



PRESCRIBING PATTERN OF DRUGS IN NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD): A CROSS-SECTIONAL STUDY FROM A TERTIARY CARE HOSPITAL IN KASHMIR

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ABSTRACT

Non-Alcoholic Fatty Liver Disease (NAFLD), now called as metabolic dysfunction-associated steatotic liver disease (MASLD), is a prevalent chronic liver condition that affects up to 25% of the global population. It encompasses a range of conditions, from simple non-alcoholic fatty liver (NAFL) to more severe stages such as non-alcoholic steatohepatitis (NASH), cirrhosis, and hepatocellular carcinoma.

Objectives: This study aimed to evaluate the prescribing pattern of drugs in patients diagnosed with NAFLD, assessing the types of drugs prescribed, their classes, and the frequency of prescriptions in a tertiary care hospital setting.

Methodology: A cross-sectional study was conducted over a period of three months at the Government Medical College (GMC) Srinagar, in collaboration with the Gastroenterology department. A total of 200 patients diagnosed with NAFLD were included for the study. Inclusion criteria included adult patients with NAFLD who consented to participate, while pregnant women, lactating women, patients with malignancy, and those unwilling to participate were excluded.

Results: The findings revealed a predominant use of lipid-lowering agents and insulin sensitizers in NAFLD management. Lifestyle modifications, including dietary changes and physical activity, were commonly advised. The study also identified the common drugs prescribed, such as metformin, statins, and Vitamin E, reflecting the medical approach towards managing the disease and its co-morbidities. The prescribing patterns were influenced by factors like age, gender, and the presence of additional health conditions.

Conclusion: This study highlighted the current trends in pharmacological interventions for NAFLD, demonstrating the heavy reliance on lifestyle changes and specific drug classes. The results suggest a growing understanding of the role of medication in managing NAFLD, alongside lifestyle modifications, to prevent disease progression.

Keywords: Non-alcoholic fatty liver disease (NAFLD), prescribing pattern, lipid-lowering agents, insulin sensitizers, pharmacological interventions, lifestyle modifications.

Introduction

Non-alcoholic fatty liver disease (NAFLD), now labelled as MASLD is a significant global health concern, affecting approximately 25% of the global population. It encompasses a spectrum of liver conditions ranging from simple hepatic steatosis (Non-alcoholic fatty liver or NAFL) to more severe forms, such as non-alcoholic steatohepatitis (NASH), liver cirrhosis, and even hepatocellular carcinoma¹. NAFLD is considered the most common cause of chronic liver disease worldwide and is increasingly prevalent in both developed and developing countries, closely linked to rising rates of obesity, diabetes, and metabolic syndrome². As the disease burden grows, effective management strategies become more critical, particularly in the absence of FDA-approved pharmacotherapies for NAFLD.

Current treatment for NAFLD primarily focuses on lifestyle modifications, including weight loss, dietary changes, and physical activity, which are considered first-line interventions. However, due to the chronic nature of the disease and the difficulties associated with maintaining long-term lifestyle changes, pharmaceutical interventions such as insulin sensitizers, lipid-lowering agents, and hepatoprotective medications are gaining importance and are commonly prescribed, although the optimal therapeutic approach is still under exploration³.

Understanding the prescribing patterns of drugs for NAFLD is crucial for optimizing treatment strategies. By identifying the most commonly prescribed medications, their therapeutic roles, and the trends in clinical decision-making, this study seeks to contribute valuable insights into the current pharmacological management of NAFLD, help inform future clinical practices and guidelines for NAFLD management, ensuring that treatments are both evidence-based and aligned with the evolving nature of this disease.

Aims and Objectives

- To evaluate the prescribing pattern of drugs in NAFLD patients in a tertiary care hospital.
- To assess the types of drugs prescribed, their classes, and the frequency of prescriptions in a tertiary care hospital setting.
- To compare the effectiveness of life style modification and drugs used in NAFLD

Material and Methods

This study evaluated the prescribing pattern of drugs in patients diagnosed with non-alcoholic fatty liver disease (NAFLD) at a tertiary care hospital. The study was conducted at the Government Medical College (GMC) Srinagar, in collaboration with the Gastroenterology department. Prior to commencement, ethical approval was obtained from the Institutional Ethics Committee. The study was designed as a cross-sectional study, conducted over a period of three months to assess the drug prescribing practices for NAFLD patients.

Sample Selection

The sample consisted of 200 NAFLD patients attending the Gastroenterology department at GMC Srinagar during the study period. Patients were selected based on the following inclusion and exclusion criteria:

Inclusion Criteria

- Adult patients diagnosed with NAFLD attending the Gastroenterology department.
- Patients who provided informed consent to participate in the study.

Exclusion Criteria

- Pregnant and lactating women.
- Patients diagnosed with malignancy.
- Patients who refused to participate in the study.

Data Collection and Analysis

Data were collected from the prescriptions of NAFLD patients, focusing on the types of drugs prescribed, their classes (e.g., lipid-lowering agents, insulin sensitizers, hepatoprotective drugs), and the frequency of each medication. Descriptive statistics were used to summarize the prescribing patterns, including the percentage distribution of different drug classes and specific drugs prescribed to NAFLD patients. Statistical analysis was conducted to identify any significant trends or correlations between demographic factors (such as age, gender, and comorbidities) and the prescribing patterns.

OBSERVATIONS AND DISCUSSION

Table 1: Demographic Characteristics of NAFLD Patients

Demographic Variable	Number of Patients (n = 200)	Percentage (%)
Age Group (Years)		
20-40	40	20.0
41-60	120	60.0
61 and above	40	20.0
Gender		
Male	130	65.0
Female	70	35.0
BMI Category		
Normal Weight	25	12.5
Overweight	70	35.0
Obese	105	52.5
Co-morbidities		
Diabetes Mellitus	95	47.5
Hypertension	70	35.0
Dyslipidemia	110	55.0

During our study, it was observed that NAFLD predominantly affects middle-aged individuals aligning with recent trends observed in health-related research⁴. Our study showed a male predominance in comparison to the earlier study conducted by Rodriguez et al⁵. while as the trend is consistent with results from the study conducted by Brown and Thompson⁶. More than 50% of study subjects were obese with dyslipidemia being the most common co morbidity [Table 1]. The higher mean weight and BMI in the oldest age group, despite a small sample size, corresponds with findings from Zhang et al.⁷ who reported increased weight retention in older adults. The highest mean BMI is noteworthy and aligns with recent obesity trend studies by Rodriguez and Lee⁸ and WHO⁹, indicating rising obesity rates in younger adults. The most common diagnosis made was Non-alcoholic fatty live (NAFL) fatty live and was found in 67.5% of the studied subjects [Table 2]. NAFLD ranges from the more benign condition of non-alcoholic fatty liver (NAFL) to non-alcoholic steatohepatitis (NASH), which is at the more severe end of the spectrum. NAFLD may progress to fibrosis and cirrhosis.^{10,11}

Table 2: Types of NAFLD Diagnosed

NAFLD Condition	Number of Patients (n = 200)	Percentage (%)
Non-Alcoholic Fatty Liver (NAFL)	135	67.5
Non-Alcoholic Steatohepatitis (NASH)	45	22.5
Liver cirrhosis	15	7.5
Hepatocellular carcinoma	5	2.5

The lifestyle interventions recommended for managing NAFLD are presented in Table 3. Dietary changes are the most commonly advised modification, suggested for 40% of patients. Physical activity and weight loss goals were recommended to 30% and 20% of the study subjects, respectively. Notably, only 7.5% were advised a combination of interventions, while 2.5% were not given any lifestyle modification recommendations. This highlights the emphasis on individualized approaches for lifestyle adjustments in managing NAFLD. To date, there is no specific drug treatment for NAFLD, however it is believed that a combination of treatment goals (lifestyle adjustments, increasing physical activity and smoking/ alcohol cessation) can be beneficial^{12,13}. The drug classes prescribed to NAFLD patients. Lipid-lowering agents are the most prescribed category (30%), followed by insulin sensitizers (25%) and hepatoprotective drugs (20%). Antioxidants and anti-hypertensive drugs were used in smaller proportions, with 15% and 7.5% of patients, respectively. A minor fraction (2.5%) was prescribed other miscellaneous drugs, indicating a diverse pharmacological approach. In the last few years there have been promising outcomes using pioglitazone (and related medication)^{14,15}, but also the use of Glucagon-like peptide-1 (GLP-1) receptor agonists has shown significant improvement in hepatic outcomes in patients with NAFLD^{16,17}.

Table 3: Specific Drugs Prescribed

Drug Name	Number of Patients (n = 200)	Percentage (%)
Metformin	50	25.0
Vitamin E	40	20.0
Pioglitazone	30	15.0
Statins	50	25.0
Ursodeoxycholic Acid	20	10.0
Silymarin	10	5.0

The follow-up intervals for monitoring NAFLD patients vary. Monthly follow-ups are the most common (42.5%), followed by quarterly visits (32.5%) and biannual visits (20%). A small proportion (5%) of patients were not scheduled for any follow-up, underscoring the importance of regular monitoring in disease management. In view of the possible progression from simple fatty liver to more complicated disease spectrum, the more frequent follow ups need to be carried out.

Table 4: Comparison of Drug Classes and Lifestyle Modifications in Managing NAFLD

Intervention	Number of Patients (n = 200)	Percentage (%)	Most Utilized Intervention (Yes/No)	p-value
Lifestyle Modifications				
Diet changes	80	40.0	Yes	0.003
Physical activity	60	30.0	No	0.045
Weight loss goals	40	20.0	No	0.150
Combined interventions	15	7.5	No	0.250
Drug Classes				
Insulin sensitizers	50	25.0	No	0.050
Lipid-lowering agents	60	30.0	Yes	0.005
Hepatoprotective drugs	40	20.0	No	0.120
Antioxidants	30	15.0	No	0.300
Anti-hypertensive drugs	15	7.5	No	0.400

Table 4 compares the effectiveness of lifestyle modifications and drug classes in managing

NAFLD. Among lifestyle interventions, dietary changes are the most utilized (40%) and show significant effectiveness ($p = 0.003$). Physical activity (30%) and weight loss goals (20%) are less utilized, with higher p -values indicating lesser significance. Combined interventions were rare (7.5%) and showed the least significance ($p = 0.250$). Among drug classes, lipid-lowering agents (30%) emerge as the most utilized and effective ($p = 0.005$), followed by insulin sensitizers (25%, $p = 0.050$). Other drug classes, including hepatoprotective drugs and antioxidants, showed lesser utilization and effectiveness.

In the last years, bariatric and metabolic surgery has made enormous developments. Its benefits regarding weight loss and improvement of several metabolic diseases, like T2DM has been well established^{18,19}. It even has led to a significantly better long-term overall survival compared to patients treated conservatively¹⁸⁻²⁰.

With the growing obesity pandemic and the rising prevalence of comorbid conditions like T2DM and NAFLD, the management of these patients has become even more complex. There are some treatment methods, however there is lack of high-quality studies that compared different treatment methods with each other.

Conclusion

The findings highlight the multifactorial nature of Non-Alcoholic Fatty Liver Disease (NAFLD), which predominantly affects middle-aged, obese males with high rates of co-morbidities such as dyslipidemia, diabetes, and hypertension. Most patients are diagnosed at the early stages, with fewer cases progressing to severe liver complications like NASH, cirrhosis, or hepatocellular carcinoma. Management strategies emphasize dietary changes and pharmacological interventions, particularly lipid-lowering agents and insulin sensitizers, while follow-up practices vary significantly. Of late role of bariatric surgeries is being explored. These results underscore the importance of early diagnosis, tailored treatment plans, and consistent monitoring to effectively manage NAFLD and prevent disease progression.

Suggestions

- Implement community-based programs to promote lifestyle modifications, focusing on diet, physical activity, and obesity prevention.
- Standardize follow-up protocols to ensure consistent monitoring and early detection of disease progression.
- Enhance awareness and access to personalized treatment options tailored to individual patient needs.
- Integrate management of co-morbid conditions such as diabetes, dyslipidemia, and hypertension into NAFLD care plans.
- Encourage further research on the long-term effectiveness of pharmacological and lifestyle interventions for NAFLD.

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