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*Original Article*

# The Function of some Important TCM and Iranian Medicinal Plants in Treatment of Viral Hepatitis

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## ABSTRACT

**Introduction:** Hepatitis is a systematic viral infection which significantly influences the liver and is divided into five types according to the causative virus. The goal of this article was to review some important medicinal plants used in both traditional Chinese and Iranian medicine in treatment of hepatitis. **Methods:** This manuscript included randomized control experiments, review articles, observational and analytical studies, which have been surveyed in Google Scholar, Scopus, ResearchGate and PubMed by using keywords including hepatitis, medicinal plants, traditional Iranian medicine, traditional Chinese medicine and health benefits. All relevant papers in both English and Chinese language were searched. We screened the articles first by reviewing titles and abstracts and subsequently reading the whole manuscript of those publications deemed suitable. **Results:** Three main kinds of hepatitis are recognized as hepatitis A, B, and C, and two other types are D and E. Each is caused by a disimilar virus, and all three types generally last for up to 6 months, although types B and C can be chronic, lasting substantially longer. All relevant papers in English language from different countries were collected. The keywords of hepatitis, medicinal plants, traditional Iranian medicine, traditional Chinese medicine and health benefits were searched in Google Scholar, Scopus, Science Direct and PubMed. The most important herbs used to prevent and treatment of different kinds of hepatitis are cordyceps (*Cordyceps sinensis*), milk thistle (*Silybum marianum*), licorice root (*Glycyrrhiza glabra*), and reishi mushroom (*Ganoderma lucidum*). The most important signs and symptoms of hepatits are flu-like symptoms, abdominal pain, fatigue, jaundice, nausea, loss of appetite and vomiting, weight loss, dark urine, diarrhea, whole body itching, mild anemia, as well as enlarged and tender liver. **Conclusion:** The use of natural and traditional medicinal plants in the treatments of different hepatitis may provide new solutions and more favorable results in the treatment of viral hepatitis.

**Key words:** Hepatitis, Medicinal Plants, Traditional Iranian Medicine, Traditional Chinese Medicine, Health Benefits.

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## INTRODUCTION

Hepatitis is a general term referring to inflammation of the liver and may result from numerous causes, both infectious such as viral, bacteria, fungal, and parasitic organisms, and noninfectious, such as alcohol, drugs, autoimmune diseases and metabolic diseases. Viral hepatitis has been a major human disease for at least 2,000 years. The 5 types of viral hepatitis include hepatitis A, B, C, D, and E. Hepatitis A is caused by an infection with the hepatitis A virus (HAV), which is mostly generally transmitted by consuming food or water contaminated by feces from a person infected with hepatitis A. Hepatitis B is transmitted through contact with infectious body fluids, such as blood, vaginal secretions or semen, containing the hepatitis B virus (HBV). Hepatitis C is caused by the hepatitis C virus (HCV) which is transmitted through direct contact with infected body fluids via injection. Hepatitis D is a serious liver disease caused by the hepatitis D virus (HDV), which is contracted through direct contact with infected blood. Hepatitis E is a waterborne disease caused by the hepatitis E virus (HEV), which is generally found in areas with poor sanitation and mostly results from ingesting fecal matter which contaminates the water supply. The use of vaccines is an important parameter to preventing hepatitis although currently vaccinations are only available to prevent the development of hepatitis A and B. Hepatitis can also develop into a long-term disease known as chronic hepatitis.

Minor Bupleurum Combination (*Xiao Chaihu Tang*) as well as other traditional prescriptions for treating symptoms characteristics of viral hepatitis have been reported to lighten hepatitis symptoms. Viral hepatitis has long been a serious problem in various parts of the world. Many medicinal plants have been evaluated against hepatitis and have proved helpful as antiviral mediators. Medicinal plants have fewer side effects, lower costs and multiple target activities. Some phytochemicals of the medicinal plants including alkaloids, polylines, terpenoids, flavonoids, polyphenolics, sulphides, saponins, coumarins etc have potential to treat viral hepatitis. Several medicinal plants from traditional Chinese medicine, traditional Iranian medicine, traditional Indian medicine etc have verified uses as hepatoprotective agents. Combinations of different medicinal plants and herbs also have been used for the treatment of chronic hepatitis. The goal of this manuscript is a short review on introduction of some important crops and herbs in traditional Chinese medicine (TCM), and traditional Iranian medicine (TIM) in treatment of viral hepatitis.

### Viral Hepatitis

Hepatitis B and C viruses are important causes of severe diseases and death. The global burden of disease due to acute hepatitis B and C and to cancer and cirrhosis of the liver is high and is forecast to become a higher ranked cause of death over the next two decades.[1-5] Because hepatitis A, B, C, D and E viruses vary in their global distribution and routes of transmission, prevention strategies need to be considered.[6] Hepatitis B virus infection early in life is related to the highest risk of chronic infection, and people with chronic infection risk progress to cirrhosis of the liver and primary liver cancer.[7] Cirrhosis and liver cancer may also accompany chronic hepatitis C virus infection. Both superinfection by, and co-infection with hepatitis D virus in hepatitis B virus-infected patients may lead to worse outcomes than infection with hepatitis B virus alone. These individuals have a higher rate of liver failure in acute

infections and a greater likelihood of developing liver cancer in chronic infections.

Hepatitis E virus infections occur both sporadically and in large epidemics, causing significant death, with particularly high mortality in pregnant women. It is evaluated that one third of the world's population has been infected with hepatitis E virus. However, the true burden of hepatitis E is not clear. Hepatitis B virus/HIV and hepatitis C virus/HIV co-infections are an increasing problem in countries with concentrated HIV epidemics, and among intraveneous drug users. Three principal types of hepatitis are known as hepatitis A, B, and C, and two other types are D and E. Each is caused by a different virus. All types can be acute, lasting for up to 6 months, whilst types B and C can also be chronic, lasting for substantially longer.[8-10] Key points about human hepatitis are shown in Table 1.

1) Hepatitis A: It is often mild, and most people make a full recovery, after which they are immune and therefore protected from the virus in the future. However, if it progresses, symptoms can be severe or life-threatening.
2) Hepatitis B: It can be transmitted when a person, a) has unprotected sexual intercourse with an infected person, b) shares a needle with an infected person, often for illegal drug or steroid use, c) has a tattoo created with unsterilized needles, d) It is accidentally pricked, e) shares personal items such as toothbrush or razor with an infected person, f) is bitten by someone who in infected. Acute hepatitis B virus infection is characterized by a vigorous, polyclonal cytotoxic T lymphocyte response against HBV.[11]
3) Hepatitis C: HCV can lead to liver damage and swelling. Around 1 in 4 people with HCV develop cirrhosis, and this can lead to liver cancer. In most countries, donated blood is now tested for HCV, although people who received organ transplants or blood donations before testing became part of the donation process may be at risk. Other at-risk groups include healthcare workers who are exposed to sharps, users of intravenous drugs and infants born to mothers with HCV. The hepatitis C virus causes chronic liver disease despite a polyclonal and multi-specific immune response.[11]

Clemente-Casares *et al.*[29] reported that hepatitis E virus (HEV) is the main cause of acute viral hepatitis worldwide. Its presence in developing countries has been documented for decades. Developed countries were supposed to be virus-free and initially only imported cases were detected in those areas. However, sporadic and autochthonous cases of HEV infection have been identified, although studies reveal that the virus has worldwide spread and chronic hepatitis and multiple extrahepatic manifestations have also been associated with HEV. Anyone who has chronic hepatitis B is also susceptible to infection with another strain of viral hepatitis known as hepatitis D (formerly called delta virus). Hepatitis D virus can only infect cells if the hepatitis B virus (HBV) is present. Being infected with both hepatitis B and D raises the risk of developing cirrhosis of liver cancer.[30,31] Moreover, reducing the risk of hepatocellular inflammatory necrosis, liver fibrosis, decompensated liver cirrhosis, liver failure, and liver cancer, improving quality of life and prolonging survival is the aim of the long-term treatment of chronic hepatitis B.[32,34] The impacts of Hepatitis B virus (HBV) infection can be lifelong as the disease can become chronic and develop further into cirrhosis, liver failure and hepatocellular carcinoma (HCC). The regions of highest prevalence for HBV infection are Africa, the Pacific region and Asia, where the virus is acquired mainly through perinatal transmission. In China, the prevalence of hepatitis B surface antigen (HBsAg) is also high and affects 8.5-10.5% of the adult population. The management of HBV in China is a complex issue, with various intermingled clinical, economic, social and cultural aspects.[35-37] Hepatitis E spread is through ingesting food or water contaminated with feces. The only way to prevent the disease is to reduce the risk of exposure to the virus. Hepatitis E virus (HEV), previously thought to only cause acute, self-limited infection in the developing countries, is emerging as an increasing cause of chronic hepatitis in transplant recipients in industrialized countries. Management of viral hepatitis in transplant candidates and recipients is complex and highly depends on the organ transplanted especially for hepatitis B and C.[38] The most important signs and symptoms of hepatitis are flu-like symptoms including fever, aching or painful muscles and joints, jaundice, abdominal pain, fatigue, weight loss, loss of appetite, nausea, vomiting, dark urine, colorless stool, diarrhea, mild anemia and tender liver.

Hepatitis A is usually transmitted by someone touching feces and then not washing their hands before putting them in their mouth or touching food. It can be transmitted by ingesting contaminated food and water, and it can also be transmitted through close contact with someone who has the virus. Hepatitis B and C are transmitted through contact with

**Table 1: Key points about human hepatitis.**

| Hepatitis | Function | Reference |
|---|---|---|
| Hepatitis A virus (HAV) | It is classified as hepatovirus, is a small, unenveloped symmetrical RNA virus which shares many of the characteristics of the picornavirus family, and is the cause of infectious or epidemic hepatitis transmitted by the fecal-oral route. | 12-15 |
| Hepatitis B virus (HBV) | It is a member of the hepadnavirus group, double-stranded DNA viruses which replicate, unusually, by reverse transcription. Hepatitis B virus is endemic in the human population and hyperendemic in many parts of the world. | 16-20 |
| Hepatitis C virus (HCV) | It is an enveloped single-stranded RNA virus which appears to be distantly related to flaviviruses, although hepatitis C is not transmitted by arthropod vectors. Hepatitis C virus is associated with chronic liver disease and also with many primary liver cancer in some regions.<br>HCV transmission is most commonly associated with direct percutaneous exposure to blood, via blood transfusions, health-care-related injections and injecting drug use. | 21-24 |
| Hepatitis D virus (HDV) | HDV is an unusual single-stranded, circular RNA virus with a number of similarities to plant viral satellites and viroids. The virus requires hepadna virus helper functions for propagation in hepatocytes and is an important cause of acute and severe chronic liver damage in many regions. | |
| Hepatitis E virus (HEV) | HEV is another non-enveloped, single-stranded RNA virus, and the cause of enterically-transmitted non-A, non-B hepatitis. This virus is responsible for high mortality during pregnancy particularly during the third trimester.<br>Four genotypes of hepatitis E have been commonly associated with human infection. Genotypes 1 and 2 are confined to human populations, whereas genotypes 3 and 4 circulate between swine and human population. | 25-28 |

infected blood. These viruses are usually transmitted by contaminated needles. Having unprotected sex with someone who is infected can also pass on the hepatitis B virus.[39,40] Many viruses can cause hepatitis, including herpes simplex virus (HSV), cytomegalovirus (CMV), Epstein-Barr virus (EBV), and others.[41] Lemoine *et al*.[42] suggested that strategies for a global approach include the implementation of operational and research programs, the improvement of screening and diagnosis tools, broader access to treatment and the integration of prevention, screening and care for viral hepatitis in local health care systems.

## Traditional Chinese, Iranian and Asian Medicine

Traditional Chinese medicine herbs have for long been used for treating chronic liver diseases both in China and other parts of Asia.[42-49] The primary goal of Chinese medicine is to create wholeness and harmony within a person, so allowing the mind, body and spirit to self-heal themselves.[50-54] Chinese philosophy is on the basis of two opposing principles of life: yin and yang, and imbalances between yin and yang within a person can manifest as illness because the body is considered a microcosm of the world.[55-62] Chinese medicine theory states the key to health is the internal ability of the body to remain strong.[63-68] The treatment of chronic hepatitis with traditional Chinese medicine and natural products has shown good therapeutic effectiveness in clinical practice.[69-72]

Yarnell and Abascals[73] reviewed traditional and researched herbal treatments for acute and chronic viral hepatitis caused by hepatitis A, B, and C viruses and they have reported the *Andrographis paniculata* Wall (kalmegh) leaf, *Silybum marianum* L. (milk thistle) seed, silymarin, silibinin, Liv. 52 formula, *Artemisia capillaries* L. (capillary wormwood, yin chen hao) leaf, Yin Chen Hao Tang, *Ligusticum porteri* L. (osha) root, *Ligusticum grayi* L. (oshala) root, *Lomatium dissection* Nutt. (desert pardley) root, *Forsythia suspense* (Thunb.) Vahl (lian qiao) herb, *Hypericum perforatum* L. (St. John's wort) herb, *Coptis chinensis* L. (gold thread, huang lian) root, *Artemisia ludoviciana* L. (western mugwort) leaf, *Glycyrrhiza glabra* L. (licorice) root, glycyrrhizin, *Schisandra chinensis* Turcz. (Baill.) (wu wei zi) fruit, *Astragalus membranaceus* (fisch.) bunge (huang qi) root, *Taraxacum officinale* F.H. Wigg (dandelion) root, *Arctium lappa* L. (burdock root, shsaiko-to, Xia Chai Hu Tang, *Salvia miltiorrhiza* Bunge (Chinese sage, dan shen) root, salvianolic acid B, Fuzheng Huayu formula, *Gynostemma pentaphyllum* (Thunb.) Makino (jiao gulan) root and *Ginkgo biloba* L. seed as useful for treatment of hepatitis. Asadi-Samani *et al*.[74] reported that there are a number of medicinal combinations in the Iranian traditional medicine which are commonly used as tonic for liver; *Allium hirtifolium Boiss*, *Apium graveolens* L., *Cynara scolymus*, *Berberis vulgaris* L., *Calendula officinalis*, *Nigella sativa* L., *Taraxacum officinale*, *Tragopogon porrifolius*, *Prangos ferulaceae* L., *Allium sativum*, *Marrubium vulgare*, *Ammi majus* L., *Citrullus lanatus* Thunb, *Agrimonia eupatoria* L., and *Prunus armeniaca* L. are some of the medicinal plants that have been used for the treatment of liver disorders in Iranian fold medicine. They have found that out of several leads obtained from plants containing potential hepatoprotective agents, silymarin, β-sitosterol, betalain, neoandrographolide, phyllanthin, andrographolide, curcumin, picroside, hypophyllanthin, kutkoside, and glycyrrhizin have been demonstrated to have potent hepatoprotective properties. A Chinese herbal decoction, kuan-sin-yin (KSY), improves liver function in patients with chronic hepatitis C (CHC). Chinese herbal medicine is used both as an adjunctive treatment to the current standard of care of as an alternative to the standard of care and represents 30-50% of the total medicine consumption for chronic hepatitis B treatment in mainland China.[75] An estimated 80% of patients with chronic hepatitis B in China and Taiwan have received Chinese herbal medicine treatments.[76] Eight herbal products were associated with lower risk of hepatocellular carcinoma as shown in Table 2. Some important herbs which use to prevent and treatment of different kinds of hepatitis is presented in Table 3.

Wang *et al*.[77] in his research which was about the role of traditional Chinese medicine and complementary medicine found that traditional Chinese medicines (TCM) were better than interferons (IFN) in lowering serum HBeAG and nosmalizing serum ALT, and equivalent to IFN in clearing serum HBV DNA. TCMs were equivalent to lamivudine (LAM) in lowering serum HBeAG, normalizing serum ALT, and clearing serum HBV DNA. TCMs, along with IFN or LAM significantly lowered serum HBeAg and improved the clearance of serum HBV DNA and the normalization of serum ALT, compared with IFN or LAM alone. No serious adverse reactions of TCM were reported in all their cited clinical trials. Their final conclusion was that TCMs are effective as alternative remedies for patients with CHB. However, additional placebo-controlled prospective randomized trials of CAM and TCM in chronic hepatitis Bpatients should be performed.

Qi *et al*.[78] revealed that TCM is widely used for chronic hepatitis B (CHB) in China and many parts of the world. Some Chinese herbal formulas like Xiao-Chai-Hu-Tang, Xiao-Yao-San, and Long-Dan-Xie-Gan-Tang, and single herbs such as *Phyllanthus niruri* L., *Radix astragali*, *Polygonum cuspidatum*, *Rheum palmatum* L., and *Salvia miltiorrhiza* Bunge have related active compounds including wogonin, artesunate, saikosaponin, astragaloside IV, and chrysophanol 8-)-beta-dglycoside seem effective and worthy in treating CHB. Zhao *et al*.[79] found that formula LeoCao-Shi (LCS) is a traditional Chinese medicine (TCM), which has long been used as a folk remedy against hepatitis B in China. They have found that LCS exerted potent anti-hepatitis effects against the infection of HBV. Song *et al*.[80] noted that traditional Chinese medicine syndrome, also called Zheng, is based on of TCM theory. They have found two significant serum proteins (m/z 4187 and m/z 5032) for classifying excess and deficiency syndromes, and the area under the receiver operating characteristic (ROC) curve was 0.887 for classifying excess and non-excess syndrome, and 0.700 for classifying deficiency and non-deficiency syndrome respectively. Shawkat *et al*.[81] concluded that herbal formulation is potentially safe and may offer some added clinical and quality of life benefits when used in the treatment of patients with chronic hepatits Cvirus infection. In their research, they used the established model of Hela D cells transfected with HCV structural genes and screened Chinese herbal medicines for inhibition of HCV transcription in Hela D cells in order to provide experimental data for clinical therapy of hepatitis C.

**Table 2: Eight TCM herbal products (four single-herb and four multi-herb products) were associated with lower risk of hepatocellular carcinoma.**[75,76]

| Single-herb products | |
|---|---|
| **Pin yin nomenclature** | **Scientific name** |
| Bai Hua She She Cao | *Hedyotis diffusa* Roxb |
| Ban Zhi Lian | *Scutellaria barbata* D. Don |
| Shen Di Huang | *Rehmannia glutinosa* (Gaertn.) Steud |
| Ban Lan Gen | *Isatis tinctoria* L. |
| Multi-herb products | |
| Pin yin nomenclature | |
| Yi Guan Jian | |
| Xiao Chai Hu Tang | |
| Wu Ling San | |
| Gan Lu Yin | |

Chandrakumar *et al*.[82] reported that a vast majority in the area relied on alternate systems of medicine for Hepatitis A therapy, depicting its potential advantages over modern system of medicine in the treatment of this specific condition. Ayurveda, Homoeopathy, Siddha and Unani comprised the four dominant alternate systems of medicine relied on by hepatitis A patients. They have noted that a collaborative effort between government, modern medicine and alternate medicine system can be highly effective in reducing the outbreaks of such epidemics through proper preventive and therapeutic strategies. It is also vital to conceive integrative therapeutic strategies and propagate these notions from primary levels, thereby benefitting the community as a whole. Jardim *et al*.[83] noted that hepatitis C virus (HCV) infection is a worldwide public health burden and it is estimated that 185 million people are, or have previously been infected worldwide. There is not effective vaccine for prevention of HCV infection, although a number of drugs are available for the treatment of infection. They have mentioned that over the past decades, there has been substantial study of compounds extracted from plants that have activity against a range of microorganisms that cause human disease.

An extensive variety of natural compounds has demonstrated antiviral action worldwide, including anti-HCV activity. Jakkula *et al*.[84] discovered that in patients with HCV, the herbal medications had no effect on any quality-of-life variables, as measured by the Hepatitis Quality of Life Questionnaire. They have concluded that a regiment of Chinese herbal medicines did not improve quality of life, liver chemistry results, or viral load in a cohort of patients with HCV. Patients and practitioners should remain cautious about the use of herbal medicines for HCV, because studies have not shown a clear benefit of these agents. Tang *et al*.[85] reported that Chinese herbs are widely used in the treatment of chronic viral hepatits B. They have noted that in traditional Chinese medicine, chronic hepatitis is considered to be caused by Zheng Xu Xie Shi, which means body resistance is weakened and the pathogen invades. Based on the principle of fu zheng qu xie (strengthening the bodys resistance against pathogenic factors), they have used *Radix Astragali* to treat chronic hepatitis and found that it could regulate the levels of many serum hormones and improve liver function. On the basis of their results, *Astragalus* compounds may promote recovery from viral hepatitis and inhibit hepatitis B virus (HBV) replication. Rajaratnam *et al*.[86] introduced some important herbal medicines such Silymarin (milk thistle), Liv-52, *Camellia sinensis* (green eta), *G.glabra* (licorice), and FuzhengHuayu, and they have noted that the increasing use of herbal medicines reflects their perceived effectiveness in the treatment and prevention of disease, and the belief that that these treatments are safe because they are natural. Some important medicinal plants with anti-hepatitis characteristics are shown in Table 4.

Avicenna classified liver diseases into 17 types and explained mechanisms for each one of the them, in liver dystemperament with an abnormal hot and dry temperature (either with an internal or external origin), the following clinical signs can be observed: loss of appetite, yellow-colored urine, fever, warmness in the liver, dry tongue, vomiting, occasional heaviness in the right side of the chest, yellowish color of the eyes, and dry cough. Continuation of liver dystemperament can cause liver damage and inflammation or waram, as mentioned in Iranian traditional medicine.[88,90] Based on Iranian traditional medicine literature, the etiology of hepatitis can be considered in line with hot and dry characteristics of humor describing high injury potential, heat intensity, high breakdown speed, softness, and tendency to remain in the liver.[89] Zhu *et al*.[91] proposed that China should take more effective measures to improve study quality, social management, the relief of economic burden for the needed patients, public awareness, evidence-based policies and medicine, super-vision for clinical practice, diagnostics ability and laboratory quality, the compliance of patients, and the quality of traditional Chinese medicine (TCM) in the management of chronic hepatitis B (CHB) infection in years to come. Yousefi *et al*.[92] found that hepatitis is a global health problem, with significant adverse impacts on patients quality of life; acute hepatitis in Iranian traditional medicine is the equivalent to *Oram harr*, and chronic hepatitis in Iranian traditional medicine is the equivalent to *Oram solb*. The clinical course of hepatitis in Iranian traditional medicine and conventional medicine are similar. They have noted that integration of traditional and conventional approaches for the analysis, diagnosis, and treatment of diseases could provide a new integrated model for dealing with patients. They have concluded that applying of Iranian traditional medicine with the viewpoints of Avicenna and traditional physicians about liver can be

**Table 3: Some important herbs used to prevent and treatment of different kinds of hepatitis.**[75,76]

| | |
|---|---|
| **Cordyceps (*Cordyceps sinensis*)** | It is a type of mushroom used in traditional Chinese medicine to support the liver. Preliminary studies show it may help improve liver and immune system function in people with hepatitis B. People who have autoimmune disease should not take Cordyceps. Cordyceps may slow down the blood's clotting ability, so people who take blood-thinning medications should use caution. |
| **Milk thistle (*Silybum marianum*)** | It has been used since Greco Roman times to treat liver problems. Several scientific studies support this traditional use. They suggest that a substance in milk thistle (silymarin) can protect liver from damage caused by viruses, toxins, alcohol, and certain drugs, such as acetaminophen. However, studies are mixed as to whether milk thistle improves liver function tests or quality of life for people with chronic active hepatitis B or C. People who are allergic to ragweed may have an allergic reaction to milk thistle. Milk thistle may have estrogen-like effects, so people with hormone-sensitive conditions should use this herb with caution. Because it acts on the liver, Milk thistle can theoretically interact with several medications that are processed through the liver. Milk thistle may help protect several medications that processed through the liver. Milk thistle help protect the liver against damage from exposure to industrial toxins. |
| **Licorice root (*Glycyrrhiza glabra*)** | Licorice root has been used in both Eastern and Western medicine to treat a variety of illnesses, including liver disease. Preliminary data from Japanese researchers suggests that taking glycyrrhizin (an active component of licorice root) along with cysteine and glycerine might help reduce the risk of cirrhosis if someone has hepatitis C and B. People with high blood pressure, or those who take steroid, digoxin (lanoxin), diuretics (water pills), or anticoagulants (blood thinners, such as warfarin (Coumadin), should not take licorice. Pregnant women should avoid licorice. Licorice interacts with many medications, and can raise blood pressure. Use licorice only under the direction of the physician. People with hormone-sensitive conditions, kidney disease, bleeding disorders, or who are taking blood-thinning medications should be particularly cautious with licorice. |
| **Reishi mushroom (*Ganoderma lucidum*)** | For chronic hepatitis B. A preliminary study showed it decreased levels of the hepatitis B virus. Reishi may lower blood pressure and interaction with blood-thinning medications. |

**Table 4: Antihepatitis medical plants.**[87]

| Family | Medicinal plant name | Hepatitis |
|---|---|---|
| Zingiberaceae | *Curcuma longa* L. | Hepatitis B Virus |
| Ganodermataceae | *Ganoderma lucidum* | Hepatitis B Virus |
| Euphorbiaceae | *Phyllanthus amarus or Phyllanthus niruri* | Hepatitis B Virus |
| Euphorbiaceae | *Phyllanthusanus* | Hepatitis B Virus |
| Acanthaceae | *Acanthus ilicifolius L.* | Hepatitis B Virus |
| Apiaceae | *Oenanthe javanica* | Hepatitis B Virus |
| Gentianaceae | *Swertia patens* | Hepatitis B Virus |
| Gentianaceae | *Swertia chirayita* | Hepatitis B Virus |
| Urticaceae | *Boehmeria nivea* | Hepatitis B Virus |
| Rutaceae | *Citrus Sinensis* | Hepatitis C Virus |
| Crassulaceae | *Rhodiola kirilowii* | Hepatitis C Virus |
| Mimosoideae | *Acacia nilotica* | Hepatitis C Virus |
| Burseraceae | *Boswellia carterii* | Hepatitis C Virus |
| Myrsinaceae | *Embelia schimperi* | Hepatitis C Virus |
| Fagaceae | *Quercus infectoria* | Hepatitis C Virus |
| Apiaceae | *Trachyspermum ammi* | Hepatitis C Virus |
| Piperaceae | *Piper cubeba* | Hepatitis C Virus |
| Myrtaceae | *Syzygium aromaticum* | Hepatitis C Virus |
| Zingiberaceae | *Zingiber officinale* | Hepatitis C Virus |
| Asteraceae | *Silybum marianum* | Hepatitis C Virus |
| Saxifragaceae | *Saxifraga melanocentra* | Hepatitis C Virus |
| Lamiaceae | *Mentha longifolia* | Hepatitis A Virus |
| Lamiaceae | *Ocimum basilicum* | Hepatitis A Virus |
| Asteraceae | *Taraxacum Officinalis* | Hepatitis |
| Brassicaceae | *Lepidium sativum* | Hepatitis |
| Fabaceae | *Trigonella foenum graecum* | Hepatitis |
| Meliaceae | *Azadirachta indica* | Hepatitis |
| Fabaceae | *Glycyrrhiza glabra* | Hepatitis |
| Euphorbiaceae | *Jatropha curcas* Linnaeus | Hepatitis |
| Asteraceae | *Cynara scolymus* | Hepatitis |
| Asteraceae | *Matricaria chamomilla* | Hepatitis |
| Fabaceae | *Cassia fistula* | Hepatitis |
| Marchantiaceae | *Marchantia thallus* | Hepatitis |
| Asteraceae | *Silybum marianum* | Hepatitis |
| Fabaceae | *Sophora flavescens* | Hepatitis |
| Salicaceae | *Flacourtia indica Governors Plum* | Hepatitis |
| Rubiaceae | *Morinda citrifolia* | Hepatitis |

important and subject to study in future. Iranian traditional medicine classification of liver inflammation of Waram-e Kabed is Table 5.

Nishikori *et al.*[93] reported anti-HCV activity of a diazabicyclo [2.2.2] octane derivative, which was isolated from a fungal culture broth of *Penicillium herquei*. Wohlfarth and Efferth[94] reported wogonin, ellagic acid, artemisinin and artesunate, chrysophanol 8-*O*-β-D-glucoside, saikosaponin C, and protostane triterpenes as active natural products against HBV. The Chinese medicine Kuan-Sin-Yin which consist of seven crude herbs, namely *Codonopsis pilosula* (*Franch.*) Nannf., *Poria cocos* (*Schw.*) Wolf, *Atractylodes macrocephalan* Koidz., *Glycyrrhiza uralensis Fisch.*, *Astragalus membranaceus* (*Fisch.*) Bunge., *Ligustrum lucidum* Ait., and *Agastache rugosa* can improve liver function and serum triglyceride levels andis a safe treatment for patients with chronic hepatitis C.[95] Elsebai *et al.*[96] concluded that grosheimol and cynaropicrin of wild Egyptian artichoke (*Cynara cardunculus* L.) are promising candidates for the development of new pan-genotypic entry inhibitors of HCV infection. Siddiqui *et al.*[97] reported that the drugs available on the market for the treatment of hepatitis B are not sufficient and also cause side effects in patients suffering from HBV infection. Wan *et al.*[98] reported that extract of *Cananga odorata* could be a good candidate for the development of anti-HBV drugs. Herbal formula for treating hepatitis A consist of *Taraxacum officinale* (dandelion) + *Andrographis paniculata* (kalmegh) + *Artemisia ludoviciana* (western mugwort) + *Ligusticum porteri* + *Glycyrrhiza glabra.*[99] The most important medicinal plants against HCV activities are *Trichilia dregeana*, *Detarium microcarpum*, *Pragmanthera capitata,*[100] *Ruta angustifolia,*[101] *Glycyrrhiza uralensis,*[102] *Toona sureni*, *Melicope latifolia*, *Melanolepis multiglandilosa*, and *Ficus fistula,*[103] *Ligustrum lucidum,*[104] *Platycodon grandiflorum,*[105] *Embelia ribes,*[106] *Phyllanthus amarus,*[107] *Garcinia mangostana,*[108] *Pinus massoniana,*[109] *Acacia nilotica*, *Piper cubeba*, and *Syzygium aromaticum,*[110] *Limonium sinense,*[111] *Morinda citrifolia,*[112] and *Dimocarpus longan.*[113] These medicinal herbs and plants are more affordable and cost effective than conventional medicine.[114,115]

## CONCLUSION

Traditional or folk medicine comprises practices, approaches, knowledge and beliefs not based on scientific evidence that are applied to treat, diagnose and prevent illness within a society. Hepatitis refers to an inflammation of the liver cells and damage to the liver. There are different types and causes, but the symptoms can be similar. Chinese medicine has a rich history in the treatment of chronic hepatitis. Chinese scholars are working hard to eliminate sources of hepatitis, and to develop treatments for chronic viral hepatitis, and develop new treatments for chronic viral hepatitis using the mixture of traditional Chinese and Western medicine. Three main types of hepatitis are known as hepatitis A, B, and C, and two other types are D and E. Each is caused by a different virus, and all three types can be acute, lasting for 6 months or less, and types B and C can be chronic, lasting for longer. The most important herbs which use to prevent and treatment of different kinds of hepatitis are cordyceps (*Cordyceps sinensis*), milk thistle (*Silybum marianum*), licorice root (*Glycyrrhiza glabra*), and reishi mushroom (*Ganoderma lucidum*). The most important signs and symptoms of hepatits are flu, jaundice, abdominal pain, fatigue, weight loss, loss of appetite, nausea and vomiting, dark urine, diarrhea, whole body itching, mild anemia, enlarged and tender liver. Chinese medicine uses nutrition, acupuncture, heat therapies (such as moxibustion), exercise, massage, meditation, and herbal medicine to treat people infected by hepatitis C virus. The review has shown some traditional Chinese medicinal herbs and plants may have positive influence on treatment of hepatitis, but few of them associated with side effects. Both consumers and herbalists commonly believe that herbal TCMs and other herbal medicine (HM) products labeled as natural are always safe and of benefits to public health, improving physical fitness, extending lifespan, and treating various kinds of hepatitis. More epidemiological studies of high methodological quality on syndrome distribution in hepatitis and standardization of syndrome differentiation for hepatitis are required to confirm the increase the efficacy of traditional medicinal herbs.

**Table 5: Iranian traditional medicine classification of liver inflammation of Waram-e Kabed.**[92]

| Liver inflammation | Etiology | Signs and Symptoms | Proposed Equivalent in Conventional Medicine |
|---|---|---|---|
| Hot liver inflammation (*harr waram*) | Hot dystemperament of the liver | Jaundice, fever, loss of appetite, excessive thirst, dark stool or pale urine, small rashes on the tongue, and heaviness of the silver | Acute hepatitis |
| Cold liver inflammation (*barid waram*) | Cold dystemperament of the liver | Black color of the face and tongue, no fever, decreased appetite, thirst, weight loss, dry eyes, no pain, and feeling of tightness in the ribs | Chronic hepatitis |
| Hard liver inflammation (*sulb waram*) | Hot or cold dystemperament of the liver | No fever, no pain, fatigue, and asymptomatic characteristics | Chronic hepatitis; liver cancer |

## CONFLICT OF INTEREST

The authors declare that they have no potential conflicts of interest.

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## ABBREVIATIONS

**HAV:** Hepatitis A virus; **HBV:** Hepatitis B virus; **HCV:** Hepatitis C virus; **HDV:** Hepatitis D virus; **HEV:** Hepatitis E virus; **TCM:** Traditional Chinese Medicine; **TIM:** Traditional Iranian Medicine; **HCC:** Hepatocellular carcinoma; **HBsAg:** Hepatitis B surface antigen; **CMV** Cytomegalovirus; **EBV:** Epstein-Barr virus; **KSY:** Kuan-sin-yin; **IFN:** Interferons; **LAM:** Lamivudine; **CHB:** Chronic hepatitis B; **LCS:** LeoCao-Shi; **ROC:** Receiver Operating Characteristics.

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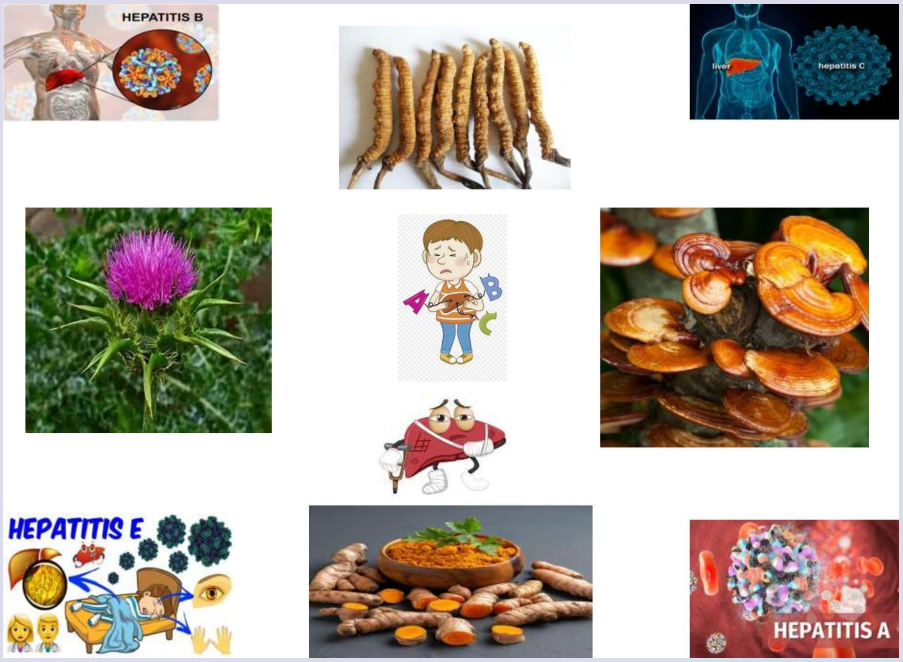
## PICTORIAL ABSTRACT



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