CLINICAL PHARMACOGNOSY

Definition

"A branch of Pharmacognosy which deals with uses, efficacy, adverse effects, contraindications and precautions of natural products or herbal drugs and also their interactions with food".

Clinical pharmacognosy also involves clinical trials of botanical and dietary supplements. Use of herbal drugs has increased in the recent times. Use of herbal drugs demands for standardization and research on quality control (identity, purity and efficacy), therapeutic indications, safety profile (adverse drug reactions, drug interactions, contraindications, precautions) of herbal drugs.

Clinical pharmacognosy can play an important role in the safe rational and efficient use of traditional medicines, because there are still unproven therapeutic benefits and undisclosed toxicities and difficulties in standardizing natural drugs.

So, clinical pharmacognosy is a bridge between clinical research and botanical knowledge. Clinical pharmacognocist should ask and help the patients about the herbal drugs or supplements that they are taking e.g. before the history of any allergic reactions. Patients can also be monitored and evaluated after taking synthetic or herbal drugs. While clinical pharmacognosy has significantly progressed the gap between this science and traditional medicines has increased.

There are several potential problems associated with herbal treatments for example lack of systematic reviews and evidence-based data about their efficacies. It is generally thought that herbal medicines have lower toxicities, but the fact is the herbal drugs can cause unwanted effects, allergic or toxic reactions. Herbs can even cause drug-drug and drug-food interactions. A clinical pharmacognosy's should be able to deal with such problems.

Study of Treatment by Herbal Medicines

Use of herbal drugs should be rational. Para herbalism (faulty herbalism) must be discouraged and avoided. In Para herbalism claims made for herbalism are often not supported by scientific evidence or the use of drug lack scientific logic. There are usually following types of misunderstanding about herbal drugs:

1. Herbs can't harm, only cure.
2. Whole herbs are more effective than their isolated active constituents.
3. Natural herbs are more effective than synthetic drugs.
4. The doctrine of signature is meaningful.
5. Physiological tests in animals are not applicable to human beings.

Rational herbalism should prevail knowledge of historical drug development indicates that plants have long being used as a rational source of therapeutic agents.

Plant drugs like digitalis, cinchona, rauwolfia, belladonna etc. have not only provided useful pharmaceuticals but their constituents have also been used as model for many synthetic drugs used in modern medicine.

It is important to know which conditions can be treated by self-medication and which condition require professional medical care. Herbal use is not recommended for pregnant women and lactating mothers, infants and children under age of 6.

Elderly patients should use herbal drugs carefully because due to decreased renal function and hepatic metabolism the drug can accumulate in the body to toxic level.

CLINICAL USES OF HERBS AND HERBAL MEDICINES

1. HERBAL MEDICINES FOR RESPIRATORY DISEASES

Different herbal drugs are used to treat various respiratory disorders like asthma, COPD, bronchitis, colds and flu etc. drugs used for these diseases include bronchodilators, demulcents, antitussives, expectorants etc.

Antitussives (codeine, morphine) cause CNS depression which further suppresses the cough. Ephedra is widely used to treat asthma. It is a bronchodilator. Ephedrine is a sympathomimetic. Codeine is a good antitussive. Antitussive act either centrally on medullary cough centers in the brain or peripherally at the site of irritation. Local action of antitussive is due to their mucilage content e.g. glycyrrhiza and colt's foot. Expectorants promote expulsion of mucus which causes coughing.

ADUSA

Botanical Origin: ***Adhatoda vasica***
Local Name: بانسہ (Bansa)
Part Used: Dried leaves
Family: *Acanthaceae*
Chemical constituents:
Main constituent is an alkaloid Vasicine. Other constituents include vasicinol, vasicinone and adhatonine.
Habitat:
The plant is indigenous to India.
Uses:
Used for the treatment of cough, bronchitis, asthma and TB.
In Ayurveda, it is prescribed for bleeding due to thrombocytopenic purpura, bleeding ulcers, piles etc. in TB fresh juice of leaves is preferred. Local use gives relief in pyorrhea (pus in gums i.e. infection) and bleeding gums.

PEEPAL

Botanical Origin: *Ficus religiosa*
Local Name: Peepal پیپل
Family: Moraceae
Part Used: fruit and bark
Habitat:
The plant is commonly found in South Asia.
Uses:
Used in the treatment of cough associated with asthma.
They are also used as anti-inflammatory and anti-diabetic.

2. HERBAL MEDICINES FOR GASTROITESTINAL DISEASES

Gastrointestinal disease is the term used for any condition or disorder that occurs within the gastrointestinal tract. Common GIT disorders include; diarrhea, constipation, celiac disease etc. The common drugs are;

ASAFOETIDA

Botanical Origin: *Ferula asafetida*
Local Name: Heeng ہینگ
Family: Umbelliferae
Part used: Oleo-gum resin obtained from bark of the plant.
Habitat:
The plat grows in Afghanistan and Iran. Asafoetida is also known as Devil's drug or Food of the god.
Constituents:

- Ferullic acid
- Umbellic acid
- Mucilage

Uses:

- As anti-diarrheal.
- It has disinfectant (anti-microbial) effects in the intestine.
- As a sedative.
- In physiological disorders i.e. epilepsy, hysteria.
- In animal experiments, it has shown anti-tumor effects.
- Used for chronic gastritis, dyspepsia and irritable colon.
- Also used to remove intestinal parasites.
- In India, it is used to treat asthma, cough, flatulence, constipation, diseases of liver and spleen.

Precautions and Adverse Reactions:
No side effects are known in connection with the proper administration of therapeutic dosage form. Over dose can cause swelling of lips, digestive complains. Headache and convulsions may occur in some susceptible individuals.
Contraindication:
Pregnant women should not use it.
Dosage:
Used in the form of tincture, 20 drops as daily dose.

FENNEL

Botanical Origin: *Foeniculum vulgare*
Part Used: ***Fruit***
Local name: سونف
Family: Umbelliferae
It is a cremocarp. It is either used as such or its oil is extracted and used for medicinal purposes. Fennel oil is a type of essential oil obtained by steam distillation.
Constituents:

- Volatile Oil
- Anethol (It is responsible for the sweet taste of fennel)
- Fenchone
- Estragole

Pharmacological Actions:

It stimulates gastrointestinal motility. In higher concentrations it acts as antispasmodic. Its reliefs cough, feeling of fullness (bloating) and flatulence.

Precautions and Adverse Reactions:

Allergic Reactions to fennel rarely occur.

Dosage:

- 0.1-0.6 ml of Fennel oil daily.
- Duration of treatment should not exceed two weeks.

CUMIN

Botanical Origin: *Cuminum cyminum*
Local name:Zeeraزیرہ
Family: Umbelliferae
Constituents:

Volatile Oil

Uses:

- Used to relief flatulence and indigestion (dyspepsia).
- Also acts as a stomachic.
- It stimulates gastric and intestinal motility.
- Also has anti-microbial properties.

BAEL

Botanical Origin: *Aegle marmelos*
Local name: بیلگری Gare Bael
Family: Rutaceae
Part Use: Unripened Fruits, Leaves, Branches.
Habitat: South East Asia
Constituents:

- Tannins
- Mucilage
- Starch
- Alkaloids

Uses:

- As anti-diarrheal

Side Effects and Precautions:

Over dosage can cause digestive complaints and constipation due to tannins.

PLUM

Botanical Origin: *Prunus domestica*
Local name:آلوچہ
Part used: Dried ripened fruit
Family: Rosaceae
Constituents:

- Malic Acid
- Citric Acid
- Pectin
- Mucilage

Uses:

- Demulcent
- Laxative
- Nutritive
- Used in enlargement of liver and spleen.

3. HERBAL MEDICINES FOR SKIN DISEASES

Skin is the one of the most vulnerable organs of the body. Although life threatening skin disorders seldom occur, but they can be very uncomfortable and can cause chronic disabilities. In addition, as the skin is so visible, skin disorders can lead to psychological stress.

Skin disorders include rashes, acne, eczema, psoriasis, dermatitis, viral infections, fungal infections, parasitic skin infections e.g. scabies, skin pigmentation disorders e.g. melisma and vitiligo.

Acne is a common skin condition characterized by comedones (black and white heads) and pus-filled spots known as pustules.

Eczema or atopic eczema is an inflammatory condition of the skin characterized by redness, blistering, oozing, crusting, scaling and thickening of the skin. It is an allergic disorder.

ALOE

Botanical origin: *Aloe barbadensis*
Local name: Musabar مصبر
Part used: Dried juice obtained from leaves
Family: Liliaceae

Aloe vera gel is a slimy latex obtained from the leaves of the plant. Aloe vera leaves contain different constituents.

Constituents:

- **Acemannan** which is a mucopolysaccharide with immunostimulant activity. It increases T lymphocytes which promote skin healing and neutralize the enzymes responsible for damaging the mucosal walls.
- **Aloe emodin** e.g. aloin, barbaloin, essential fatty acids having anti-inflammatory action.
- **Glycoproteins** which speed up the healing process by inhibiting pain and inflammation.
- **Vitamin** C and E

Uses:

- Aloe gel is used as anti-inflammatory.
- Used to treat itching, inflammation, burns and for wound healing.

ANGELICA

Botanical name: *Angelica archangelica*
Local name: انجليق
Part used: Seeds, whole herbs and roots.
Constituents: Volatile oil including Piene, Phellendrene and Camphene

Uses:

- Angelica fruit is used in fever and cold and for skin infections.
- Angelica roots are used as rubefacient and diaphoretic.

Dosage: **4.5g** or **1.5g** tincture (10-20 drops daily).

PEPPERMINT

Botanical origin: *Mentha piperita*
Local name: پودینہ
Part used: Dried leaves
Family: Labiatae / Lamiaceae
Constituents: Volatile oil containing menthol, menthone, methyl acetate and menthafuran.
Uses:

- It is used as mild analgesic and anesthetic.
- Internally used in dyspepsia.
- Used as carminative.
- For nausea and vomiting.
- Used as sclerolytic agent.

Contraindications: Gall stones
Dosage: Average daily dose is **3-6 g.**

LEMON

Botanical name: *Citrus lemon*
Local name:لیموں
Part used: Juice, peel and volatile oil
Family: Rutaceae
Constituents:

- Volatile oil (limonene, citral)
- Flavonoids

Uses:

- Mainly used as a source of Vitamin C in low resistant scurvey and cold.
- Used to treat rheumatism.
- Used in the treatment of sunburn.

4. HERBAL MEDICINES FOR DIABETES

Introduction:
It is a metabolic disorder, characterized by persistently high blood sugar levels over a long period of time due to lack of insulin secretion by pancreas or insulin resistance.
Maximum sugar level during fasting is 100mg/dl.
Pre diabetic condition:
Sugar level between 100 and 125 mg/dl in fasting and random sugar level should be less than 200mg/dl.
Types of Diabetes:
Type 1/ Juvenile (Diabetes mellitus):
It is due to absolute deficiency of insulin due to destruction of β- cells of pancreas. This destruction can be caused by viral infection or auto-immune disease. It occurs in children or before 30 years of age.
Type 2/ Non-insulin dependent diabetes mellitus:
Also called adult onset diabetes mellitus. Usually occurs after 30 years of age. It occurs as a result of insulin resistance (body develops resistance against circulating insulin even though the level of insulin is normal or greater in the body).
Body produces insulin in response to glucose. The main reason is obesity or fat.
Symptoms:

- Polydepsia

- Polyphagia
- Polyurea
- Dry mouth
- Blurred vision
- Fatigue
- Poor/slow healing of injuries or infection
- Ketoacidosis (only in type 1)

GYMNEMA

Botanical Origin: *Gymnema sylvestre*
Local Name:گڑماربوٹی
Family: Asclepiadaceae
Chemical Constituents:

- Gymnemic acid
- Gymnemoside
- Gymnemosaponins.
- Also contain tannins and mucilins.

Mechanism of action:
Gymnemic acids increases secretions of insulin from the β-cells. 0.125mg/ml of gymnema extract can be used to increase the insulin secretions. It also inhibits the adrenal hormones that increase glucose level from the liver.
ADRs:
Patients should be monitored for the hypoglycemia due to hypoglycemia due to hyper secretion of insulin.
Contraindications:

- Pregnancy

Uses

- Diabetes
- Hepatic disorders
- gastric disorders

SYZYGIUM

Botanical name; *Syzygium jambolanum*
Local name:جامن
Family: Myrtaceae
Constituents:
Fruit contains Jamboline, Vit $B_{1, 2, 3, 6}$ Vit C, Glycosides and Kaemferol.
Jambolin glycosides stimulates insulin secretion. It blocks enzyme aldoreductase.
Alkaloid jambocine and glycoside Jamboline inhibits the diastatic activity which converts starch to sugar.
Uses:
It is used in

- Diabetes
- Diarrhea
- Gastric problems
- Bronchitis

AZADIRACHTA

Botanical Name: *Melia azadiracta*
Azadirachta indica
Local name: Neemنیم
Family: Meliaceae
Constituents:
Azadirachtine is the main active antibiotic constituent.
Mechanism of action:
It decreases glucosidase activity in the intestine.It also blocks inhibitory effect of serotonin on insulin release.It causes regeneration of B-cells.
Adverse drug reactions:
Serious side effects occur in children. For example: vomiting, diarrhea eczema loss of consciousness and even death. May also decrease fertility in men.
Uses:

- Used in diabetes mellitus.
- Used as sedative and anthelmintic

MOMORDICA

Botanical Name: *Momordica charantia*
Local name:کریلا
Family: Cucurbitaceae
Constituents:

- Charantin
- Cucurbitacin
- B-carotene
- Lectin

Mechanism of action:
Charantin increase insulin sensitivity at dose of 100mg/kg. It increases glucose uptake by cells. Lectin has insulin like activity. It is the main constituent of hypoglycemic activity of bitter melon.
Uses:
It is used as

- Anti-diabetic
- Stomachic
- Anthelmintic
- Ulcer
- Gout

Adverse drug reactions:

- Diarrhea
- Hypoglycemia
- Fever

5. HERBAL MEDICINES FOR CVS DISEASES

According to WHO, CVS diseases are defined as:

"Group of disease of heart, blood vessels and include coronary heart diseases cerebrovascular diseases, peripheral arterial disease, rheumatic heart disease, congenital heart disease, DVT and pulmonary embolism."

GARLIC

Botanical name: *Allium sativa*
Local name: لہسن
Part used: Fresh bulb of plant.
Constituents:
Allicin, peptides, ajoen.
Uses:

- Decrease cholesterol level.
- It has a thrombolytic factor ajoen.
- It decreases blood pressure.
- Also used to treat the colon, prostate and bladder cancer.
- Also has a hypoglycemic activity**.**

Mechanism of action:

Allicin is a lipid lowering compound. Ajoen is antiplatelet. It has fibrinolytic effect. It decreases blood pressure by causing vasorelaxation due to hydrogen sulphide production. It also inhibits ACE.

POMEGRANATE

Botanical Name: *Punica granatum*
Local Name: انار
Family: Punicaceae.
Part Used: Fruit
Constituents:
Anthrocyanins, quercetin, vit. C, ellegic acid, flavonoids, catechins.
Mechanism of action:

Rutin (flavonoid) prevents blood clot, flavonoids decrease the blood pressure.

Uses:

- Hypertension
- Anticarcinogenic.

INDIAN SQUILL

Botanical Name: *Urginia indica*
Local Name: **جنگلی** پیاز
Family: liliaceae.
Part used: Bulb of plant.
Constituents:
Cardioglycosides and scillaren A, B
Mechanism of action:

It increases intracellular level of calcium by inhibiting Na/k atpase activity.

Uses:

- Cardiac stimulant
- Expectorant

- Use in CHF
- Used in asthma

DIGITALIS

Botanical name: *Digitalis purpurea*
Family: Scrophulariace
Local name:زہر الکشّاتبین
Part used: Dried leaves
Constituents:
Dried leaves contain:

Purpurea glycosides A and B which give rise to Digitoxin and Digoxin allied sp. *Digitalis lanata* contain lanatosides A, B and C which give rise to Digitoxin, Digoxin, and Gitoxin respectively.

Mechanism of action:
All cardiac glycosides have same mechanism of action. They block Na/k atpase which result in the high level of intracellular calcium in cardiac muscles. Increase the calcium catalyzes contractile reaction, increasing force of contraction of heart muscles.
Cardiac glycosides are also used as antiarrythmic drug as they slow down the conduction through AV node.

Uses:

- In CHF.
- As antiarrhythmic
- As diuretic

Adverse effects:
Palpitation, sweating, hallucination and fainting.

Dosage:
1.5 gm of leaves in 2 divided doses.
Purified digoxin is used as single dose of 0.125 mg to 0.25 mg daily.

LILY OF VALLEY

Botanical name: *Convallaria majalis*
Family: asparagaceae
Local name:سوسن
Habitat:
Europe, eastern america
Part used:
Roots, leaves, flowers.
Constituents:
Convallarin, convallamarin, convallatoxin.
Mechanism of action:
Same as other.
Uses:

- As cardiotonic
- As diuretic
- In CHF

Dose:
600 mg per day.
Adverse effects:
Nausea, stupor, cardiac arrythmia

6. HERBAL MEDICINES FOR CENTRAL NERVOUS SYSTEM

CANNABIS

Botanical Origin: Cannabis sativa
Local name:بھنگ
Family: Cannabinaceae
Part Used: leaves
Chemical constituent:
THC (main active constituent) which is converted into different active metabolites. THC the half-life **24 hours** but the metabolites can be detected up to **60 days.**
Mechanism of Action:
THC act on cannabinoid receptors in the brain it causes relaxation, reduces coordination, low BP, sleepiness, disruption in attention altered sense in of time and space.
In high doses, it causes hallucination, delusion, impaired memory, disorientation. THC affects neurotransmitters, norepinephrine, dopamine, serotonin, GABA.
Dose:
To treat amyotrophic lateral sclerosis, 10 mg of THC orally for two weeks.
Uses:

- For management of chemotherapy-induced nausea
- Glaucoma
- Spasticity in multiple sclerosis
- Neuropathic pain.

OPIUM

Botanical Origin: *Papaver somniferum*
Local name: خشخاش,افیم
Family: Papaveraceae
Opium is dried exudate obtained from incisions made on the walls of un-ripped but fatty grown capsule of *Papaver somniferum*.
Constituents:
Phenanthrene alkaloids or Benzyl isoquinoline alkaloids are morphine, codeine, and papaverine.
Uses:

- **Codeine** is a cough suppressant and analgesic
- **Morphine** is used as a potent narcotic analgesic to treat severe pain e.g operative pain or pain due to bone fracture.
- **Papaverine** is a smooth muscle relaxant used as antihypertensive

Dose: 1-4 times a day.

NUX VOMICA

Botanical Origin: *Strychnous nux-vomica*
Local name:کچلا
Family: loganiaceae
Constituents:
Alkaloids- strychnine, brucine, loganine. Seeds contain about 1.5% strychnine.
Dose:
Strychnine is not used therapeutically, used only in research.

Seed powder up to 30 mg / per day is used therapeutically to treat diabetes, asthma, to improve appetite as cardiac and respiratory stimulant.
Strychnine – CNS stimulant.

Mechanism of Action:

Strychnine is used as an antagonist to glycine and acetylcholine receptors.
It affects Motor nerves a strychnine is CNS stimulants; high doses can cause cardiac and respiratory failure (brucine closely resembles strychnine in action but is slightly less poisonous. It only causes paralysis of peripheral motor nerve).

BELLADONNA

Botanical Origin: *Atropa belladonna*
Local name:ماکو
Family: Solanaceae
Part Used: Leaves, roots, and berries are used as drugs.
Chemical constituents:
Tropane alkaloids

- Hyocine
- Hyoscyamine
- Atropine

Mechanism of Action:

Atropine, hyoscine, and hyoscyamine are anticholinergic. They block muscarinic receptors i.e. M1, M2, M3, M4.

Uses:

Antispasmodic they block bronchial and gastric secretions, asthma, peptic ulcer, dyspepsia.
It decreases motility of GIT and tone of unitary bladder (exocrine secretions- controlled by PNS). It causes mydriasis, restlessness, excitement, irritability, and hallucination. It causes transient slowing of heart followed by tachycardia.

Adverse effects:

Symptoms of poisoning include dilated pupil, increase body temperature, sensitivity to light, blurred vision, tachycardia, loss of balance, constipation, confusion, and hallucination.

7. HERBAL MEDICINES FOR MUSCULO SKELETAL DISORDERS

Musculoskeletal disorders are injuries or pain in joints, ligaments, muscles, nerves, tendon and structures that support limbs, neck and back.

NIGELLA (BLACK SEED)

Botanical Origin: *Nigella sativa*
Local name:کلونجی
Family: ranunculaceae
Part used: seeds
Constituents:
Most active constituent is thymoquinone, dithymoquinone and carvacrol.

Uses:

Black seed or nigella is used in osteoporosis, thymoquinone inhibits the activity of cyclooxygenase 1(it is involved in inflammatory process and pain sensation) and is a powerful anti-inflammatory agent.
Other uses include asthma, diabetes, epilepsy, hypertension etc.

PHYCHOTIS AJOWAN

Botanical origin: *Trichospermum ammi*
Local name:اجوائن
Family: Apiaceae
Part used: Seeds
Constituents:
Thymol, pinene, fatty acids.
Uses:

- High level of thymol increases gastric secretion which improves digestion.
- Because of thymol it is anesthetic and analgesic.
- Due to its anti-inflammatory and anesthetic properties, it is used in rheumatism and arthritis. Its oil is also used topically in the treatment of rheumatic and neurologic pain e.g sciatica.

Adverse reactions:
It can aggravate peptic ulcer.

FENUGREEK

Botanical origin: *Trigonella foenumgraecum*
Local name:میتھی
Family: leguminaseae, faboceae
Part used: Seeds, Leaves
Constituents:
Amino acids, saponins, protein, flavonoids, alkaloid–trigonelline.
Uses:
Arthritis is an auto immune disease. Fenugreek suppresses immune disorders by acting as a mimic of estrogen. It is a good anti-diabetic.
Adverse reactions:
Diarrhea, gastric upset, facial swelling & hyper-sensitivity. (steroids cause fluid retention i.e edema)
Dose:
5-30 g of defatted fenugreek seed powders up to 3 times a day.

8. HERBAL MEDICINES FOR RENAL DISEASES

Kidneys are bean-shaped organs having millions of tiny structures or functional units called nephrons which filter the blood removing waste produced in metabolic reactions. Kidneys play an important role in maintaining homeostasis, regulating acid, base and electrolyte balance in the body.
Kidney injuries are usually due to direct damage to kidneys or damage from certain drugs or dehydration. Kidney problem include kidney stone, e.g. Calcium stones, polycystic stones.

CUCUMIS

Botanical Origin: *Cucumis melo*
Family: cucurbitaceae
Local name:خربوزہ , سردا
English Name: musk melon
Part used*:* fruit
Constituents:
Cucurbitacin, dextrose, citric acid and water

Uses:

- In urinary conditions to remove stones
- It increases filtration through kidneys to facilitate the elimination of toxins and waste
- It also decreases the incidence of kidney infection
- Its alkalizing effect inhibits the growth of coli from bacilli and increases the solubility of acidic salts

Dose:

250-500 g daily

CORN

Botanical Origin: *Zea mays*

Family: Poaceae

Local name:مکئی

Constituents:

- Saponins
- Volatile oil
- Mucilage
- Vitamin c
- Allantoin

Mechanism of action:

Saponins which are anti-inflammatory and allantoins is a good healing agent.

Uses:

- Because of K content, corn is a useful diuretic for different urinary problems
- Corn soothes and relaxes the lining of urinary tubules and bladder, relieving irritation and improving urine flow
- Corn reduces kidney stone formation, it can also relief chronic cystitis

Dose:

- As an infusion in UTIs one cup three times a day
- As a tincture take 3ml three times a day for cystitis

TRIBULUS

Botanical name: *Tribulus terrestis*

Local name: گھوکھرو خوردا

Family: Zygophyllaceae

Constituents:

- Alkaloids
- Resins
- Tannins
- Sugars, sterol
- Essential oil, peroxidase
- Diastase

Uses:

- Used for urinary disorders mainly for removing kidneys stones and to relieve irritation.
- Usually used in the form of infusion
- Also used as diuretic
- Used in psoriasis and for heart diseases

BERBERIS

Botanical name: *Berberis vulgaris*
Local name:زرشک,
Family: barberidaceae
Constituents:

- Alkaloids —berberine
- Pectin
- Tannins
- Polyphenolic compounds

Uses:

- Diuretic
- Relieves venous congestion
- In anal fistula
- It removes stones, especially oxalates
- It also removes stones from gall bladder
- It removes stones especially oxalates.
- It also removes stones from gall bladder.

9. HERBAL MEDICINES FOR HEPATITIS

Liver is a vital organ located in the right upper quadrant of abdomen below the diaphragm. It performs different important functions like detoxification, protein synthesis and production of bio-chemicals necessary for digestion. Also involved in the storage of glycogen, fat soluble vitamin, and decomposition of RBCs, Plasma protein synthesis, hormone production and bile production.

Plasma protein e.g. Albumin (having colloidal nature exerts osmotic pressure). Deficiency of proteins -edema

Hepatitis means inflammation of liver most often caused by virus. Most common hepatitis viruses are A, B and C.

Hepatitis A: It is caused by hepatitis A virus. Many patients remain asymptomatic. Symptoms include nausea, vomiting, diarrhea, yellow skin fever, abdominal pain, acute liver failure rarely occurs. Most common in elderly patients.

It spreads by eating / drinking food/water contaminated with infected feaces. It may also be transferred through infected person.

Prevention: Hepatitis A vaccine

Hepatitis B:

Hepatitis B is serious infection caused by HBV. It may become chronic also lasting for more than 10 months. It can increase the risk of developing liver failure, cancer or cirrhosis.

Prevention: vaccine

Hepatitis C

Hepatitis C is caused by virus C

Symptoms

- Yellow eyes and skin
- Dark urine
- Stomach pain
- Loss of appetite
- Nausea
- Fatigue
- It spread from the blood or body fluid of infected person

Treatment

Sofosbuvir and Daclatasvir.

❖ Hepatitis D and E are less common

BERBERIS

Botanical origin: *Berberis vulgaris*
Common name: Barberry
Local name: زرشک,
Family: Berberidaceae
Part used*:* Root, bark, stem & fruits.
Constituents: Berberine and pectin.
Uses:

- Berries are edible & rich in vit C.
- The plant is mildly poisonous, except for its fruit.
- Fruit has been used as tea, jelly or syrup for treatment of disorders of respiratory tract, fever infections cold & flu.
- Roots are hepato protective

PICRORHIZA

Botanical origin: *Picrorhiza kurroa*
Local name:کتکی
Family: Scrophulariaceae
Part used: Flowers, leaves, rhizomes.
Constituents:

- Picrosides 1 & 2
- Apocynin.

Uses:

Hepatitis, orally relieves anorexia nausea, discomfort and Rheumatoid arthritis.