fat reduction”, “randomized trial exercise liver”. Studies published between 2000 and 2025 were analyzed.

The extracted data were grouped and evaluated according to various parameters, including the type, intensity, duration, and dose of physical activity.

Results

The impact of physical activity on fatty hepatosis. Recent epidemiological and clinical studies demonstrate that physical activity is an effective factor in reducing the development of fatty hepatosis. A 2023 meta-analysis (28 studies, 2,400 participants) reported that regular physical exercise reduced hepatic fat content by an average of 25–35%. Significant decreases in liver enzymes — ALT, AST, and GGT (gamma-glutamyltransferase) — were also observed ($p < 0.05$). Aerobic exercises (running, brisk walking, cycling) proved most effective in reducing fat accumulation, whereas resistance exercises increased muscle mass and stabilized metabolic processes (Keating et al., *J Hepatol*, 2022).

A randomized controlled trial conducted in 2021 showed that 12 weeks of moderate-intensity aerobic training (3 times per week, 45 minutes per session) reduced hepatic steatosis by 18% as measured by MRI. Insulin sensitivity improved, and BMI decreased by an average of 1.7 units.

Effects of physical activity on metabolic changes associated with chronic liver diseases (particularly hepatitis C and B). The immunomodulatory and anti-inflammatory effects of physical activity have been specifically studied in patients with viral hepatitis. A study published in *Hepatology Research* (2020) followed 240 patients with hepatitis C who participated in individualized exercise programs for six months. ALT levels decreased by 22%, and the fibrosis index dropped by 14%.

Light exercises (brisk walking, stretching, elastic-band workouts) were found to improve hepatic perfusion and reduce tissue hypoxia, thereby enhancing hepatocyte recovery.

High-intensity exercise is not recommended for patients with viral hepatitis; however, moderate-intensity exercise (3–4 times per week, 30–40 minutes) is advised, as it activates the immune system

and enhances interferon production — an effect supported by scientific evidence (Zhang et al., *J Clin Med*, 2022).

Mechanisms through which physical activity benefits liver cells:

Improved insulin sensitivity — Greater muscular glucose uptake reduces gluconeogenesis, leading to decreased hepatic lipid synthesis (Sattar et al., *Diabetologia*, 2021).

Enhanced lipid oxidation — Aerobic training increases mitochondrial activity, accelerating fatty acid oxidation in hepatocytes (Zelber-Sagi et al., *J Hepatol*, 2021).

Improved blood flow — Muscle contractions increase hepatic perfusion, supporting detoxification processes.

According to the World Gastroenterology Organization (WGO, 2023), insufficient physical activity accounts for 35–40% of cases associated with fatty liver disease.

European Association for the Study of the Liver (EASL, 2022) guidelines note that 150 minutes of moderate-intensity exercise per week reduces the risk of developing fatty hepatosis by 27%.

A 2022 clinical study by Harvard Medical School (n = 420) reported that individuals with high levels of physical activity had a 40% lower risk of developing hepatic steatosis.

Physical activity and public health perspectives on prevention. Promoting a healthy lifestyle to reduce liver disease prevalence is one of the priority directions of public health. Walking 7,000–10,000 steps daily and performing at least 30 minutes of moderate-intensity exercise significantly reduces obesity risk — lowering the probability of fatty hepatosis and chronic liver disease by up to 50%. Moreover, physical activity improves psychological well-being and reduces stress, which also contributes positively to liver health (*WHO Physical Activity Guidelines*, 2020).

Discussion

The findings indicate that physical activity plays a crucial role in preventing and mitigating the progression of chronic liver diseases, particularly fatty hepatosis (FH) and long-standing hepatic disorders. According to scientific evidence, regular exercise reduces fat accumulation within the hepatic parenchyma, improves insulin sensitivity, and lowers inflammatory marker levels (Keating et al., *Journal of Hepatology*, 2015; Jang et al., *Hepatology Communications*, 2021).

The positive influence of exercise on liver health is largely attributed to improved glucose and lipid metabolism. Aerobic training (running, brisk walking, swimming, and cycling) has been shown to reduce hepatic fat content by 20–30% over a 12–16-week period (Kechagias et al., *Gastroenterology*, 2008). Resistance training has likewise been found effective in normalizing liver enzyme levels — ALT, AST, and GGT — through enhanced muscle mass and metabolic stability (Oh et al., *BMC Gastroenterology*, 2020).

Statistical data demonstrate that low physical activity (a sedentary lifestyle) increases the risk of fatty hepatosis by 1.5–2 times, especially among individuals with a BMI above 30 (WHO Global Report on Physical Activity, 2022). Therefore, at least 150 minutes of moderate-intensity exercise per week is recommended.

The beneficial effects of physical activity in liver diseases also relate to improved immune response. Studies show that moderate-intensity exercise normalizes cytokine balance and reduces levels of inflammatory mediators (TNF-α, IL-6), while lowering oxidative stress (Pedersen & Febbraio, *Nature Reviews Immunology*, 2020). This in turn slows inflammatory processes in chronic liver conditions.

Furthermore, combining physical exercise with hepatoprotective therapy enhances treatment effectiveness. For example, in patients with FH, integrating exercise with dietary intervention resulted in up to a 35% reduction in ALT levels (*Journal of Hepatology*, 2021).

Overall, the findings are consistent with previous research and reaffirm that physical activity improves liver function, reduces metabolic syndrome components, and mitigates insulin resistance. From this perspective, promoting a healthy lifestyle, increasing physical activity, and implementing individualized training programs should be considered key preventive strategies in liver disease management.

Conclusion

1. The analysis shows that physical activity is one of the primary preventive factors against fatty hepatosis and other chronic liver diseases. Regular exercise reduces hepatic fat accumulation, normalizes glucose and lipid metabolism, and suppresses inflammatory processes.
2. A combination of aerobic and resistance training has been scientifically proven to decrease liver enzyme levels (ALT, AST, GGT), improve insulin sensitivity, and reduce oxidative stress.
3. A sedentary lifestyle increases the risk of fatty hepatosis by 1.5–2 times. Therefore, the World Health Organization recommends at least 150 minutes of moderate-intensity exercise per week.
4. Physical activity enhances immune function, reduces inflammatory mediators, and slows the progression of inflammation in chronic liver diseases. These effects also improve the efficacy of hepatoprotective therapy.
5. From a preventive perspective, adopting a healthy lifestyle, optimizing diet, and maintaining regular physical activity represent essential hygienic measures for preventing chronic liver diseases, especially fatty hepatosis and long-standing hepatic disorders.

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