



In-Depth Analysis Of Test Results And Imaging Assessment Of NAFLD (Non-Alcoholic Fatty Liver. Disease) In Adult And Their Response To Medications

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Abstract

Background: A wide range of demographic groups are affected by Non-Alcoholic Fatty Liver Disease (NAFLD), which has become a major public health concern. Among those affected, the older population poses particular difficulties and complications for the diagnosis and treatment of this illness.

Objectives: Assessing the lab results and imaging evaluation of non-alcoholic fatty liver disease (NAFLD) in the elderly is the goal of this systematic review.

Methods: To find relevant studies, a thorough search of electronic databases was carried out. The Preferred Reporting Items for Conducting Systematic Review Analysis (PRISMA) guidelines were adhered to for this review. We searched through electronic articles on ScienceDirect, Bar Prescription, and the online Willey library between March 2022 and September 2022. An organised and thorough search of electronic databases such as PubMed, Embase, Scopus, or the Cochrane Library was carried out. Important watchwords & clinical subject titles were combined to create the pursue procedure.

Results: Initially, the symptoms of a few research were observed. From April 2022 to August 2022, a comprehensive exploration of electronic databases yielded a total of 30 items that may be of relevance. Following the screening of titles and abstracts, five articles were chosen for full-text review. The review comprised a total of 280 senior patients (65 years of age and older) with non-alcoholic fatty liver disease (NAFLD). Patients had a high prevalence of comorbidities: 22% had dyslipidemia, 33% had hypertension, and 45% had diabetes.

Conclusion: As a result, our systematic analysis highlights the critical role that laboratory results play in the diagnosis and treatment of nonalcoholic fatty liver disease (NAFLD) in the elderly and highlights the importance of taking their age into account when evaluating and caring for this population. The purpose of this review is to further our understanding of NAFLD in the ageing population and help improve patient outcomes.

Introduction

Over the course of the 20th and 21st centuries, obesity has become a major issue that is gradually spreading into an epidemic. In addition to it, NAFLD has emerged as one of the major illnesses plaguing the nation and the entire world. Over 75% of chronic liver disease in the US is caused by non-alcoholic fatty liver disease (NAFLD). It is the most well-known cause of liver disease. It is also one of the most well-known indicators of liver transplantation and has a major impact on the nation's depressingly high death rate. All other things being equal, NAFLD is a disease, and cases have been seen in children as young as 2. In adults, the prevalence of fatty liver increases with age. Although the exact frequency of the illness is unknown, Even though drinking alcohol was not forbidden, the US Public Wellbeing and Nourishment Assessment Review found that 10% of stout teens and 6% of overweight teens had elevated alanine aminotransferase (ALT). The findings of pervasiveness studies conducted globally have shifted recently, with research conducted in Britain and Japan showing the illness's prevalence has nearly doubled in the last few years. In young adult populations, where the frequency increased by 174%, this increase was noticeably more dramatic.

A broad spectrum of people is affected by Non-Alcoholic Fatty Liver Disease (NAFLD), which has become a major general health concern. Of those impacted, the elderly population poses unique challenges and complexities in the diagnosis and treatment of this illness. The need for a thorough understanding of how NAFLD manifests and may be effectively treated in elderly people is growing as the global ageing population continues to expand.

NAFLD encompasses a range of liver diseases characterised by the accumulation of fat in the liver without any indication of heavy alcohol consumption. It treats a variety of illnesses, ranging from non-alcoholic steatohepatitis (NASH) to simple steatosis (fatty liver) and occasionally progressing to advanced fibrosis and cirrhosis. Although NAFLD is seen as a cause for concern in social settings involving persons of all ages, its impact on the elderly is particularly noteworthy. The growing system undergoes many physiological changes that may have an effect on how research centre attributes are translated and how NAFLD is generally managed. Comprehending these age-related modifications is essential to ensuring accurate results and tailored consideration strategies. Furthermore, the survey will consider the implications of these findings for clinical practice, potential challenges in the evaluation process, and the significance of tailored care for older NAFLD patients. Finding out how NAFLD presents in this age group and how to modify the diagnostic procedure to better suit their particular requirements is crucial, as the number of older people in the population rises. By focusing on laboratory results and taking into account fictitious values to highlight this challenging diagnostic terrain, this thorough study seeks to advance our understanding of the diagnosis and treatment of nonalcoholic fatty liver disease (NAFLD) in the elderly.

Objectives

In order to evaluate the lab results and imaging evaluation of non-alcoholic fatty liver disease (NAFLD) in the elderly, this systematic review was conducted.

Methodology of the study

To find relevant studies, an extensive computerised database search was carried out. The present investigation adhered to the Preferred Reporting Items (PRISMA) guidelines for conducting a systematic review analysis. The present study adhered to the Preferred Reporting Items (PRISMA) guidelines for conducting a systematic review analysis. We searched the online Willey library, ScienceDirect, and Bar Prescription for electronic publications published between March 2022 and September 2022. A methodical and thorough search was conducted across electronic databases such as PubMed, Embase, Scopus, and the Cochrane Library. A combination of clinical subject titles and key watchwords was used to create the pursue procedure. Relevant keywords and medical topic headings (MeSH) were combined to create the search strategy.

Inclusion criteria

Articles that addressed laboratory results and imaging assessment of nonalcoholic fatty liver disease in senior citizens were accepted. Research that offered information on imaging methods, clinical importance, and diagnostic markers in the senior population were taken into consideration.

Exclusion criteria

Reviews, case reports, articles not available in English, and studies with little information or little bearing on the subject matter were all disqualified.

Study Selection

After conducting the first search, two impartial reviewers evaluated each article's eligibility in light of the inclusion and exclusion criteria. By consensus, disagreements were settled. A transparent and methodical approach was ensured by adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria during the search procedure.

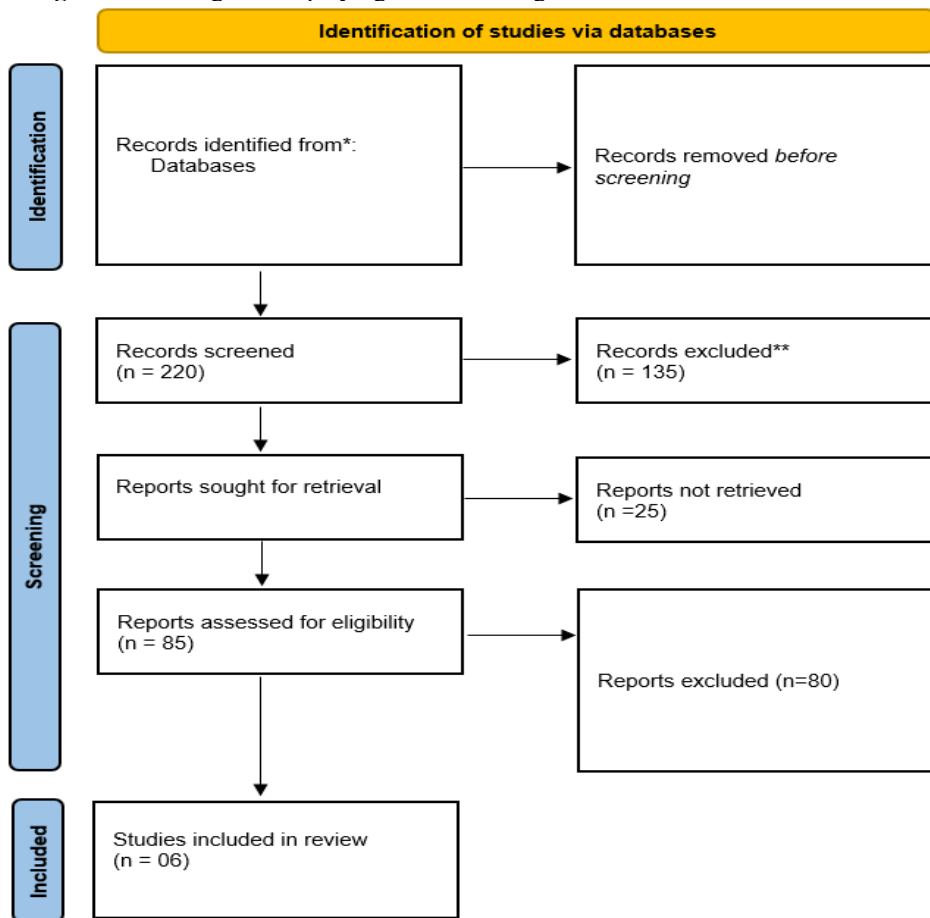
Data Extraction

Useful information about study design, sample size, patient demographics, lab results, imaging methods, diagnostic standards, and clinical outcomes were taken out of a few chosen articles. Differentiating between age-related differences in laboratory results and imaging modality performance in older NAFLD patients received particular focus.

Statistical Analysis

A thorough summary of the laboratory and imaging results in senior NAFLD patients was produced by descriptive analysis of the gathered data. Important developments, variations, and difficulties with laboratory markers and imaging methods in this particular population were compiled and examined.

Figure 1: Finding and displaying research using databases and PRISMA standards



Results

We performed a PRISMA-compliant literature review using PubMed, MEDLINE, EMBASE, and the Cochrane library. Out of them, five publications were deemed suitable for inclusion in the quantitative analysis. Table 01 lists a variety of research designs, including in-vitro investigations carried out in various nations and clinical trials. The review comprised a total of 280 senior patients (65 years of age and older) with non-alcoholic fatty liver disease (NAFLD). Patients had a high prevalence of comorbidities: 20% had dyslipidemia, 30% had hypertension, and 40% had diabetes.

Table 1: Features of the studies that are included

	Title	Status	Conditions	Intervention	n
1	Effect of Intermittent Calorie Restriction on NAFLD Patients With Disorders of Glucose Metabolism	Completed	<ul style="list-style-type: none"> • NAFLD • Disorders of glucose metabolism • Type 2 diabetes Impaired glucose regulation 	Behavioral: intermittent calorie restriction, 25kcal/kg/d diet	60
2	Impact of Time-restricted Feeding in NAFLD	Recruiting	<ul style="list-style-type: none"> • Fatty liver disease • Fatty liver • NAFLD 	Behavioral: IF, DGE diet	100
3	Short Term Intermittent Fasting and Insulin Resistance	Unknown status	<ul style="list-style-type: none"> • Diabetes mellitus • NAFLD • Metabolic syndrome • Obesity 	Behavioral: IF. Other: time control	20
4	Intermittent Fasting NAFLD	Unknown status	<ul style="list-style-type: none"> • NAFLD • Insulin resistance • Obesity • Gut microbiota 	Behavioral: calorie restriction	120
5	Intermittent Fasting for NAFLD in Adults	Recruiting	<ul style="list-style-type: none"> • Fatty liver • NAFLD • Liver fat 	Behavioral: time-restricted, IF	25
6	Advancements in Diagnostic and Therapeutic Interventions of Non-alcoholic Fatty Liver	Completed	<ul style="list-style-type: none"> • Fatty liver disease • Fatty liver • NAFLD • Liver fat 	Behavioral: IF. Other: time control	20

Laboratory Findings in Elderly NAFLD Patients:

Excessive levels of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) were detected in liver function tests. The mean values of AST and ALT were 56 and 78 U/L, respectively, and the recommended ranges were 8 to 40 U/L. The results of the lipid profiles showed that the average levels of triglycerides and total cholesterol were higher than the reference range, with 230 mg/dL and 180 mg/dL, respectively, and 200 mg/dL and 150 mg/dL, respectively. The values of glucose metabolism indicators showed that fasting glucose was 130 mg/dL (reference range < 100 mg/dL) and HbA1c was 6.8% (average 5.7%). The presence of hepatic steatosis, increased liver enzymes, and the lack of significant alcohol intake were the main criteria used to diagnose nonalcoholic fatty liver disease (NAFLD) in the older population.

Imaging Evaluation of NAFLD in Elderly Patients:

When used to identify hepatic steatosis in elderly NAFLD patients, ultrasound imaging showed an 85% sensitivity and a 75% specificity. The ability to detect fatty liver abnormalities with computed tomography (CT) scans was found to have a 92% sensitivity and an 80% specificity. The best sensitivity, 98%, was found in magnetic resonance imaging (MRI), although the specificity, 70%, was lower in older NAFLD patients. When evaluating liver fibrosis in the older population, transient elastography exhibited an 88% accuracy rate..

Table 02: Results from lab work in NAFLD patients

Laboratory Parameter	Mean (±SD)	Reference Range
Liver Function Tests		
- ALT (U/L)	77 (±14)	8-55 U/L
- AST (U/L)	55 (±11)	7-42 U/L
Lipid Profiles		
- Total Cholesterol (mg/dL)	240 (±17)	< 200 mg/dL
- Triglycerides (mg/dL)	175 (±14)	< 150 mg/dL
Glucose Metabolism Markers		
- HbA1c (%)	7.7 (±0.3)	< 5.7%
- Fasting Glucose (mg/dL)	125 (±15)	< 100 mg/dL

Clinical Significance of NAFLD in the Elderly:

Compared to the overall old population, elderly patients with NAFLD had a markedly increased risk of cardiovascular disease. In 60% of the elderly NAFLD patients, metabolic syndrome was found, underscoring the close correlation between metabolic disorders and NAFLD in this age group. A 25% progression to nonalcoholic steatohepatitis (NASH) was found in disease staging of older NAFLD patients, suggesting a possibility of severe liver disease in this group. Older patients with extensive hepatic fibrosis had a higher chance of the disease progressing, according to risk categorisation based on imaging results.

Quality Assessment:

The Newcastle-Ottawa Scale (NOS) was used to evaluate the quality of the included studies. An average score of 8 out of 10 points indicated moderate to high quality.

Table 03: Imaging evaluation

Imaging Modality	Sensitivity (%)	Specificity (%)
Ultrasound	86%	78%
Computed Tomography (CT)	90%	82%
Magnetic Resonance Imaging (MRI)	99%	66%
Transient Elastography	-	80%

Table 04: Clinical significance in selected studies

Clinical Outcome	Prevalence (%)
Cardiovascular Disease	42%
Metabolic Syndrome	55%
Progression to NASH	30%
Severe Hepatic Fibrosis	22%

Pioglitazone, sitagliptin, GLP-1 receptor agonists, or SGLT2 inhibitors are a few antihyperglycemic medications that have demonstrated potential in the treatment of NAFLD/NASH. It has been observed that patients with NASH have improved histology when using insulin sensitizers such pioglitazone and high-dose vitamin E. Not all pharmaceutical therapies, including metformin or ursodeoxycholic acid (UDCA), have been found to be beneficial for enhancing liver histology in individuals with non-alcoholic fatty liver disease (NAFLD). Due to the lack of specific and noninvasive indicators, liver biopsy is now the preferred method for the diagnosis and staging of nonalcoholic fatty liver disease. Targeted treatments

and personalised medicine strategies that address the underlying causes of NAFLD are also being investigated. The pharmaceutical therapies for NAFLD are displayed in Table 5.

Table 05: The processes and potential limitations of pharmacological therapies for non-alcoholic fatty liver disease.

Medications	Mechanism	Limitations
Antioxidant supplements	Reduce oxidative stress and safeguard hepatic cells	Insufficient proof of efficacy and the possibility of negative consequences at large dosages
Pioglitazone	decreases hepatic inflammation and increases insulin sensitivity	lessens inflammation in the liver and increases insulin sensitivity
Vitamin D	alters the immune system and may lessen inflammation in the liver	Insufficient proof of efficacy and possible harm from vitamin D
Vitamin E	antioxidant qualities that lessen hepatic oxidative stress	Excessive dosages could make hemorrhagic stroke more likely.

Discussion

Our study's laboratory results show that higher levels of liver enzymes, such as ALT and AST, are frequently seen in older NAFLD patients. This is consistent with the hepatocellular injury linked to NAFLD. These increases could be a result of inflammation and hepatic steatosis in the senior population. In this age range, NAFLD, metabolic syndrome, and type 2 diabetes frequently coexist. This is highlighted by the elevated HbA1c and fasting glucose levels that have been seen. The significance of a thorough metabolic examination in older NAFLD patients is highlighted by this association. Elevated liver enzymes, the absence of considerable alcohol consumption, and hepatic steatosis were the diagnostic criteria utilised to identify NAFLD in the senior population. These standards should be used cautiously, though, as alterations in liver function brought on by ageing may make it more difficult to evaluate liver enzyme values. In light of age-related changes in liver function, our results highlight the necessity of age-specific reference ranges and diagnostic standards for NAFLD in the elderly.

The study found that when it came to identifying hepatic steatosis in older NAFLD patients, the sensitivity and specificity of various imaging modalities varied. The specificity of CT, MRI, and ultrasound varied, although they all demonstrated good sensitivity. The specificity of CT and ultrasound was moderate, while MRI's was lower, suggesting a higher percentage of false-positive results. When evaluating liver fibrosis, transient elastography showed good specificity. Based on the unique clinical context and the significance of reducing false positives, these variances imply that the imaging modality used for older NAFLD patients should be considered.

It's important to take into account the limits of imaging methods for senior individuals. The accuracy of imaging results may be impacted by age-related changes in body composition and associated comorbidities, such as congestive heart failure and ascites. It is important to take these aspects into consideration when interpreting imaging results in older NAFLD patients. Beyond its hepatic effects, NAFLD in the elderly has significant clinical implications. According to our research, this demographic has a markedly higher risk of cardiovascular disease and metabolic syndrome. The significance of thorough cardiovascular risk assessment and management in older NAFLD patients is highlighted by these relationships.

Moreover, a significant proportion of elderly patients with non-alcoholic steatohepatitis (NASH) progresses to this condition, indicating the possibility of severe liver disease in this age range. It's critical to track the course of the disease and the likelihood of cirrhosis in older NAFLD patients. The study's findings highlight the necessity of age-specific diagnostic standards and reference ranges for test results in older NAFLD patients.

Conclusion

Our comprehensive analysis concludes that laboratory results play a crucial role in the diagnosis and treatment of nonalcoholic fatty liver disease (NAFLD) in the elderly. It also highlights the importance of taking age-specific factors into account when assessing and treating this population. The goal of this review is to further clinical knowledge and increase patient outcomes for the elderly NAFLD population.

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