

# **ASSOCIATION OF INSULIN RESISTANCE AND DYSLIPIDEMIA WITH NON ALCOHOLIC FATTY LIVER DISEASE (NAFLD)**

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# INTRODUCTION

- Non-alcoholic fatty liver disease (NAFLD) is a **chronic liver condition** characterized by **excessive fat accumulation** in the liver cells (hepatocytes) in the absence of significant alcohol consumption.
- It is considered the **hepatic manifestation of metabolic syndrome** and is prevalent worldwide, affecting approximately 25% of the global population.
- The condition ranges from simple steatosis to non-alcoholic steatohepatitis (NASH), which can progress to fibrosis, cirrhosis, and hepatocellular carcinoma.
- NAFLD is associated with an increased risk of cardiovascular disease, type 2 diabetes, and chronic kidney disease, making it a significant public health concern.<sup>1</sup>

- **Insulin resistance** is an important factor in the pathogenesis of NAFLD. It refers to the diminished ability of cells, particularly liver, muscle, and adipose tissue, to respond to insulin.
- **Dyslipidemia** is also commonly observed in individuals with NAFLD. The typical lipid profile includes elevated triglycerides, increased low-density lipoprotein (LDL) cholesterol, and decreased high-density lipoprotein (HDL) cholesterol levels.
- These lipid abnormalities contribute to the progression of NAFLD and increase the risk of cardiovascular diseases, creating a vicious cycle of metabolic disturbances.
- The association between NAFLD and dyslipidaemia underscores the need for comprehensive management strategies targeting both liver health and lipid metabolism.<sup>3</sup>

- Hence there is a **need for more comprehensive investigations** that explore how these metabolic disturbances interact and influence each other in the context of NAFLD.<sup>4</sup>
- Moreover, while the prevalence of NAFLD and its associated metabolic abnormalities is well-documented in Western populations, there is a paucity of data from Asia , where the prevalence and risk factors may differ.<sup>5</sup>
- This cross-sectional study aims to address these gaps by examining the intricate relationships between insulin resistance, dyslipidaemia, and NAFLD. By elucidating these connections, the study intends to provide a more holistic understanding of NAFLD and inform more effective prevention and treatment strategies.

# **Research Question**

Is there association of insulin resistance and dyslipidemia with non alcoholic fatty liver disease??

# **Primary Aim**

To **investigate the relationship** between insulin resistance and dyslipidemia in NAFLD.

# Objectives

- To assess **interrelation** of insulin resistance and dyslipidemia in individuals with NAFLD.
- To assess **insulin resistance** in target population.
- To identify **specific** lipid profile abnormalities associated with varying levels of insulin resistance in NAFLD patients.
- To evaluate the **role of lifestyle factors**, such as diet and physical activity, in moderating the effects of insulin resistance and dyslipidemia on NAFLD progression.

# **Materials and Methods**

## **□ Study Design:**

Hospital-based cross-sectional study.

## **□ Study Population:**

Adult patients with NAFLD.

## **□ Sample Size**

From routine opd and indoor patients considering the exclusion criteria we get 5-10 patients/ week .

Hence considering convenient sampling sample size of 200 patients is taken.

# Inclusion Criteria

- Patients with NAFLD based on ultrasound imaging
- Patients from the age group of 18-60 years.

# **Exclusion Criteria**

- Patient with HbA1c > 6.4% or known case of diabetes.
- Patients who are on statin or any other antilipidemic drugs.
- History of alcohol consumption.
- Presence of other chronic liver diseases.
- Current use of medications known to induce liver steatosis.

## **Study Period:**

After approval from institutional ethics committee till data is collected.  
(approx. 12 months)

## **Source Of Data:**

Data obtained from **USG abdomen**, **lipid profile** (Serum cholesterol, triglycerides, LDL, HDL, VLDL), **fasting blood glucose**, **fasting insulin level**, and **HbA1C** values in patients of NAFLD

# **Methodology**

- **Detailed demographic data**, including age, sex, ethnicity, body mass index (BMI), and waist circumference, will be collected. A **detailed medical history** will be obtained from each participant. This will include the duration of NAFLD diagnosis, history of diabetes mellitus, hypertension, cardiovascular diseases, and other metabolic conditions.
- Information on **lifestyle factors** such as dietary habits, physical activity, alcohol consumption, smoking status, and family history of metabolic or liver diseases will also be gathered.

- Patients will be asked about their **use of medications**, including antihypertensives, statins, antidiabetics, and other relevant drugs. A thorough **clinical examination** will be conducted. This will include measurements of weight, height, BMI, waist and hip circumference, and blood pressure.
- A **detailed physical examination** focusing on signs of liver disease, such as hepatomegaly, jaundice, and ascites, will be performed. Other relevant systemic examinations, including cardiovascular and endocrine system evaluations, will be carried out to identify any coexisting conditions that may influence insulin resistance or dyslipidemia.
- Investigations:- All patients will undergo estimation of **Serum cholesterol, triglycerides, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and very low-density lipoprotein (VLDL)**.

- Fasting blood glucose levels will be measured to assess baseline glycemic control. **HbA1c levels** will provide an indication of long-term glycemic control over the past 2-3 months. **Homeostasis model assessment of insulin resistance (HOMA-IR)** will be calculated using **fasting insulin** and glucose levels. This will provide a quantitative measure of insulin resistance in the study population.
- **Serum alanine aminotransferase (ALT), aspartate aminotransferase (AST) and alkaline phosphatase (ALP)** levels will be measured to evaluate liver function and the extent of liver damage.
- **Abdominal ultrasound** with linear/ curvilinear probe ( to assess surface irregularity) will be performed to confirm the presence of hepatic steatosis.

# **Statistical Analysis**

- Statistical analysis will be performed using SPSS version 21.0 software. Quantitative data, including measures of insulin resistance, lipid profiles, and liver function tests, will be presented as mean and standard deviation. Qualitative data, such as the presence or absence of specific lipid abnormalities and lifestyle factors, will be presented in incidence and percentage tables. For the analysis of quantitative data, an unpaired t-test will be applied. For qualitative data, the Chi-square test will be used to assess associations. A p-value of less than 0.05 will be considered statistically significant, indicating a meaningful relationship between insulin resistance, dyslipidemia, and NAFLD progression.

# **Ethical Considerations**

There is no intervention involved in the study that can harm the subject. And informed and written consent will be obtained from them.

The data generated from this study, focusing on the relationship between dyslipidemia, insulin resistance, and NAFLD, will be used solely for academic and research purposes, and potential current and future uses of the data will be shared with participants.

# References:-

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