

An Ayurvedic Perspective of Nonalcoholic Fatty Liver Disease

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Background: Non-Alcoholic Fatty Liver Disease (NAFLD) is a spectrum of liver disorders characterized by the accumulation of fat in the liver, including simple steatosis and non-alcoholic steatohepatitis (NASH). If left untreated, it can progress to more severe conditions such as liver cirrhosis and hepatocellular carcinoma. NAFLD is also associated with metabolic disorders like type 2 diabetes and coronary artery disease. Current treatment approaches are limited and largely centered around lifestyle and dietary changes.

Aim and Objective: To explore and present a comprehensive understanding of Non-Alcoholic Fatty Liver Disease (NAFLD) from an Ayurvedic perspective and evaluate its potential in the management and treatment of this condition.

Materials and Methods: A thorough review of classical Ayurvedic texts and contemporary scientific literature was conducted to identify correlations between NAFLD and relevant Ayurvedic concepts. The study also examined existing Ayurvedic formulations, dietary practices, and lifestyle interventions that align with managing conditions analogous to NAFLD.

Conclusion: Ayurveda offers a holistic approach to preventing and managing NAFLD through personalized dietary guidelines, lifestyle modifications, and herbal formulations. Its emphasis on balancing bodily Doshas and promoting liver health positions it as a promising complementary strategy in managing NAFLD and related metabolic disorders.

Keywords: Coronary Artery Disease, Steatosis, Steatohepatitis, Ayurveda

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Introduction

Non-alcoholic fatty liver disease (NAFLD) is a disease of affluent societies, and its prevalence is increasing in proportion to the rise in obesity. It can be classified into simple fatty infiltration (steatosis-5-10% of the liver's total weight), inflammation (non-alcoholic steatohepatitis, or NASH), and cirrhosis in the absence of excessive alcohol consumption. Simple steatosis does not cause morbidity, while NASH is linked to progressive fibrosis, cirrhosis, and liver cancer. NAFLD is strongly associated with obesity, dyslipidemia, insulin resistance, and type 2 diabetes mellitus, and so may be considered to be the hepatic manifestation of the 'metabolic syndrome'.^[1]

Ayurvedic texts do not directly discuss liver disease, which is caused by poor lipid metabolism due to a lack of exercise and unhealthy eating habits. In Ayurveda, liver disorders and their management are described in vast and scattered detail throughout the ancient texts, and these are dealt with under *Udara Roga* or the abdominal disorders. According to various *Ayurvedic literature*, *Udara Roga* is eight in number and the symptoms of *Yakritodara*, which *Lakshana* are described the same as *Pleehodara* resemble a nonalcoholic fatty liver disease.^[2]

Also, *Susruta*, first time, gave the specific name to the *Yakrit Vridhi* as *Yakrit Dalyudara*.^[3]

The symptoms and signs of *Yakritodara* are the same as those of *Pleehodara*, as both the organs are *Mula* of *Rakta Vaha Srotas*, and the liver and spleen are said to have similar functions. The classics describe five kinds of *Pleehodosha* (*Pancha Pleeha Dosha*) similarly, *Yakrit Gata Dosha* may be established. *Astanga Samgraha* has described three types of *Pleehodara*, so three types of *Yakritodara* may be enumerated. To fully grasp diseases in Ayurveda, it is essential to consider *Nidana*, *Dosha*, and *Doosha*. Also, Non-alcoholic fatty liver disease (NAFLD) unquestionably falls under the category of *Santarpanajanya Vyadhi*, as defined by *Acharya Charaka* in the *Charaka Samhita*.^[4]

Materials and Methods

Ayurvedic classical texts, clinical medicine literature, and relevant websites were referred to and reviewed for the present study. Various databases such as PubMed, Scopus, DHARA, Google Scholar,

And ScienceDirect were searched using keywords such as 'Non-Alcoholic Fatty Liver', '*Yakrit Vridhi*', and '*Yakrit Dalyudara*'.

Epidemiology

In India, the prevalence of NAFLD has been reported to be 9% to 53%.^[5,6] NAFLD is more common in men. Non-Alcoholic Fatty Liver Disease (NAFLD) is emerging as an important cause of liver disease in India and has taken the lead in recognizing NAFLD as a major Non-Communicable Disease. Out of 10, one to three people can have NAFLD, which highlights the impact of the disease. Non-communicable diseases (NCDs) account for more than 66% of deaths in the country.^[7]

Disease Review

Because of the vitiation of gastric fire and the rise of morbid matter, men might develop a variety of diseases, but these circumstances specifically cause abdominal disorders [*Udara*]. Complete digestion will not occur, and morbid materials will accumulate in the body when the stomach fire is weak from eating unclean food. In addition to blocking the upper and lower gastrointestinal channels, this diseased matter impairs the function of the *Prana*, the stomach fire, and the *Apana*. It then causes the abdomen to protrude excessively and penetrate between the skin and the flesh, leading to abdominal illness.

Nidana, or etiology, is crucial in developing and treating diseases. Abdominal diseases are caused by a variety of factors, including excessive accumulation of morbidity in the body, chyme-morbidity, shock, over-impletion, obstruction (of the passage of stools) due to piles or hair in the ingested food, ulceration and perforation of the intestines, the consumption of extremely hot, salty, alkaline, irritant, acid, or poisoned food, improper rehabilitation procedures, dry, antagonistic, and impure diets, emaciation from splenic disorders, the neglect of treatment of severe diseases, dehydration, and the suppression of natural urges.

Loss of appetite, extremely slow digestion of sweet, heavy, and unctuous foods, failure to distinguish between indigestion and digestive conditions, intolerance to overeating, mild foot edema, persistent weakness, dyspnea even with light exertion, increased and accumulated fecal matter due to dehydration and mis peristalsis, pelvic,

Hypochondriac, and iliac pain, As the distension grows, it hurts as though it were about to burst. Even with a small and light diet, the stomach swells. In addition to the abdominal folds vanishing, a network of veins appears. These are the initial signs of disorders of the abdomen. [*Udara*].**[8]**

Acharya Charaka also quotes that the key dietary (*Aharaja*) and regimental (*Viharaja*) factors include *Snigdha* (unctuous), *Madhura* (sweet), *Guru* (heavy), and *Pichilla* (slimy) foods, as well as *Navanna* (newly harvested grains) and various meats. Excessive consumption of these foods can lead to *Tarpana* (over-nourishment), causing *Kapha Dushti* (vitiation of *Kapha Dosha*).**[3]**

Overindulgence in curd, newly harvested grains, and milk may result in *Srotorodha* (obstruction of circulatory channels) due to their congestive properties. Additionally, long-term regimental practices can disrupt *Kapha Dosha* and lead to the formation of *Ama* (toxins). Also, according to *Sushruta Vidhi*, *Abhishyandi Ahara Sevana* leads to *Rakta* and *Kapha Dushti*.**[9]** Further *Vidahi Ahara* leads to *Dushti* of *Pitta*, which causes *Manda Jwara*, and *Abhishyandi Ahara* leads to *Dushti* of *Kapha*, which causes *Mandagni*.**[10]**

Among the eight types of *Udara Roga*, the specific cause of *Pleehodara* described as the spleen, located on the left side of the abdomen, can enlarge and become displaced due to excessive food intake, travel, vehicle operation, strenuous exercise, heavy lifting, long walks, and weight loss from emetic therapy or chronic diseases. It may also swell from increased blood volume related to higher *Rasa* levels. Initially, the spleen feels very firm upon palpation, like a tortoise shell. If untreated, this condition can progress to *Pleehodara*, extending toward the sides and lower abdomen (*Kukshi*) and affecting the pancreas (*Agni Adhithana*).**[7]**

Kapha Dushti caused by *Nidana* leads to the accumulation of *Meda* in the Liver. Fatty liver is the medical term for this condition. It is caused by *Srotorodha*, or channel obstruction, due to vitiated *Kapha* and *Meda*, leading to an increase in *Vata*. When *Vata* becomes vitiated, it results in *Agnivikruti*, and this cycle continues. Inflammatory changes occur in hepatocytes when *Pitta* is involved in the pathophysiology of the disease, progressing it to the next stage known as Non-Alcoholic Steatohepatitis (NASH).

As *Vata* plays a role, fibrosis can develop, potentially advancing the condition to more severe forms, such as cirrhosis, ascites, and hepatocellular carcinoma, alongside other metabolic issues.**[11]**

Several factors contribute to the etiopathogenesis of fatty liver, including the vitiation of *Samanavayu*, *Apanavayu*, *Pachaka Pitta*, *Ranjaka Pitta*, *Kledaka Kapha*, *Rasa Rakta*, *Medo Dhatu*, and *Pureesha*.**[12]** The *Srotas* associated with the etiology and expression of fatty liver include *Annava*, *Udakava*, *Rasava*, *Raktava*, *Medova*, and *Pureeshava*.**[13]** The *Dushti* of these *Srotas* is caused by a high-fat diet, soft beverages, and a sedentary lifestyle, according to the Ayurvedic theory. *Nidanarthakara Rogas* include *Ajeerna* (indigestion), *Sthaulya* (obesity), and *Prameha* (diabetes mellitus), arise from the vitiation of the *Annava*, *Rasava*, and *Medova Srotas*.**[14]**

Disease Manifestations

Patients with non-alcoholic fatty liver disease (NAFLD) may experience nonspecific symptoms, although many are asymptomatic. If the same features as *Pleehodara* fatigue, mild fever, weak digestion, symptoms of *Kapha* and *Pitta* vitiation, loss of strength, and severe anemia appear on the right side of the body, it should be known as *Yakritodara* according to Acharya Sushruta. Moreover, in *Asthang Hridaya Nidanasthana* chapter 12, he described symptoms of *Yakrita Roga* as the same of *Pleehodara* (*Udarvarta*, *Ruja*, *Anaha*, *Trishna*, *Jwara*, *Gauravata*, *Aruchi*, and *Kathinya*).**[15]**

Also, in the early stages of Non-Alcoholic Fatty Liver Disease (NAFLD), patients often experience abdominal heaviness, bloating, appetite changes, constipation or diarrhea, fatigue, and belching. This resembles *Ajeerna*,**[16]** a digestive disorder; in obese individuals, it mirrors *Sthaulya*.

As NAFLD progresses to Non-Alcoholic Steatohepatitis (NASH), symptoms align with *Amlapitta* (gastroesophageal reflux), including sour belching, burning sensations in the chest and abdomen, bloating, tastelessness, and loose stools. Patients may have frequent bowel movements without proper digestion, similar to *Grahani* (sprue).

In advanced stages like fibrosis and cirrhosis, serious symptoms emerge, indicating liver dysfunction.

These include signs of *Pandu* (anemia and fatigue), *Kamala* (yellowing of the skin and eyes), and *Raktapitta* (vomiting blood). Ultimately, the condition can lead to *Udara* (ascites) or a more site-specific issue, *Yakritodara*.^[17]

Management

Ayurveda offers promising potential for managing this condition. Since fatty infiltration is a type of *Santarpanajanya Vyadhi*, *Apatharpana* treatment is advised, focusing on avoiding triggers and disrupting the disease's pathogenesis. The treatment aims to correct *Agni* (digestive fire), digest *Ama* (toxins), alleviate *Kapha*, and perform *Lekhana* (scraping) of accumulated *Medas* (fat).^[18]

Nidana Parivarjana: Avoiding *Shleshma Medokara Ahara* (*Kapha*-increasing diets) can help reduce NAFLD incidence.

Shodhana: *Virechana* (purgation) is ideal, targeting the *Yakrit* (liver) as the disease's root. *Rooksha Virechana* with *Choornas* (powders) and *Kashayas* (decoctions) is recommended to cleanse excessive *Dosha* and *Srothorodha*.

Samsamana: In the initial stage of *Amavastha* (excess *Kapha*), treatments such as *Pachana* (digestion), *Deepana* (stimulating digestion), and *Rookshana* (drying) should be applied to pacify *Kapha* and *Ama*. Utilizing *Katu* (pungent) and *Tikta* (bitter) *Rasa* can also be beneficial, as these have *Sneha-Meda-Kleda-Shoshana* properties. Using *Lekhaneeya* drugs can effectively eliminate *Sanchita Ama* and excess fat from liver cells. Additionally, *Medohara Chikitsa* can offer further benefits.

Ayurveda Formulations as^[19-22]

| SN | Kalpana | Formulation |
|-----|-----------|---|
| 1. | Guggulu | Triphala Guggulu ^[19] |
| 2. | Kashaya | Patolkatukrohinyadi Kashayam, ^[20] Rohitakaabhaya Kwath |
| 3. | Vati | Arogyavardhini Vati, ^[21] Manakadi Gudika, Rohitaka Vati |
| 4. | Churna | Rohitaka Churna |
| 5. | Lavana | Abhaya Lavana |
| 6. | Rasa/Lauh | Rasaraj Rasa, Yakritpleehari Lauh, Yakridari Lauha, Shankhadravak Rasa, Loknatha Rasa, Chitrakadi Lauh, Rohitaka Lauh |
| 7. | Kshara | Putika Kshara |
| 8. | Ghrita | Pippali Ghrita, Shadpala Ghrita |
| 9. | Swedana | Gomutra |
| 10. | Ekala | Katuki, Kalmegha, Kumari, Daruharidra, Rohitaka, Aushadha ^[23] Apamarga Root, Varuna, Kakamachi Bringaraj |

Rasayana: This method is particularly suitable since *Ama* is *Dhatuleena*. Look for drugs that aid digestion and promote detoxification, such as *Triphala*, *Shilajatu*, and *Guggulu*.

Pathya and Apathya^[24]

Pathya Ahara: *Purana Kulathi*, *Mung*, *Shali*, *Yava*, *Jangal Mamsa*, *Peya*, *Sura*, *Sidhu*, *Madhu*, *Rasona*, *Eranda Taila*, *Ardra*, *Harada*, *Elaichi*, *Yavakshara*, *Aja Dugdha*, *Godugdha*, *Ushtri Dugdha*, *Mahisha Dugdha*, *Tikta Rasa*, *Arka Makoya*.^[25]

Pathya Vihara: *Langhana*, *Agni Karma*, *Basti*, *Siravyadhna*^[26], *Yoga-Asana*^[27] - *Pranayama*, *Kapalabhati*, *Pachhimamotasana*, *Ardhamatsyendrasana*, *Dhanurasana*, *Mandukasana*.

Apathya Ahara: It's advisable to avoid heavy, greasy foods, along with items like yogurt, ghee and certain grains, *Tila*, *Ushna*, *Vidahi*, *Aanupa Audaka Mamsa*.

Apathya Vihara: Avoiding daytime naps and listening to natural urges is also beneficial, *Snehana*, *Dhoompana*, *Jalapana*, *Vamana*.

Result

The comprehensive review of Ayurvedic texts and contemporary literature revealed a significant conceptual overlap between Non-Alcoholic Fatty Liver Disease (NAFLD) and various Ayurvedic liver disorders, primarily *Yakritodara* and *Pleehodara*, under the broad classification of *Udara Roga*.

Key findings include:

- **Etiopathogenesis Correlation:** NAFLD aligns with *Santarpanajanya Vyadhi* (diseases due to over-nutrition), primarily caused by the vitiation of *Kapha* and *Meda* along with *Agni Mandhya* (weak digestive fire) and *Srothorodha* (obstruction of bodily channels). This closely reflects the pathogenesis of fatty liver disease described in modern medicine, including lipid accumulation, insulin resistance, and systemic inflammation.
- **Progression Stages Match:** The progression of NAFLD - from simple steatosis to Non-Alcoholic Steatohepatitis (NASH) and ultimately cirrhosis - can be traced in Ayurvedic terms through increasing involvement of *Pitta* and *Vata*, leading to *Agnivikriti*, *Ama* accumulation, and eventual *Udara Roga*.

- **Symptom Parallels:** Clinical symptoms of NAFLD - such as bloating, fatigue, indigestion, and hepatomegaly - correspond to symptoms described in *Yakritodara*, *Ajeerna*, *Sthaulya*, and *Pandu*, affirming a clinical resemblance.
- **Management Strategies Identified:**
 - *Shodhana* therapies such as *Virechana* (therapeutic purgation) and *Langhana* (lightening therapy) were most effective in early and intermediate stages.
 - *Samshamana* therapy (palliative) with *Deepana*, *Pachana*, *Lekhana* drugs like *Triphala Guggulu*, *Arogyavardhini Vati*, *Patolkaturohinyadi Kashaya*, and *Rohitaka* were noted for their hepatoprotective and lipid-lowering properties.
 - *Rasayana* therapies such as *Shilajatu*, *Guggulu*, and *Triphala* promote liver regeneration and enhance metabolic function.
 - *Pathya-Apathya* guidelines provided a dietary and lifestyle framework that supports liver health and reverses metabolic dysfunction.
- **Lifestyle Interventions:** Ayurvedic practices including yoga, pranayama, and specific asanas like *Mandukasana* and *Ardha Matsyendrasana*, were beneficial for managing obesity, improving digestion, and reducing hepatic fat.
- **Formulations:** More than ten classical formulations were identified with direct or supportive roles in managing liver disorders comparable to NAFLD, supporting the clinical efficacy of Ayurveda-based treatment regimens.

Discussion

Non-Alcoholic Fatty Liver Disease (NAFLD), increasingly recognized as the hepatic component of metabolic syndrome, poses a significant public health burden globally and in India. With no approved pharmacological treatment available in modern medicine, the role of integrative and traditional systems like Ayurveda has gained considerable attention for both preventive and therapeutic strategies. This review reveals a strong conceptual framework in Ayurveda that closely aligns with the etiopathogenesis, progression, and clinical features of NAFLD. The condition's manifestation, which involves excessive fat deposition in the liver, corresponds to *Yakritodara*, a subset of *Udara Roga*,

And is categorized under *Santarpanajanya Vyadhi*, or diseases of over-nourishment. This reflects the Ayurvedic understanding that imbalances in *Kapha* and *Meda*, often due to improper *Ahara* (diet) and *Vihara* (lifestyle), are central to the disease's origin.

Furthermore, Ayurvedic texts detail how *Mandagni* (weak digestive fire), *Ama* (toxins), and *Srotorodha* (channel blockages) create a cascade of physiological disruptions that mirror modern biomedical explanations of lipid accumulation, inflammation, and insulin resistance seen in NAFLD and its progression to NASH. The intricate involvement of *Dosha* (*Kapha*, *Pitta*, and *Vata*) during different stages of the disease aligns with the modern understanding of pathogenesis - from hepatic steatosis (*Kapha*, *Meda*), to inflammation (*Pitta*), and finally fibrosis and cirrhosis (*Vata* involvement).

The clinical features mentioned in classical Ayurvedic texts - such as abdominal heaviness, loss of appetite, bloating, fatigue, and anemia - resemble those in early and advanced stages of NAFLD. Ayurvedic parallels like *Ajeerna*, *Sthaulya*, *Amlapitta*, *Grahani*, *Pandu*, and *Kamala* provide a broader spectrum of symptomatic understanding.

Importantly, the management protocol in Ayurveda is not only symptomatic but aims at root-cause resolution through:

- *Shodhana* therapies (primarily *Virechana*) to expel accumulated *Doshas*.
- *Samsamana* therapies using *Deepana-Pachana*, *Lekhana*, and *Rasayana* herbs to stimulate digestion, promote fat metabolism, and regenerate liver cells.
- Dietary and lifestyle modifications that emphasize *Kapha-Meda* reducing diets, abstaining from heavy or fermented foods, and including therapeutic yogic practices.

The identified formulations like *Triphala Guggulu*, *Arogyavardhini Vati*, *Rohitaka Kashayam*, and *Shilajatu* show promising hepatoprotective, anti-inflammatory, and lipid-lowering properties, as supported by both classical claims and emerging clinical evidence. These formulations support liver detoxification, regulate lipid metabolism, and strengthen *Agni*, thus addressing both the symptoms and causes of NAFLD. Moreover, non-pharmacological approaches, including *Langhana*, *Yoga*, and *Pranayama*,

Play a crucial role in reducing abdominal fat, enhancing metabolism, and improving mental health, key components in developing and managing metabolic diseases.

Conclusion

All diseases, including metabolic syndrome, which is mostly brought on by poor diet and lifestyle choices, are largely caused by changes in the human-environment interaction. An increasingly common disorder that can lead to end-stage liver disease is fatty liver disease. It has the potential to proceed to cirrhosis and liver failure. There is no proven pharmaceutical treatment for fatty liver disease in contemporary medicine. Since no single medication has been proven successful, treatment for it is still being developed. Consequently, there is a search for safe and affordable alternative treatment modalities.

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