

Systematic Review

Reviving liver health with ayurveda: a systematic review of non-alcoholic fatty liver disease management

Harshitha K. S.^{1*}, Mythrey R. C.²

¹Department of PG and PhD studies in Kayachikitsa, Sri Kalabhyraweshwara Ayurvedic Medical College, Hospital and Research Centre, Bengaluru, Karnataka, India

²Department of PG and PhD Studies in Kayachikitsa, Government Ayurveda Medical College and Hospital, Mysuru, Karnataka, India

Received: 20 February 2025

Revised: 17 March 2025

Accepted: 03 May 2025

*Correspondence:

Dr. Harshitha K. S.,

E-mail: drharshithasathyakumar@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Liver diseases (Yakrit Roga) constitute a global health concern. Non-alcoholic fatty liver disease (NAFLD), which exhibits a global prevalence of 25%, is on the rise, raising significant concerns regarding its impact on global health. NAFLD results in the accumulation of triglycerides and unbound fatty acids within the hepatic tissue. This systematic literature review presents a comprehensive examination of the restoration of liver health in individuals with NAFLD through the principles of Ayurveda. It analysed the results in this discipline from its inception in 2016 to the latest research published in recent years, utilizing PubMed and Scopus, employing specific inclusion and exclusion criteria. Based on the research results, it can be concluded that there is existing evidence regarding both the safety and effectiveness of Ayurvedic interventions along in the treatment of NAFLD. The combined effects of Triphala Guggulu and Arogyavardhini Vati in combination with Pathya (Ayurvedic diet and exercise) showed promising combination. Physical exercise and dietary management are the principal methods for regulating the progression of NAFLD and significantly elevates the probability of non-alcoholic steatohepatitis, (NASH) cirrhosis, and hepatocellular carcinoma.

Keywords: Liver cirrhosis, Ayurveda, Liver health, Traditional Indian medicine, Management, NAFLD, Yakritodara

INTRODUCTION

Globally, liver diseases represent an important source of morbidity and mortality.¹ A variety of etiological factors contribute to liver dysfunction, which can result in intricate conditions; however, the rates of advancement and clinical trajectories may vary.¹ Ayurveda, Siddha, and Unani (collectively referred to as ASU) are traditional medical systems originating from India. These systems delineate various classifications of liver disorders and propose therapeutic methodologies, products, and natural constituents for their treatment.² NAFLD presumed to be Yakrit Vikar and addressed with concept of the Ayurveda.³ NAFLD, an inflammatory hepatic disorder that is often linked to insulin resistance, central adiposity, and

metabolic syndrome. The worldwide prevalence of NAFLD has risen to 25% and is projected to reach 56% by the year 2030.⁴

NAFLD, a leading contributor to cirrhosis and hepatocellular carcinoma (HCC), represents a significant global concern for healthcare professionals.⁵ NAFLD is anticipated to emerge as the main source of liver-related morbidity and mortality, as well as hepatic transplantation. In individuals who do not consume alcohol, NAFLD leads to the accumulation of lipids within the liver.⁶ Steatosis, with or without moderate inflammation of the NAFL, advances to NASH, resulting in an accelerated progression of fibrosis. In contrast to other hepatic disorders, NAFLD is associated with metabolic syndromes.⁷

NAFLD is a medical disorder in which persons who drink little or no alcohol accumulate too much liver adipose tissue.⁸ NAFLD is a common hepatic condition that ranges from simple fatty liver to NASH, a more severe form with hepatic inflammation and injury.^{9,10} The aberrant accumulation of lipid droplets is Simple steatosis in hepatocyte cytoplasm without histological signs of damage, inflammation, or fibrosis.¹¹ Steatosis is self-limiting and may be treated with lifestyle changes. Steatosis may proceed to NASH.¹² NASH-related cirrhosis replaces liver architecture with type 1 collagen, resulting in pseudolobules.¹³ Excess energy intake, obesity, resistance to insulin, genetic predispositions, the gender and ethnic variations, bacteria in the gut structure, hypoxia, oxidative damage, peroxidation of lipids, inflammatory cytokines, hepatic iron buildup, endogenous cannabinoid receptor 1 activation, and epigenetic alterations all contribute to NAFLD.¹⁴

Ayurveda drugs have treated liver problems of several causes for ages. Pharmacological medications used to treat NAFLD of various etiologies are reviewed in this systematic study.¹⁵ Previous research on hepatoprotective plants show that herbal medicines and phytochemicals reduce liver damage. Hepatoprotective qualities reduce oxidative stress, which harms the liver, in most experiments.¹⁶ Other methods include fibrogenesis

suppression, oxidative damage mitigation, tumor growth reduction, and antiviral actions.¹⁷ The effectiveness and safety of Ayurvedic liver drugs have been shown, however randomized clinical studies are few.¹⁸ NAFLD therapy requires more randomly chosen multicentric clinical research to develop evidence-based therapies.¹⁹ For certain therapeutic plants, further study is needed to identify, isolate, verify, and normalize the active components or molecules and test them in appropriate culture or laboratory animals to rationally apply chosen medication candidates. Thus, this field of study is young, but it provides a platform for future inquiry and conversation and has great potential to improve our understanding. The article examines how Ayurveda might restore liver function in NAFLD patients.

METHODS

We undertook a systematic literature review utilizing the PubMed, Scopus, Web of Sciences, Embase, and Cochrane Library sources. We employed the following keyword words: "Ayurveda," "drugs," "medicinal plants," "herbal drugs," "treatment," "management," "traditional medicine," "fatty liver," "liver diseases," and "NAFLD," to identify articles published between January 2016 and January 2025.

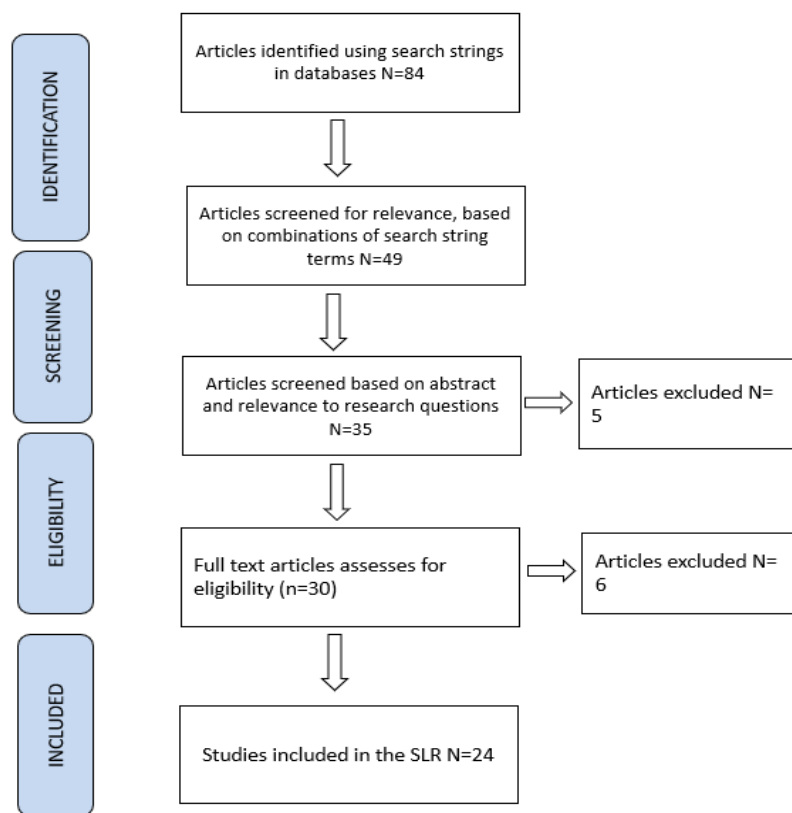


Figure 1: Literature search process of selection of articles for inclusion in the SLR (based on the PRISMA flow diagram).

Study selection

All recognized papers' headings and abstracts were selected to establish their eligibility. Studies were deemed eligible for consideration if they met the following selection criteria: A total of 84 studies were identified through database searches, supplemented by additional data obtained from various sources. The author categorized the articles according to their titles, subsequently examining the abstracts to ascertain eligibility. Studies were deemed eligible for consideration if they fulfilled the criteria during the initial review phase, data duplicates papers were eliminated, and further analysis was conducted on the remaining papers. Inclusion criteria include the study provided sufficient information regarding Ayurveda, clinical outcomes of NAFLD and liver diseases. Research examining the detrimental impacts on Ayurveda and liver diseases caused by NAFLD was also considered. Investigations were likewise excluded if they involved participants with a history of drinking alcohol to excess, viral hepatitis, autoimmune hepatitis, Wilson's illness, or hemochromatosis. The study also encompassed papers that addressed preventive measures and Ayurvedic drug formulas.

Prisma diagram is based on the data where nearly 35 publications were excluded from the study following the initial screening due to their absence of requisite data for analysis. An additional 30 articles and studies pertaining to data were reviewed, resulting in the exclusion of 6 papers due to the symptom of liver disease caused by excessive use of alcohol. A total of twenty-four manuscripts that met the established inclusion criteria were selected and subjected to review. A total of twenty-four papers encompassing all potentially eligible studies were compiled, and the viability of every research investigation was evaluated by the author in accordance with the established inclusion criteria.

Data extraction and quality assessment

Utilizing a standardized data obtaining form, the data were extracted statistics from the comprised studies. The subsequent information was extracted from each study: Rechecking of articles was employed to resolve any discrepancies in the data retrieval or quality assessment processes.

RESULTS

Ayurveda is abundant with a diverse array of herbo-mineral formulations, the efficacy and safety of which in the treatment of liver disease have been substantiated through various research studies included in the review. To treat liver disease, the therapeutic value of Ayurveda formulations can be used.²⁰

The hepato-stimulant properties of many drugs are clarified in Ayurveda and are used to treat hepatic disorders. The Charak Samhita, the most ancient recorded

text of Ayurveda, describes various drugs in relation to the treatment of medical conditions analogous to jaundice (medical presenting analogous to Kamala), hepatomegaly (clinical appearance identical to Yakridalyodara), cirrhosis (clinical appearance identical to Kumbhkamala), and ascites (medical presentation equivalent to Jalodara, which means fluid in the abdomen).²¹ Classical texts have characterized the liver as the anatomical locus of Rakta (blood) and Pitta (bile). Consequently, the pathogenesis associated with liver diseases primarily stems from impaired digestive fire (Mandagni), an accumulation of Rakta or Pitta, obstruction, and compromised movement of bile (Pitta), or a confluence of these elements.²⁰

Table 1: Different Ayurvedic formulations of different articles.

Reference	Different Ayurvedic formulation
Sharma et al ²	Triphala Guggulu and Arogyavardhini vati
Banerjee et al ²³	Triphala is a compound made from Amalaki (<i>Embolica officinalis</i> L.), Haritaki (<i>Terminalia chebula</i> L.), as well as Vibhitaki (<i>Terminalia bellerica</i> L.)
Varsakiya et al ¹³	Virechan Karma (therapeutic purgation) was followed by oral Ayurvedic medicines including Varunadi Kwatha, Kanchanar Guggulu, and Aarogyavardhini vati
Das et al ¹⁶	Piper beetle plants
Panda et al ⁹	Arogyavardhini vati
Zhu et al ¹¹	Berberine (BBR), a natural plant product
Zarzour et al ²⁹	50% methanolic extract of <i>P. niruri</i>
Ghezelbash et al ²⁸	Triphala and Chirayita
Ganesh et al ⁴ , Shivnitwar et al ⁷ , Kantharia et al ⁸	Liv 52
Girhepunje et al ²⁴	Vardhaman Pippali Rasayan
Zhang et al ³⁰	<i>Terminalia bellirica</i> ethanol extract
Beselga et al ³¹	Mediterranean spices and aromas
Raut et al ¹⁵	<i>Picrorhiza kurroa</i> , Royle ex Benth

Different formulations of ayurveda to revive liver

The classical review of Ayurveda delineates a variety of formulations for the treatment of liver disorders (Table 1). Among these, the most prevalent and frequently prescribed include Katuki (*Picrorhiza kurroa* Royle ex Benth), Bhunimba (*Andrographis paniculata* Nees.), Bhumiamalaki (*Phyllanthus niruri* Linn.), Kakmachi

(*Solanum nigrum* Linn.), Mulethi (*Glycyrrhiza glabra* Lin.), Giloy (*Tinospora cordifolia* [Willd] Hook. F. and Thoms.), Bhringraj (*Eclipta alba* [L.] Hassk.), Pippali (*Piper longum* L.), Rohitaka (*Tecoma undulata* G. Don.), Nimba (*Azadirachta indica* A. Juss.), Sharapunkha (*Tephrosia purpurea* Pers. Linn. Pers.), Ashwagandha (*Withania somnifera* Lin.), Vasa (*Adhatoda vasica* Nees.), Paarijata (*Nyctanthes arbor-tristis* Linn.), Bharangi (*Clerodendrum serratum* Linn. Moon.), and Haridra (*Curcuma longa*), among others.²²

Jhavuka (*Tamarix aphylla* Linn.), Dhataki (*Woodfordia fruticosa* Kurz.), Jambu (*Syzygium cumini* Lin.), Kasani (*Cichorium intybus* Lin.), Dugdhapheni (*Taraxacum officinale* Weber ex Wiggers), Nimba (*Azadirachta indica* A. Juss.), Apamarga (*Acyranthes aspera* Lin.), Himsra (*Capparis spinosa*), and Kasamarda (*Cassia occidentalis*) are less used clinically for liver conditions but more often for other diseases. Unique administration of *P. longum*, which uses adjusted ascending and decreasing doses, Vardhamana Pippali and a particular milk diet, rejuvenates. Treatment of hepatic ascites with this method is widespread and successful.²³ Triphala is a compound made from Amalaki (*Emblica officinalis* L.), Haritaki

(*Terminalia chebula* L.), as well as Vibhitaki (*Terminalia bellerica* L.). In Ayurveda, Arogyavardhini vati, Triphala Guggulu, and Phaltrikadi Kwath cure hepatic diseases. The main ingredient in Arogyavardhini vati is Katuki (*P. kurroa*), accounting for 50% of entire formulation.²⁴ Bitter taste of katuki (*P. kurroa*) helps digest Ama (metabolic toxins). Trituration with Triphala decoction combines Triphala, Pippali (*Piper longum*) and Guggulu (*Commiphora mukul*). Decoction improves digestion, metabolism, phlegm, circulation, edema, urinary problems and tissue regeneration, according to Ayurveda.²⁵

Pippali reduces body fat and potentiates pharmacological substances, whereas Guggulu purifies channels and reduces obesity. Triphala Guggulu is Lekhaniya (obesity scraper) and reduces triglycerides and body fat in NAFLD patients.²⁶ Phaltrikadi kwath, a popular herbal remedy, contains Guduchi, Vasa (*A. vasica* Nees.), Kalmegh, Nimba (*A. indica* A. Juss.), Katuki (*P. kurroa*), and Triphala. Clinical trials show its hepatitis treatment effectiveness.²⁷ Triphala is hepatoprotective, appetite-stimulating, chemopreventive, and hyperacidity-reducing. S. chirayita is widely used to treat gastrointestinal problems, and chronic hepatitis.²⁸

Table 2: Different compounds present in the Ayurvedic medication with application.

Ayurvedic Medicine	Composition	Uses
Liv 52	<i>Capparis spinosa</i> , <i>Cichorium intybus</i> , <i>Solanum nigrum</i> , <i>Terminalia arjuna</i> , <i>Cassia occidentalis</i> , <i>Achillea millefolium</i> , <i>Tamarix gallica</i>	Prevention and treatment of viral hepatitis, as well as serving as a prophylactic measure against the adverse effects of chemotherapy in tuberculosis, liver cirrhosis, and alcoholic hepatitis
Triphala	Amalaki, Haritaki, Vibhitaki	Prevents fatty liver and good digestion.
Pipaali	<i>Piper longum</i>	Reduces body fat and potentiates pharmacological substances
Arogyavardhini Vati	Triphala, Guggulu, and Phaltrikadi Kwath	Cure hepatic diseases
Katuki	<i>Picrorrhiza kurroa</i>	Treatment of Hepatitis, promising effect on bilirubin, SGOT, SGPT.
Phyllanthus niruri	Phyllanthus, namely, <i>Phyllanthus amarus</i> , <i>Phyllanthus fraternus</i> , <i>Phyllanthus aderspatensis</i> , <i>Phyllanthus urinaria</i> , and <i>Phyllanthus Rotundifolius</i>	Hepatoprotective activity

Clinical trial Sharma et al examined the combined effects of Triphala Guggulu and Arogyavardhini Vati in combination with pathya (Ayurvedic diet and exercise).⁶ Some patients received just Pathya. A randomized, retrospective, open-ended study of 32 NAFLD patients showed considerable improvement with a healthy diet and lifestyle. Combining herbomineral drugs with pathya has showed promise for treating this metabolic condition. Varsakiya reported a 20-year-old male patient with fever, chills, malaise, right shoulder discomfort, and right upper quadrant pain.¹³ Virechan Karma (therapeutic purgation) was followed by oral Ayurvedic medicines including Varunadi Kwatha, Kanchanar Guggulu, and Arogyavardhini vati. Pathya apathy (wholesome-unwholesome diet) from Ayurveda was also prescribed.

Four months were spent on therapy and one month on follow-up. Improvement was measured by symptom alleviation and abdominal USG. After therapy, all symptoms subsided. USG showed a 5.1×5.1 cm hypoechoic lesion with calcified edges in liver right lobe segment VIII. This case study shows that Ayurvedic methods may treat liver abscesses.¹²

Das and Sarkar as morbidity rates rise dramatically, hepato-biliary diseases pose a major medical and social issue.¹⁶ The tribes' 28 species of medicinal herbs were studied and catalogued. North-East Indian tribes employed 56 factory species from 29 families as remedies. This investigation confirmed prior findings that traditional local healers knew how to employ plant parts and therapeutic

plants for various ailments and diseases. This study shows the importance of Piper beetle plants in these two cultures' homes as ethnomedical remedies. The fact that this species is eaten virtually daily in cultural events may explain its ethnomedicinal status. This research may emphasize the value of traditional therapeutic plants for many disorders.

Banerjee et al that the burden of disease is worsened by a lack of treatments. Obeticholic acid is the sole NAFLD treatment.²³ Novel targets like lipid synthase, farnesoid X receptor signalling, peroxisome proliferator-activated receptors associated with inflammatory signalling, and hepatocellular injury have helped NAFLD progress to NASH as more research is done on its mechanisms.

Zhu et al found that berberine (BBR), a natural plant product, helps NAFLD, however the mechanisms remain unknown.¹¹ Focus on NAFLD pathophysiology, progression, and BBR therapy mechanisms. BBR targets insulin sensitivity, AMPK pathway regulation, mitochondrial function, oxidative stress, LDLR mRNA stabilization, and gut microenvironment regulation to treat NAFLD. Berberine also reduces PCSK9 expression and DNA methylation to cure NAFLD.

Panda et al investigated thirteen traditional Ayurveda formulations, and eight therapeutic plants utilized in Ayurveda alongside scientific investigations.⁹ In liver problems, Arogyavardhini vati is most prescribed. The most popular single herb used by herbalists and Ayurveda doctors to treat jaundice and other liver ailments is Haridra (*Curcuma longa*), Katuki (*P. kurroa*), Chireeta (*Swertia chirayita*), Punarnava (*Boerhavia diffusa*), Kiratatikta (*Swertia chirayita*), and Bhumi amalaki (*Phyllanthus niruri* Linn.).

Zarzour et al found that a 50% methanolic extract of *P. niruri* standardized extract has maximal NAFLD inhibitory effects and decreases atherosclerotic risk in rats fed a high-fat diet.²⁹ Compared to a non-treated group, the NAFLD score, visceral fat weight (22%), hepatomegaly (16%), ALT (45%), ALP (38%), serum total cholesterol (TC) (48%), low-density lipoprotein (LDL) (65%), LDL/HDL (66%), and hepatic cholesterol content (43%) decreased. Half of *P. niruri* ME reduced hepatic lipid peroxidation, fat formation, visceral adiposity, and liver enzyme irregularities.

Raut et al stated that a 23-year-old male patient complained lack of appetite, weariness, and constipation to the OPD.¹⁵ Clinical blood tests showed liver function was impaired, lipid profile disrupted, and radiological examination revealed NAFLD. Siravyadha (bloodletting) was Sushruta's therapy for Yakrut Vikar, similar to phlebotomy in contemporary medicine. In the Siravyadha, 65 ml blood was obtained three times over 15 days. Comparisons of blood and radiological tests showed corrections. Siravyadha, in conjunction with modifications to lifestyle and dietary habits, effectively, reliably, and economically treated NAFLD.

According to Mawar et al plant-based drugs have become increasingly popular and important in Ayurveda due to their safety, efficacy, and affordability.³ Herbal extracts exhibiting antioxidant, anti-diabetic, and antihyperlipidemic properties have demonstrated efficacy in alleviating the symptoms associated with non-alcoholic liver disease. This study endeavours to consolidate the management of Yakridhalyudar (liver disorders) through the utilization of medicinal plants in the mitigation of NASH, which may prove beneficial to clinicians operating within the domain of Ayurveda.

Yadav et al elucidate that, according to Ayurveda, agni-vikruti plays a significant role in the manifestation of gastrointestinal disorders. This study seeks to impede the pathogenesis of NAFLD through the rectification of gni (Agni Deepana) at both the levels of Jataragni and Dhatwagni.²²

DISCUSSION

NAFLD is a medical condition characterized by the accumulation of lipids in the liver with no alcohol consumption.¹ The mechanisms underlying the progression of NAFLD are multifaceted and relatively complex.⁸

The Ayurveda drugs used to treat liver disorders enhance digestive and metabolic functions, purify the blood, alleviate obstructions caused by undigested metabolic waste, facilitate the flow of bile, and thus lessen swelling or edema and inflammation.⁵ This clinical relief is accompanied by significant changes in chemical and radiological parameters. On the basis of their choleric and cholegogue action, antioxidant consequence, antiviral properties effect, antiedemic, anti-inflammatory, a diuretic antioxidative, rejuvenate, and hepato-splenoprotective effects, as well as their metabolism-promoting and immune-modulating effects, the drugs are said to have hepatoprotective properties.³¹

Ayurveda highlights the importance of a balanced diet in the restoration of dosha equilibrium.^{1,6} It is advisable to consume foods that are easily digestible, low in fat, and abundant in nutrients. It is imperative to refrain from the consumption of refined foods, carbohydrates, and excessive lipids. Ayurvedic botanicals such as Haridra (*Curcuma longa*), Katuki (*P. kurroa*), Chireeta (*Swertia chirayita*), Punarnava (*Boerhavia diffusa*), Kiratatikta (*Swertia chirayita*), and Bhumi amalaki (*Phyllanthus niruri* Linn.), Liv 52, Triphala, Vardhaman Pippali Rasayan, Jalodara, *Terminalia bellirica* ethanol extract are recognized for their hepatoprotective attributes.^{7-9,12,26,30} These botanicals facilitate the detoxification of the liver and mitigate inflammation. Liv 52 has instigated a significant transformation in the fields of biomedical and clinical research pertaining to liver diseases.⁷ It is the best-selling Ayurvedic product in India and promoted across twenty-five nations. Liv 52 demonstrates a substantial impact on the prevention and treatment of viral hepatitis,

as well as serving as a prophylactic measure against the adverse effects of chemotherapy in tuberculosis, liver cirrhosis, and alcoholic hepatitis, among other conditions.⁸

An experimental study obviously revealed the protecting impact of widely recognized Arogyavardhini vati contrary to CCl₄ induced hepatotoxicity in rodents it has verified anti-oxidant qualities.⁹ Argyavardhini vati, in conjunction with the extract of Bhumyamlaiki (*Phyllanthus frataruns* L.) and Triphala churna, plays a significant role in the clearance of HBsAg and the normalization of liver transaminases in patients infected with hepatitis B within a period of 45 days.^{12,25} Argyavardhini vati possesses significant therapeutic benefits in the management of non-alcoholic liver disorders.²³ The active constituents of Argyavardhini vati is *Picrorrhiza kurroa* are effective in mitigating liver toxicity and enhancing the preservation of hepatic glycogen. It demonstrates efficacy in the treatment of hepatitis B infection and shows a promising effect on bilirubin, SGOT, and SGPT levels. It also exhibits cytotoxic activity against human breast, liver, and prostate carcinoma cell lines. It additionally facilitates liver regeneration by reinstating cytochrome functionality.

CONCLUSION

Ayurveda treats liver disease holistically by addressing its root causes and encouraging wellness. It uses nutrition, herbal remedies, detoxification, and lifestyle changes to restore balance and improve liver function. Chronic liver illnesses such viral hepatitis, NAFLD, cirrhosis, and hepatocellular carcinoma are most common in Ayurveda hospitals and clinics. The most widely used single herbs utilized in Ayurveda to treat NAFLD, viral hepatitis B, hepatocellular cancer and jaundice therapy are Katuki (*P. kurroa*), Chireeta (*Swertia chirayita*), Punarnava (*Boerhavia diffusa*), Kiratatiktika (*Swertia chirayita*). The best NAFLD therapy were combination of Ayurvedic drugs consumed recommended by Ayurvedic doctors along with physical exercises.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

- Pan S, Ghosh M, Mukherjee U, Ghosh S, Banerjee S, Sarkar R. The importance of Ayurveda, the traditional Indian system of medicine for the treatment of liver diseases. 2024.
- Sharma B, Sharma M, Rai S, More AB. Review of clinical and preclinical studies on Ayurveda drugs used in management of liver diseases: A search for proof of concept. J Indian System Med. 2021;9(4):226-34.
- Mawar B, Yadava RK, Mahto RR. Management Of Yakridaldyudar (Liver Disorders) Wsr To Non-Alcoholic Steatohepatitis (NASH). Pharma Science Monitor. 2020;11(3):1-15.
- Ganesh S, Joshi N, Jain MK, Sharma L, Desai A, Rafiq M, et al. Clinical and safety evaluation of Liv. 52 in alcoholic liver disease: a review. Gastroenterol Insights. 2022;13(4):377-86.
- Nasir F, Itrat M, Khan F. Evidence-Based Unani Pharmacotherapeutics for the Treatment of Non-Alcoholic Fatty Liver Disease: A Mechanistic Review. Alternative Therapies Health Med. 2024;30(8):32-42.
- Sharma B, Sharma M, Rai S, More AB. Review of clinical and preclinical studies on Ayurveda drugs used in management of liver diseases: A search for proof of concept. J Indian System Med. 2021;9(4):226-34.
- Shivnitwar SK, Gilada I, Rajkondawar AV, Ojha SK, Katiyar S, Arya N, et al. Safety and Effectiveness of Liv. 52 DS in Patients with Varied Hepatic Disorders: An Open-Label, Multi-centre, Phase IV Study. Cureus. 2024;16(5):e60898.
- Kantharia C, Kumar M, Jain MK, Sharma L, Jain L, Desai A. Hepatoprotective effects of Liv. 52 in chronic liver disease preclinical, clinical, and safety evidence: a review. Gastroenterol Insights. 2023;14(3):293-308.
- Panda AK, Bhuyan GC, Rao MM. Ayurvedic intervention for hepatobiliary disorders: Current scenario and future prospect. J Tradit Med Clin Natur. 2017;6(210):2.
- Bhatt N, Deshpande M, Namewar P, Pawar S. A review of classical, proprietary and patented Ayurved products and their ingredients in liver/spleen diseases. Int J Pharmaceut Sci Res. 2018;9(10):4056-70.
- Zhu X, Bian H, Gao X. The potential mechanisms of berberine in the treatment of nonalcoholic fatty liver disease. Molecules. 2016;21(10):1336.
- Jiang Y, Zhao L, Ma J, Yang Y, Zhang B, Xu J, et al. Preventive mechanisms of Chinese Tibetan medicine Triphala against nonalcoholic fatty liver disease. Phytomedicine. 2024;123:155229.
- Varsakiya J, Kathad D, Kumari R, Nayak S. Ayurvedic Management of Yakrit Vidradhi (Liver Abscess)—A Case Report. Int Res J Ayurveda Yoga 2023;6(4):38-48.
- Ranjan S, Pattanayak SP, Ranjan G. Polyherbal Approach for the Management of Alcohol-Induced Liver Disease, their Complications and Hangover: A Review. Int J Gastroenterol Hepatol Dis. 2024;04.
- Raut A, Dharmi-Shah H, Phadke A, Shindikar A, Udupi S, Joshi J, et al. Picrorrhiza kurroa, Royle ex Benth: Traditional uses, phytopharmacology, and translational potential in therapy of fatty liver disease. J Ayurveda Integrative Med. 2023;14(1):100558.
- Das J, Sarkar BR. A Review of Ethnomedicinal Plants And Their Traditional Uses For The Treatment Of Hepatobiliary Disease By Different Tribes Of North-East India. IJP. 2023;10(6):284-98.
- Nendouhada LP, Sibuyi NR, Fadaka AO, Meyer S, Madiehe AM, Meyer M, et al. Phytonanotherapy for the Treatment of Metabolic Dysfunction-Associated

- Steatotic Liver Disease. *Int J Molecular Sci.* 2024;25(11):5571.
18. Jangid SK, Binorkar SV, Chhatbar DK, Ravi AK. Management of biliary calculi through Ayurveda-A case report. *AYU.* 2024;45(2):72-8.
19. Narendra B, Manasi D. A Comparative Review on Medicinal Plants Used for the Liver Disorders as in Ayurved, Siddha and Unani [ASU] Systems of Medicine Part 2-Phytochemical and Pharmacological Aspects. 2021;11(6):44034-68.
20. Bhagiya SG, Shukla RB, Joshi NP, Thakar AB. A single-case study of management of Jalodara (ascites) Ayu. 2017;38:144-7.
21. Bhatt N, Deshpande M. A critical review of Indian medicinal plants for hepatocellular carcinoma. *Int J Ayurvedic Herb Med.* 2022;12:4150-86.
22. Yadav B, Kuchewar V, Bharti. A protocol for an open-label randomized parallel group clinical study on nonalcoholic fatty liver disease (NAFLD). *J Med Pharmaceut Allied Sci.* 2024;13-I(4):6681-6.
23. Banerjee T, Sarkar A, Ali SZ, Bhowmik R, Karmakar S, Halder AK, et al. Bioprotective Role of Phytocompounds Against the Pathogenesis of Non-alcoholic Fatty Liver Disease to Non-alcoholic Steatohepatitis: Unravelling Underlying Molecular Mechanisms. *Planta Medica.* 2024;90(9):675-707.
24. Girhepunje KS, Gupta V, Jain R, Nakanekar A, Singh OP. Effect of integrated paracentesis and oral Vardhaman Pippali Rasayan (vpr) therapy in ascites due to alcoholic liver cirrhosis: A case report *World J Pharm Sci.* 2017;6:1402-17.
25. Ratha KK, Meher SK. Ayurvedic management of acute viral hepatitis: A case report. *Indian J Case Rep.* 2018;4:511-4.
26. Singh MP, Kuchewar V. Management of Jalodara (ascites) through treatment principles of Ayurveda: A case report. *J Indian Sys Med.* 2019;7:185-8.
27. Aswathy G, Dharmarajan P, Sharma AR, Sasikumar VK, Vasudevan Nampoothiri MR. Ayurvedic management of cirrhotic ascites *Anc Sci Life.* 2016;35:236-9.
28. Ghezelbash B, Shahrokhi N, Khaksari M, Asadikaram G, Shahrokhi M, Shirazpour S. Protective roles of Shilajit in modulating resistin, adiponectin, and cytokines in rats with non-alcoholic fatty liver disease. *Chinese J Integrative Med.* 2022;28(6):531-7.
29. Zarzour RH, Ahmad M, Asmawi MZ, Kaur G, Saeed MAA, Al-Mansoub MA, et al. Phyllanthus niruri standardized extract alleviates the progression of non-alcoholic fatty liver disease and decreases atherosclerotic risk in Sprague–Dawley rats. *Nutrients.* 2027;9(7):766.
30. Zhang B, Luo X, Han C, Liu J, Zhang L, Qi J, et al. Terminalia bellirica ethanol extract ameliorates nonalcoholic fatty liver disease in mice by amending the intestinal microbiota and faecal metabolites. *J Ethnopharmacol.* 2023;305:116082.
31. Baselga-Escudero L, Souza-Mello V, Pascual-Serrano A, Rachid T, Voci A, Demori I, et al. Beneficial effects of the Mediterranean spices and aromas on non-alcoholic fatty liver disease. *Trends Food Sci Technol.* 2017;61:141-59.

Cite this article as: Harshitha KS, Mythrey RC. Reviving liver health with ayurveda: a systematic review of non-alcoholic fatty liver disease management. *Int J Res Med Sci* 2025;13:2574-80.