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Review

Non-alcoholic fatty liver disease and associated dietary and lifestyle risk factors

Hana'a Mahmoud Al-Dayyat[a], Yaser Mohammed Rayyan[b], Reema Fayez Tayyem[a,*]

[a] Department of Nutrition and Food Technology, Faculty of Agriculture, The University of Jordan, Amman, Jordan
[b] Department of Gastroenterology & Hepatology, School of Medicine, The University of Jordan, Amman, Jordan

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ABSTRACT

Nonalcoholic fatty liver disease (NAFLD) has emerged as the most common chronic liver disease worldwide with a reported prevalence ranging 20–30% depending on the studied populations. The high prevalence of NAFLD is probably due to the contemporary epidemics of obesity, unhealthy dietary pattern, and sedentary lifestyle. NAFLD patients are at increased risk of cardiovascular and liver related mortality. The cornerstone of any treatment regimen for patients with NAFLD is lifestyle modification focused on weight loss, exercise, and improving insulin sensitivity. The purpose of this review is to outline the effect of diet and lifestyle factors on developing NAFLD.

Contents

1. Introduction

Nonalcoholic fatty liver disease (NAFLD) is considered as one of the most public-health related causes of chronic liver disorders all over the world, which is characterized by fat accumulation, mainly as triglyceride (TG), inside liver cells [1]. It is identical to that seen in alcoholic fatty liver disease (AFLD) but in the absence of significant quantities of alcohol consumption [2]. Excessive

* Corresponding author at: Department of Nutrition and Food Technology, Faculty of Agriculture, The University of Jordan, Amman 11942, Jordan.
E-mail address: r.tayyem@ju.edu.jo (R.F. Tayyem).

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triglyceride build-up is defined as 5% or more of hepatocytes fat content (steatosis) [3]. This accumulation of fat within liver cells can cause inflammation (steatohepatitis) leading to NASH and potentially can progress to cirrhosis and finally, may lead to end stage liver disease [4].

NAFLD may progress through three different stages starting from nonalcoholic fatty liver (NAFL) to nonalcoholic steatohepatitis (NASH), and finally liver cirrhosis [1]. The range of NAFLD severity is clarified in Fig. 1. NAFL represents an increase in the accumulation of fat within liver cells, without significant inflammation of the hepatocytes, whereas, inflammation that may progress to liver fibrosis is usually seen in NASH [5]. While, both NAFL and NASH are potentially reversible with intervention, cirrhosis represents an irreversible stage of liver disease [6]. Around 5–6% of NAFLD patients who have NASH, the liver becomes scarred, and lumpy [7]. For this reason, it is very important to improve dietary habits and lifestyle patterns to prevent the disease from progressing and getting worse by reducing the amount of fat within liver cells and thus prevent the development of NAFLD [8].

1.1. Prevalence of NAFLD

The prevalence of NAFLD all over the world is increasing and it has been estimated to reach about 20–30% of the general population [9].

In fact, the prevalence of NAFLD has been increasing in close relation to the increasing prevalence of obesity, diabetes, and metabolic syndrome (MS) [10]. For instance, NAFLD has been reported in over (76%) of type 2 diabetes (T2DM), with much higher rates in obese adults (80–90%) and patients with hyperlipidemia (90%) [11]. Also, age, gender, and ethnicity are associated with a varying prevalence of NAFLD [12]. Additionally, the prevalence of NAFLD patients is reported as high as 5%–18% in Asia [2]. Other studies have shown NAFLD prevalence in USA to at 20–30% of the general population, while the prevalence of NAFLD in obese individuals was estimated at about 75–92%. The variations in these rates are related to the technology used for diagnosis and screening of NAFLD [13]. Other studies indicated that the prevalence rates in Japan, China and India have been reported as (14%), (5%) and (5–28%) respectively [14].

Among children, 3–10% are estimated to have NAFLD, and this appears to be rising to reach about 40–70% among obese children in some Western countries [15]. Fig. 2 refers to the prevalence of NAFLD in the general population that was estimated to be in the range of 6%–35%. [14].

Globally, the incidence of NAFLD in the USA is only 3–5% of the general population when using a liver biopsy, while, the incidence is much higher when non-invasive techniques are used to reach about 10–35% [14]. The prevalence of NASH is estimated to be about 2–3% of the general population [15]. Another study have estimated the prevalence of NASH among NAFLD patients with or without clinical indication, based on that, the estimated prevalence of NASH in the general population ranges between 1.5%–6.45%. [13].

Features of the MS are not only highly prevalent in patient with NAFLD, but components of the MS also increase the risk of developing NAFLD. A prospective descriptive pilot study by Lambis et al. [16], illustrated the percentage frequency of associated risk factors with NAFLD (Fig. 3). These factors include diabetes, hypertension, and obesity. The distribution was as follows: 28% obese; 20% diabetes (DM); 17% hypertension (HT) and obesity; and 35% DM and HT.

1.2. Symptoms of NAFLD

Typically, NAFLD is called the silent disease due to the lack of symptoms in the early stages [17]. Most individuals with NAFLD are asymptomatic and the diagnosis mostly follows abnormal findings on liver function tests, or abnormal liver imaging including abdominal ultrasound performed to investigate other features of metabolic syndrome [18]. Occasionally, NASH patients may present with fatigue, unjustified weight loss, and discomfort in the right upper side of the abdomen [19]. Cirrhosis may eventually develop prior to diagnosis, where the presentation is similar to other causes of liver cirrhosis, that include but not limited to jaundice, splenomegaly, ascites and variceal bleeding [20].

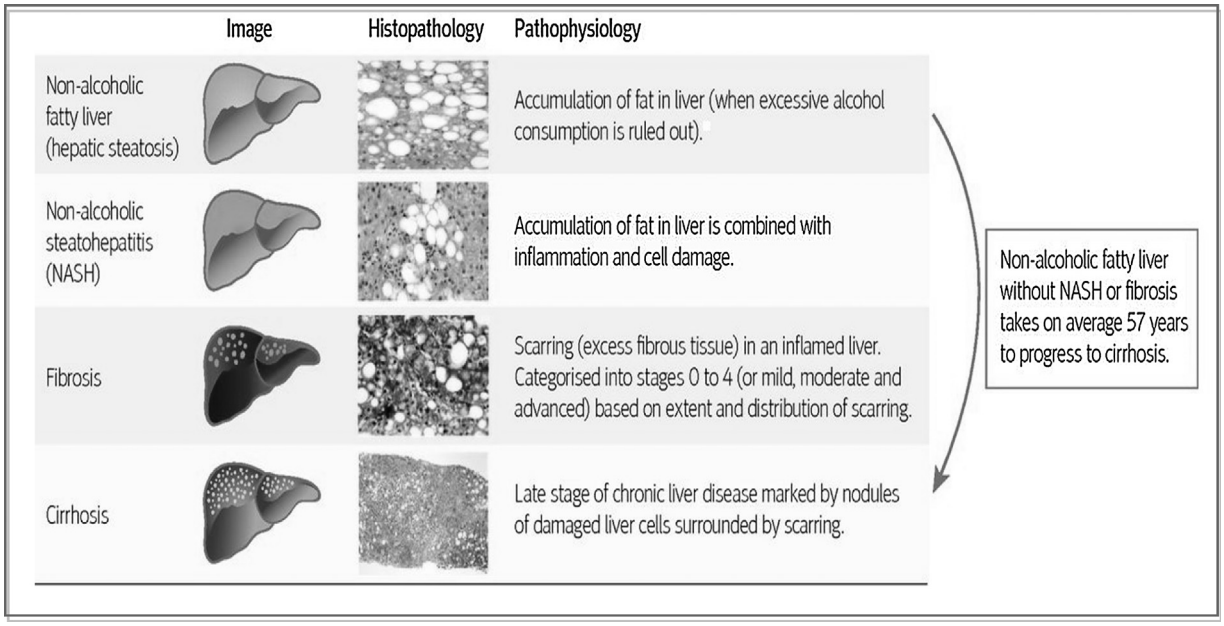

Fig. 1. Histological progression of non-alcoholic fatty liver disease (NAFLD). Adopted from Glen et al. [1].

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