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YAKRITDALYUDARA AND NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD): AN INTEGRATED AYURVEDIC AND MODERN ANALYTICAL STUDY

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ABSTRACT

Yakritdalyudara, described in classical Ayurvedic texts, is conceptually correlated with Non-Alcoholic Fatty Liver Disease (NAFLD), a metabolic disorder characterized by excessive fat accumulation in hepatocytes due to dietary irregularities, sedentary lifestyle, and metabolic dysfunction. The present observational analytical study was conducted on 100 diagnosed cases of NAFLD to evaluate etiological factors, Agni status, dietary and lifestyle patterns, and their correlation with clinical and biochemical parameters. Data were collected on Ayurvedic parameters such as Agni, Koshta, Ahara Shakti, and Nidana Sevana along with modern indicators including BMI, lipid profile, liver function tests, HbA1c, and ultrasonography findings, and analyzed using chi-square tests. The results showed that 77% of patients had Mandagni, indicating impaired digestive-metabolic function as a central pathogenic factor. A high prevalence of overweight (73%) and obesity (11%) was observed along with significant dyslipidemia (78% elevated cholesterol, 75% elevated triglycerides/VLDL) and abnormal glycemic status (81% prediabetic or diabetic). Ultrasonography revealed Grade I fatty liver in 41%, Grade II in 36%, and Grade III in 23% of patients. Significant associations were observed between NAFLD and dietary factors such as Ati-Lavana and Ati-Vidahi Ahara, as well as lifestyle factors including Divaswapa, Viruddhahara, Vegadharana, and sedentary habits ($p < 0.05$), with a statistically significant relationship between Mandagni and NAFLD ($\chi^2 = 19.71$, $p = 0.003$). The study concludes that Agni Mandya is the central etiological factor in Yakritdalyudara/NAFLD, and that most patients were in the early, reversible stage of disease, indicating that timely dietary, lifestyle, and Ayurvedic interventions may effectively prevent progression and support hepatic recovery through an integrative approach.

Index Terms – Yakritdalyudara , NAFLD , Udarroga , agni , ama

INTRODUCTION

Non-Alcoholic Fatty Liver Disease (NAFLD) is one of the most common metabolic liver disorders worldwide, primarily associated with obesity, insulin resistance, unhealthy dietary habits and sedentary lifestyle. The condition is characterized by excessive fat accumulation in hepatocytes, which may progress to inflammation, fibrosis and liver dysfunction if left untreated. The increasing prevalence of

NAFLD has emerged as a major public health concern in modern society due to rapid lifestyle changes and altered food habits.

In Ayurveda, NAFLD can be correlated with Yakritdalyudara, a condition resulting from impairment of Agni, formation of Ama and abnormal accumulation of Meda in the Yakrit (liver). Consumption of Guru, Vidahi and Abhishyandi Ahara, along with lifestyle factors such as Divaswapna and lack of physical activity, contribute to dosha imbalance and metabolic disturbances. Understanding the role of etiological factors and Agni vikriti in NAFLD may help establish an integrative approach for early prevention and effective management of the disease.

AIM

To analyze and assess the Ayurvedic and modern etiological factors along with the status of Agni in patients suffering from Yakritdalyudara, specifically Non-Alcoholic Fatty Liver Disease (NAFLD).

OBJECTIVES

1. To study the etiological factors and Agni status in patients of Yakritdalyudara from an Ayurvedic perspective.
2. To evaluate the etiological factors and Agni status in patients of Yakritdalyudara based on modern medical aspects.
3. To determine the relationship between etiological factors, Agni status and Yakritdalyudara (Non-Alcoholic Fatty Liver Disease).

CONCEPT OF AGNI

Agni in Ayurveda refers to the vital metabolic and transformative energy responsible for digestion, metabolism, tissue formation, and overall physiological functioning. Derived from Sanskrit roots meaning “that which energizes” or “leads,” Agni is considered a form of *Tejas* (energy principle). In Vedic literature, Agni is regarded as a sacred divine force and mediator between humans and deities, symbolizing purity, transformation, intelligence, and cosmic order. Ayurveda classifies Agni into 13 types: one Jatharagni (primary digestive fire), five Bhutagnis (elemental metabolic fires), and seven Dhatvagnis (tissue-specific metabolic fires). Jatharagni governs digestion in the gastrointestinal tract and exists in four functional states—Manda (slow), Tikshna (excessive), Vishama (irregular), and Sama (balanced). Bhutagni is responsible for elemental transformation and assimilation of nutrients, mainly in the liver, while Dhatvagni supports tissue nourishment and metabolism. Agni plays a crucial role in digestion, nutrient transformation, maintenance of body tissues and sensory functions, physiological balance, mental clarity, and overall health.

Relevance of Agni and Bhutagni in Liver Function

Bhutagni is considered functionally active in the **Yakrit (liver)**, where it contributes to metabolic transformation of substances absorbed from the gastrointestinal tract. The liver is therefore viewed as a key site of elemental metabolism, detoxification and biochemical transformation, linking Agni directly with hepatic function and disease processes such as Yakritdalyudara (NAFLD).

UDARA ROGA (ABDOMINAL DISORDER AND YAKRITODARA)

Udara Roga refers to diseases of the abdominal region and is classified among the Ashta Mahagadas due to its severity and difficult prognosis. According to Ayurvedic classics, Mandagni (impaired digestive fire) is the primary causative factor. Udara Roga is characterized by progressive abdominal distension and includes eight types, among which Plihodara and Yakritodara are associated with splenic and hepatic involvement.

Yakritodara develops due to improper diet and lifestyle factors such as excessive intake of Ushna, Amla, Lavana, Kshara, Vidahi and Viruddha Ahara, suppression of natural urges, excessive exertion, improper Panchakarma, and chronic disorders like Pandu, Kamala and Grahani. These factors lead to Mandagni,

causing vitiation of Vata, Pitta and Kapha, Agni and Mala dushti, and Srotorodha, ultimately resulting in enlargement and dysfunction of Yakrit and Pliha, the Moola of Raktavaha Srotas.

Clinically, Yakritodara presents with Daurbalya, Arochaka, Avipaka, Pipasa, Angamarda, Jwara, Anaha, Karshya and altered taste perception, along with abdominal enlargement and discoloration of the abdominal skin. Based on doshic predominance, it is classified into Vataja, Pittaja and Kaphaja types. The pathogenesis occurs through either Sthana-Chyuti Janya (traumatic/mechanical displacement) or Vyadhi-Karshana Janya (systemic progression due to chronic disease and Rasa-Rakta dushti). If untreated, the disease may progress to severe fluid accumulation resembling ascites.

CHIKITSA (MANAGEMENT OF PLIHODARA/YAKRITODARA)

The management of **Plihodara and Yakritodara** follows a comprehensive Ayurvedic approach aimed at eliminating vitiated doshas, correcting **Mandagni (impaired digestion)**, reducing organ congestion and restoring normal function of the liver (Yakrit) and spleen (Pliha). The treatment primarily focuses on **Shodhana (purificatory therapies)** followed by **Shamana (palliative therapies)**.

1. Raktamokshana (Siravedha)

Raktamokshana, particularly Siravedha (venesection), is considered an important therapeutic procedure in Yakritodara and Plihodara, especially in conditions associated with Raktadushti. It helps reduce the load of vitiated blood on the Yakrit and Pliha, relieves congestion and abdominal distension, and alleviates symptoms such as burning sensation, heaviness and bloating. By eliminating aggravated Pitta and Rakta doshas, it acts as an effective detoxification therapy.

2. Swedana (Fomentation Therapy)

Swedana with Gomutra is indicated due to its Lekhana, Bhedana and Kapha-Vata pacifying properties. This therapy helps soften abdominal swelling, reduce distension and stiffness, mobilize vitiated doshas toward the gastrointestinal tract for elimination, and improve local circulation and metabolic activity.

3. Shamana Chikitsa

Following Shodhana therapies, Shamana Chikitsa is administered to pacify residual doshas and prevent disease recurrence. The treatment aims to restore Agni, strengthen hepatic and splenic function, maintain metabolic balance, and prevent further progression of Yakritdalyodara.

4. Takra Kalpana

Takra Kalpana is considered highly beneficial in Udara Roga because of its Deepana, Pachana, Laghu and Grahi properties. Medicated buttermilk prepared with Madhu, Taila, Vacha, Sunthi, Shatahva, Kushta and Saindhava Lavana helps improve digestion and appetite, reduce abdominal bloating and heaviness, balance Kapha and Vata doshas, and support hepatic metabolism and systemic detoxification.

MODERN PRESPECTIVE OF LIVER

The liver is the largest solid gland in the human body, located mainly in the right upper quadrant of the abdomen, occupying the right hypochondrium, epigastrium, and part of the left hypochondrium. It is reddish-brown, soft, highly vascular, and weighs about 1600 g in males and 1300 g in females. The liver is wedge-shaped and has five surfaces—anterior, posterior, superior, inferior, and right. Anatomically, it is divided into right and left lobes by the falciform ligament, with the larger right lobe containing the caudate and quadrate lobes. The porta hepatis is an important transverse fissure through which the portal vein, hepatic artery, and nerves enter, while hepatic ducts and lymphatics exit. The liver has a dual blood supply, receiving 20% blood from the hepatic artery and 80% from the portal vein. Blood passes through hepatic sinusoids and drains into the inferior vena cava through hepatic veins, supporting extensive metabolic functions. It also possesses rich lymphatic drainage and autonomic nerve supply through the

hepatic plexus. Functionally, the liver is divided into eight segments according to the Couinaud classification, which is important in modern hepatic surgery.

Gut–Liver Axis

The **gut–liver axis** represents bidirectional communication between the intestine and liver via the portal circulation and biliary system. Nutrients, microbial products and toxins from the gut reach the liver, influencing metabolism and immune responses.

Disruption of this axis contributes to chronic liver diseases such as:

- Cirrhosis
- Alcoholic liver disease
- Non-Alcoholic Fatty Liver Disease (NAFLD)

Altered gut microbiota and increased intestinal permeability lead to inflammation, fibrosis and progressive hepatic injury.

Non-Alcoholic Fatty Liver Disease (NAFLD)

Non-alcoholic fatty liver disease (NAFLD) is the most common chronic liver disease worldwide, including in India, and is strongly associated with obesity, type 2 diabetes mellitus, metabolic syndrome, and cardiovascular disease. NAFLD comprises a spectrum of liver disorders ranging from simple steatosis (NAFL) and non-alcoholic steatohepatitis (NASH) to fibrosis, cirrhosis, and hepatocellular carcinoma (HCC). Globally, NAFLD affects nearly 25% of the population, while in India its prevalence ranges from 9% to 53%, affecting individuals of all age groups and both sexes. The disease develops through a multifactorial "multi-hit" mechanism involving insulin resistance, lipotoxicity, oxidative stress, gut microbiota imbalance, and genetic susceptibility such as PNPLA3 and TM6SF2 gene variants. Insulin resistance plays a key role by increasing free fatty acid delivery to the liver, leading to hepatic fat accumulation, inflammation, and progression to NASH and fibrosis. Diagnosis requires evidence of hepatic steatosis along with exclusion of significant alcohol intake and other liver diseases. Common diagnostic tools include ultrasonography, FibroScan with controlled attenuation parameter (CAP), CT, MRI, and liver biopsy, which remains the gold standard though rarely performed. Fibrosis assessment is commonly done using non-invasive methods such as FIB-4, APRI, NAFLD Fibrosis Score, and elastography (FibroScan).

TREATMENT OF NAFLD

1. Lifestyle Modification

Lifestyle modification is the first-line management for NAFLD and includes weight reduction of 5–10%, regular aerobic exercise, dietary control with reduced saturated fat and sugar intake, and proper management of associated conditions such as diabetes, hypertension and dyslipidemia.

2. Pharmacotherapy

Pharmacological treatment is mainly indicated in patients with NASH and fibrosis. Commonly used agents include Vitamin E, Pioglitazone, Saroglitazar (commonly used in India), and emerging therapies such as GLP-1 receptor agonists.

3. Emerging Therapies

Newer treatment modalities under evaluation include FXR agonists such as obeticholic acid, CCR inhibitors, and thyroid receptor agonists, which target metabolic and inflammatory pathways involved in NAFLD progression.

4. Liver Transplantation

Liver transplantation is indicated in end-stage liver disease and advanced cirrhosis due to NAFLD, with outcomes comparable to other chronic liver dise

OBSERVATIONS

The study included 100 patients diagnosed with Yakritdalyudara (NAFLD). The majority belonged to the middle age group of 41–50 years (51%), followed by 31–40 years (32%) and below 30 years (16%), with minimal representation above 50 years (1%). Females (65%) outnumbered males (35%). Most participants were married (88%), and a large proportion belonged to Hindu religion (94%).

Educational status revealed that most patients had matric-level education (51%), followed by graduates (28%) and postgraduates (13%), while 6% were illiterate. Occupationally, housewives constituted the largest group (46%), followed by employed individuals (33%) and business workers (13%). Urban residents formed the highest proportion (47%), and most patients belonged to the upper-middle (36%) and middle socioeconomic class (30%).

Family history of liver disease was present in 18% of patients, while 71% had no such history. Dietary patterns showed a slight predominance of mixed diet (55%) over vegetarian diet (45%). Irregular dietary habits were common, particularly Vishamashana (35%), Alpashana (34%) and Adhyashana (17%), indicating disturbed food patterns in most patients.

Psychological assessment revealed Chinta (stress) in 49% of patients. Agni Pariksha showed Mandagni in 77% of cases, followed by Vishamagni (16%), Tikshnagni (3%) and Samagni (4%). Jaranashakti was moderate in most patients, while Abhyavaranashakti was generally adequate in 80% of cases.

Bowel habits indicated Krura Koshtha in 60% of patients and irregular Vata-Mutra-Purisha-Retasa Mukti in the majority (71%), suggesting constipation tendency. Associated disorders included piles (32%), PCOS (23%) and indigestion (6%), while 56% had no comorbidity.

BMI analysis showed 73% were overweight and 11% obese (Class I), while waist circumference was elevated in most patients (91–100 cm in 47%). Lifestyle factors revealed sedentary behavior, irregular exercise, high intake of Ushna, Lavana, Vidahi and Abhishyandi Ahara, along with frequent consumption of stale and junk foods.

Metabolic assessment showed 52% prediabetic and 29% diabetic patients (HbA1c >6.4%). Lipid profile revealed dyslipidemia, with 75% having high VLDL and 78% showing elevated total cholesterol. Ultrasonography showed Grade I fatty liver in 41%, Grade II in 36% and Grade III in 23%.

Liver function tests were largely within normal limits for bilirubin; however, mild elevations of SGOT/SGPT were seen in nearly one-third of patients. Serum albumin was low in 73% of cases, while total protein was reduced in 22%.

Overall, the findings indicate that NAFLD in this study population is strongly associated with middle age, female predominance, sedentary lifestyle, disturbed dietary habits, Mandagni, metabolic syndrome and dyslipidemia.

such as **Yakritdalyodara**, supporting integrative approaches in hepatology.

RESULT

A total of 100 patients diagnosed with Yakritdalyudara (NAFLD) were included in the study. Most patients belonged to the 41–50 years age group (51%), with female predominance (65%). The majority were married, urban residents, and belonged to middle to upper-middle socioeconomic class, while housewives constituted the largest occupational group. Mixed dietary habits were observed in 55% of patients, and irregular dietary practices such as Vishamashana, Alpashana, and Adhyashana were highly

prevalent. Sedentary lifestyle, Divaswapa (day sleep), stress, irregular sleep, and late-night awakening were commonly noted.

Mandagni was the predominant Agni status in 77% of patients, followed by Vishamagni (16%). Krura Koshtha was observed in 60% of cases. Anthropometric assessment showed that 73% of patients were overweight and 11% were obese, with increased waist circumference indicating central obesity. Metabolic abnormalities were highly prevalent, with 52% prediabetic and 29% diabetic, while dyslipidemia was common, including elevated total cholesterol and VLDL levels. Liver function tests revealed mild elevation of SGOT/SGPT in about 30% of cases, whereas bilirubin and alkaline phosphatase remained largely normal, suggesting early-stage disease. Ultrasonography showed Grade I fatty liver in 41%, Grade II in 36%, and Grade III in 23% of patients.

Statistical analysis demonstrated significant associations between NAFLD severity and Mandagni, increased BMI, Ati-Lavana Ahara, Ati-Vidahi Ahara, Viruddhahara, Divaswapa, Vegadharana, sedentary lifestyle, and smoking ($p < 0.05$). Significant biochemical associations were also observed with total lipids, total proteins, and indirect bilirubin levels. Overall, the findings suggest a strong association of NAFLD with Agni dysfunction, unhealthy dietary habits, sedentary lifestyle, obesity, and metabolic syndrome, supporting the Ayurvedic concept of Yakritdalyudara as a metabolic disorder primarily driven by impaired Agni and lifestyle factors.

Results of Statistical Analysis

A total of 100 subjects were analyzed to assess the association between ultrasonographic grading of fatty liver and various etiological, lifestyle, metabolic, and biochemical factors using Chi-square test, Pearson contingency coefficient, and descriptive statistics. Significance was considered at $p < 0.05$.

1. Significant Associations with Fatty Liver Grade

Significant associations ($p < 0.05$) were observed between fatty liver grade and both Ayurvedic and biomedical variables:

Ayurvedic dietary and lifestyle factors
Mandagni showed a strong association with fatty liver severity ($\chi^2 = 19.71$, $p = 0.003$), with predominance of Mandagni in 77% of subjects. Significant dietary and behavioral factors included Ati Lavana ($p = 0.001$), Ati Vidahi Ahara ($p = 0.03$), Viruddha Ahara ($p = 0.03$), Abhishyandi Ahara ($p = 0.047$), Pooti Anna Sevan ($p = 0.005$), Ati Ushna Ahara ($p = 0.05$), Ahitashana ($p = 0.05$), and Atiruksha Ahara ($p = 0.05$).

Lifestyle factors such as Vegadharan ($p = 0.05$), Divaswapa ($p = 0.03$), Ratri Jagaran ($p = 0.047$), Stress (Sanshobha) ($p = 0.047$), Ativyavaya ($p = 0.001$), and Atipurnat ($p = 0.04$) also showed significant associations.

Physical inactivity was strongly associated, with reduced exercise ($p = 0.02$) and reduced physical activity (Ati Margagamana) ($p = 0.02$) showing higher fatty liver grades.

Smoking also demonstrated a significant association ($p = 0.012$), with higher severity seen among exposed individuals.

Anthropometric factor
BMI showed a highly significant association with fatty liver grade ($\chi^2 = 25.39$, $p < 0.001$), with overweight individuals comprising 74% of the sample and showing higher grades of fatty liver.

2. Non-Significant Associations

No significant association was observed with several biochemical and lifestyle variables:

Liver function tests
SGOT ($p = 0.693$), SGPT ($p = 0.501$), alkaline phosphatase ($p = 0.469$), direct bilirubin ($p = 0.216$), serum albumin ($p = 0.678$), and serum globulin ($p = 0.32$) were not significantly associated with fatty liver grade, indicating preservation of hepatic synthetic and enzymatic function in most cases.

Lipid profile
Total cholesterol ($p = 0.173$), HDL ($p = 0.148$), VLDL ($p = 0.869$), and triglycerides ($p = 0.323$) showed no statistically significant association, although trends indicated worsening lipid metabolism with increasing fatty liver grade.

Other factors
Family history ($p = 0.913$), nutritional factors ($p = 0.991$), and metabolic factors ($p = 0.188$) were not significantly associated with disease severity.

3. Significant Biochemical Associations

Some biochemical parameters showed significant correlation with fatty liver severity:

- Total lipids ($\chi^2 = 12.2$, $p = 0.002$) showed a significant association, indicating progressive dyslipidemia.
- Total proteins ($\chi^2 = 22.48$, $p < 0.001$) showed a strong association, with increasing abnormality in higher grades.
- Indirect bilirubin showed a significant association ($\chi^2 = 15.13$, $p = 0.001$), increasing with disease severity.

4. Summary of Key Findings

Out of all variables analyzed, significant associations were predominantly observed in:

- **Dietary factors (Ahara)**
- **Lifestyle factors (Vihara)**
- **Obesity (BMI)**
- **Total lipids and total proteins**

In contrast, most liver function tests and conventional lipid parameters did not show statistically significant variation across fatty liver grades.

DISCUSSION

Non-Alcoholic Fatty Liver Disease (NAFLD), correlated with Yakritdalyudara in Ayurveda, represents a metabolic disorder characterized by progressive hepatic fat accumulation driven primarily by lifestyle, dietary habits, and metabolic dysfunction. Classical Ayurvedic texts such as *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya* describe Yakrit Vikara in association with Mandagni, Meda Dushti, and Srotorodha, which closely align with the modern understanding of insulin resistance–mediated hepatic steatosis.

Integrated Pathogenesis of NAFLD (Ayurveda–Modern Correlation)

The present study demonstrates that NAFLD develops through a multifactorial pathway involving dietary, behavioral, and metabolic triggers. Predominant findings showed a high prevalence of Mandagni (77%), overweight status (73%), and dysregulated dietary habits including Vidahi, Abhishyandi, Ushna, and Viruddhahara intake. These factors collectively initiate Agni impairment, leading to Ama formation and Meda Dhatu accumulation, which corresponds to hepatic triglyceride deposition in modern terms.

From a biomedical perspective, these findings align with insulin resistance–driven lipogenesis, increased free fatty acid influx, and impaired lipid oxidation, ultimately resulting in hepatic steatosis. Thus, Mandagni may be interpreted as a functional correlate of metabolic inflexibility and insulin resistance.

Significant Determinants of Disease Severity

Statistical analysis identified several key factors significantly associated with fatty liver severity ($p < 0.05$):

- **Obesity (BMI)** showed the strongest association ($p < 0.001$), confirming its central role in NAFLD progression.
- **Agni status (Mandagni)** was highly significant ($p = 0.003$), supporting its role as a primary pathogenic driver.
- **Dietary factors** such as Ati-lavana, Ati-vidahi, Abhishyandi Ahara, Viruddhahara, and Pooti Anna were significantly associated with disease severity, indicating the role of Santarpanajanya Ahara in hepatic fat accumulation.
- **Lifestyle factors** including sedentary behavior, Divaswapa, Vegadharana, stress, and irregular sleep patterns showed significant associations, highlighting the contribution of behavioral dysregulation.
- **Smoking and Ativyavaya** also showed significant associations, suggesting additional metabolic and hormonal stressors.

Biochemically, significant dyslipidemia (elevated total lipids and altered lipid profiles) further supported the progression of metabolic dysfunction underlying NAFLD.

Non-Significant Findings and Clinical Implications

Interestingly, conventional liver function tests including SGOT, SGPT, bilirubin, and alkaline phosphatase were not significantly associated with disease severity. This indicates that hepatocellular enzyme elevation is not a sensitive marker in early to moderate NAFLD, where structural fat accumulation occurs before functional impairment.

Similarly, family history, nutritional scoring, and some lipid parameters did not show statistically significant associations, reinforcing the dominant role of environmental and behavioral factors over hereditary predisposition in this cohort.

Disease Progression Perspective

Ultrasonographic grading revealed a distribution across Grade I (41%), Grade II (36%), and Grade III (23%) fatty liver, indicating that a substantial proportion of patients had already progressed beyond early-stage steatosis. This supports the concept that continued exposure to Nidana such as improper diet, sedentary lifestyle, and Agni Dushti leads to progressive hepatic involvement.

From an Ayurvedic standpoint, this progression reflects worsening Meda Dhatu Vriddhi, increasing Srotorodha, and deeper involvement of Yakrit with gradual suppression of Pitta and Agni.

Clinical and Theoretical Implications

The study strongly supports the integrative hypothesis that NAFLD/Yakritdalyudara is primarily a lifestyle-induced Santarpanajanya Vyadhi. Mandagni serves as the central pathological factor, linking dietary indiscretion and sedentary behavior to metabolic dysfunction and hepatic fat accumulation.

This reinforces the importance of early lifestyle correction, dietary regulation, and Agni restoration in prevention and management of NAFLD. Ayurvedic interventions targeting Meda Dushti and Agni enhancement may offer a rational therapeutic approach alongside modern metabolic management.

CONCLUSION

The present study establishes a strong conceptual and clinical correlation between **Yakritdalyudara (as described in Ayurveda)** and **Non-Alcoholic Fatty Liver Disease (NAFLD)**. Despite differing epistemological frameworks, both systems converge on a common pathophysiological foundation rooted in **dietary indiscretion, impaired digestion, and metabolic dysfunction**.

In Ayurveda, the disease process is initiated by the prolonged intake of **Vidahi and Abhishyandi Ahara**, leading to **Kapha–Pitta vitiation, Agni Mandya, and Ama formation**. This ultimately results in **Meda accumulation (Abaddha Meda)** in the Yakrit, causing **Srotorodha and hepatic dysfunction**, manifesting clinically as Yakritdalyudara.

Similarly, modern medicine describes NAFLD as a consequence of **caloric excess, sedentary lifestyle, insulin resistance, and dyslipidemia**, leading to hepatic steatosis, oxidative stress, inflammation, and possible progression to NASH and fibrosis.

The findings of the present study support this integrated understanding. A majority of patients were **overweight or obese**, exhibited **dyslipidemia, elevated metabolic risk markers, and Mandagni (77%)**, indicating a strong association between impaired digestive-metabolic function and fatty liver pathology. Significant associations were observed between NAFLD and **dietary factors (Ati-Lavana, Ati-Vidahi), lifestyle factors (Divaswapa, Viruddhahara, Vegadharana), and BMI**, as confirmed by chi-square analysis.

Importantly, most biochemical parameters such as bilirubin and transaminases remained within or near normal limits, suggesting that the majority of patients were in the **early and reversible stage of NAFLD**, where lifestyle modification and Agni correction may be highly effective.

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