

Human population

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A population is defined as a group of organisms of the same species occupying a particular space at a particular time. The scientific study of human population is called demography.

Demographic Terms

- **Population density** - Population density of a species is the number of individuals of a species per unit area or volume. For example number of animals per square km.
- **Nativity (birth rate)** :- It is expressed as number of live birth per 1000 individual of a population per year.
- **Mortality (death rate)** :- It is commonly expressed as the number of deaths per 1000 individual of a population per year.
- **Immigration** :- The arrival of individuals into population of permanent settlement.
- **Emigration** :- The outward movement of the individual from the native place to join another population is called Emigration.
- **Sex ratio** :- Ratio of human male and female in particular population.
- **Age ratio** :- This is the ratio of human on the basis of reproductive period of the individuals of particular population. The population can be divided into three age groups.

Pre-reproductive (below 18 years).

Reproductive (19-40 years).

• Post-reproductive (40-70 years).

• Carrying capacity:- The carrying capacity is the capacity of an area that can support the maximum population throughout the season.

• Population explosion:- The rapid and unplanned growth in number of population is called as population explosion.

• Environmental resistance:- The factors which naturally check the population growth beyond the carrying capacity of an area are called environmental resistance.

• Biotic potential:- It is the biological capacity of any organism to produce offspring's. This is called reproductive potential.

Zero growth rate:- When the natality and mortality rate is same, the population remains constant showing zero growth rate.

Population Growth Curve.

• Growth of a population can be expressed by a mathematical expression called growth curve.

the growth curve may be J-shaped or S-shaped.

J-shaped growth curve (exponential growth curve)

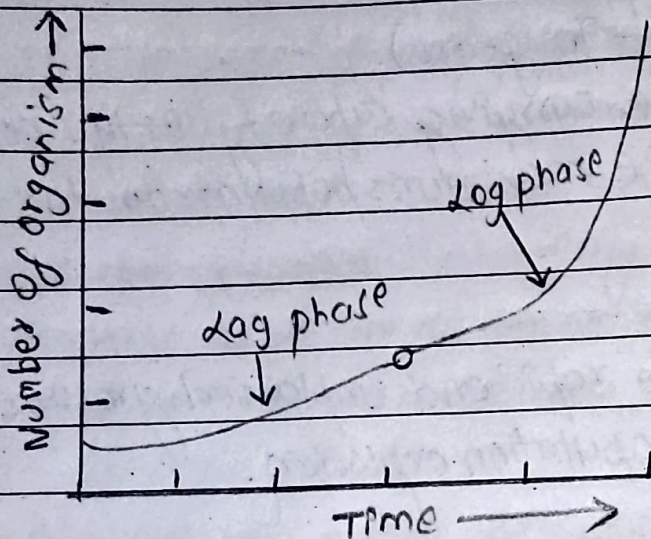


Fig. 12.1 : J-shaped curve

This curve indicates that population increases rapidly in exponential fashion. When ecological conditions are favourable the population grows without any limit. But this does not happen in nature because the environmental resistance does not allow a population to grow towards infinity. It consists two phases only.

1. lag phase :- It is a period of adaption of organism to new environment, so is characterized by slow or no growth in population.
2. log phase :- It is characterized by the rapid growth in population which continues till enough food is available.

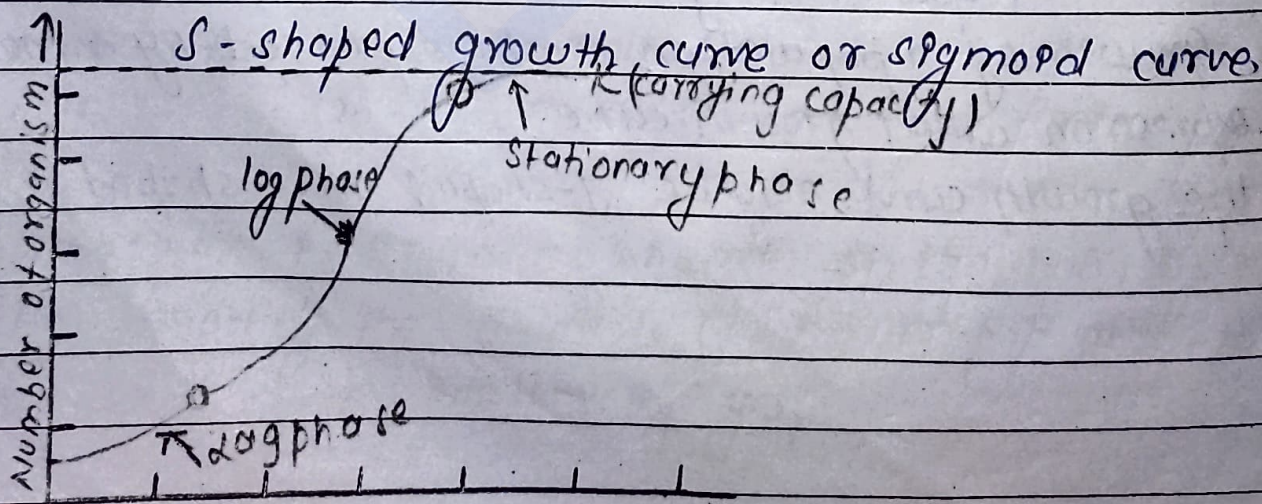


Fig. 12.2 : S-shaped curve.

This is a common curve which is observed in the most of the species. If they are introduced into a new habitat, in the beginning the population increases slowly then increases rapidly but again becomes slow down gradually until an equilibrium level is reached. This curve is divided into three phases.

1. Early phase or lag phase:-

In this phase the individuals try to adapt themselves to the environment. so there is no or very little increase in population.

Malthus theory of Human population growth.

Thomas Robert Malthus, in 1798 put forward a theory of human population growth. He states that:

1. Population multiplies in geometric ratio whereas food resources multiplies in arithmetic ratio.
2. Fastest growth of population than that of its requirement creates an imbalance between the two.
3. when the imbalance reaches a certain value, some factors like scarcity of food and natural disasters like earthquakes, flood, drought etc will bring the population to a desired level, such a population crash is called catastrophic control of population. These factors were called positive checks by Malthus.

3. Family planning: Family planning is an important method to control overpopulation. Some of the important methods of birth control are as follows:-

A) Natural methods:- It includes following methods:
1. Safe period or Rhythm period: It is a period of menstrual cycle in which the chance of fertilization is minimum. A week before and a week after menstrual phase is considered as safe period because ovulation does not occur in this period.

2. Coitus interruptus:- It is an oldest method in which male withdraws his penis before ejaculation, hence reduces the chance of pregnancy.

3. Abstinence:- In this method sexual intercourse between couples should be absent during the risk period from 10th to 17th day of menstrual cycle. This also helps to prevent pregnancy.

B) Mechanical methods:- This method includes:

1) Condom:- They are most widely used contraceptives which are most effective and have no side effects. These check pregnancy.

2) Intrauterine contraceptive device (IUCD):- The devices which are used inside the uterus are called IUCD. These include copper-T and loops which are fitted in the uterus and prevent fertilization.

3) Diaphragm or cervical cap:- It is a female condom which is fitted in the vagina of female hence checks the entry of sperm into uterus.

C. Chemical method:-

These include the various chemicals which prevent the pregnancy. The chemical used in this method are spermicides. These chemicals are introduced in vagina before sexual intercourse. These kill the sperms or reduce the mobility of sperm and prevent the pregnancy.

D. Hormonal method:-

Hormones play important role in ovulation and pregnancy. These contraceptives suppress the ovulation and delay the mobility of sperms. These includes following methods:-

1. Oral pills:-

Oral contraceptive pills should be taken on pill every day which contains combination of progesterone and estrogen hence called combined pills.

2. Injectable device:- Injectable contraceptive are given by injection into a woman's arm once every 1, 2 or 3 month.

3. Norplant:- It is the contraceptive inserted under the skin of woman's upper arm. It consist of matchstick size rods of hormones which continuously release the hormone for about 3 to 5 years.

E. Surgical method:- Surgical method include following types:-

1. Vasectomy:- It is a permanent method of birth control in male in which vas deferentia are cut and tie. therefore sperm are not pass out.

2. Laparoscopy:- It involves the blockage of fallopian tubes by an instrument called laproscope.

3. Tubectomy:- It is also a permanent method to birth control in female in which the fallopian tubes are cut and tied. Therefore no ova and sperms are carried and met.

Health disorders

A person who posses a good health physique and health does not necessarily mean that they are free from disease. Similarly a good-looking healthy person may have several diseased conditions. A good health is a state of a complete physical, mental and social well being.

Physical, mental and social and physiological disorder of the body is known as disease.

Any change from the normal state that cause discomfort to disturb the health is called disease.

Terminology:-

- **Etiology:-** The study of cause of disease.
- **Epidemiology:-** The study of cause, mode of transmission and control of disease.
- **Causative agent:-** factors which cause the disease.
- **Pathogen:-** Any organism that causes disease.
- **Vector:-** Any organism that transfer disease from one person to another.

• **Incubation period:-** The time interval between the infection of pathogen and appearance of first symptoms of the disease.

- Epidemic disease :- Disease spreading widely affecting many people at some time.
- pandemic :- An epidemic usually affecting a large proportion of the population occurs in a wide geography.

Concept on cardio vascular disease.

Cardio vascular disease (CVD) is a general term for condition affecting the heart or blood vessels. It is associated with fatty deposited inside the arteries with damage and increase the risk of blood clots. It is also associated with damage to arteries in brain, heart, kidney and eyes. It is one of the main cause of death and disability.

The cardio - vascular disorder include:

a. Coronary heart disease (CHD) :-

It is the most common type of heart disease. This disease related to the coronary arteries which supply the blood to the muscle of the heart. When a coronary artery becomes blocked (usually by a blood clot) an area of heart tissue loses its enough blood supply and oxygen. This reduction of blood can quickly damage and kill the heart tissue causing heart attack.

b. Heart failure :- It is chronic and a progressive condition in which the muscles of the heart unable to pump enough blood to meet the body's need for blood and oxygen. In this disease the muscle of the heart become stiff or weak. It cannot pump out enough oxygen rich blood. Basically, the heart cannot keep up with its workload leading to the heart attacks.

c. Arrhythmia:- It is a problem with the rate or ~~rate~~ rhythm of the heartbeat. During an arrhythmia, the heart can beat either too slow or with an irregular rhythm. When heart beats too fast the condition is called tachycardia. When the heart beats too slow, the condition is bradycardia. Electrolyte levels that are too high or too low can affect our heart's electrical impulses and contribute to arrhythmia development.

d. Heart valve problem:- Heart rate problems occur when one of the four valves (tricuspid, pulmonary, mitral and aortic valve) in the heart does not work properly. The blood can leak through the valve in the wrong direction (called regurgitation), or a valve may not open far enough and block the blood flow (called stenosis). Sometimes, an unusual heartbeat happens in the heart which is called heart murmur.

e) Stroke (Arterioelomies):- A stroke is caused by a lack of blood flow to the brain. This can happen because of a blood clot traveling in the blood vessel in the brain or bleeding in the brain.

f) Peripheral Arterial Disease:- It occurs where there is a blockage in the arteries to the limbs usually the legs. This causes dull or cramping leg pain, hair loss on the legs and feet, weakness in the leg, persistent sores on the feet and legs.

g) Rheumatic Heart Disease:- Rheumatic heart disease is an auto-immune disease, most common in children after a severe throat infection by certain strains of streptococcus bacteria. The anti

bodies against streptococcus may react with myocardium and cause heart difficulties.

- h) Aortic disease:- Aortic disease are a group of conditions affecting the aorta. One of the most common aortic disease is an aortic aneurysm, where the aorta becomes weakened and bulges outwards.
- g) Cyanosis:- It refers to a bluish coloration of the skin and mucous membranes due to too much deoxygenated haemoglobin in the blood.

* Concept of Respiratory Disorder:-
Respiratory disorders are the of respiratory tract including trachea, bronche, alveoli, pleura, pleural cavity etc. Respiratory disorders are the diseases that affect the lungs and other parts of the respiratory system. Respiratory disorders are common

The common respiratory disorders in human are:-

- a) Asthma:- It is a chronic respiratory condition that brings difficulty in breathing due to the inflammation of the respiratory tract. It can be triggered by the inhalation of the particles from air. The physical activity or respiratory infection may also contribute to asthma. Asthma suffers wheeze, cough, and have difficulty in breathing during an attack. About 334 million people suffer from asthma, which is the most common chronic respiratory disease of the childhood.

b) Chronic Obstructive pulmonary disease (COPD):- COPD is another chronic respiratory disorder caused by the long term exposure to the substance that irritate and damage the ~~lungs~~ lungs. As estimate 65 million people have moderate to severe chronic obstructive pulmonary disease (COPD) from which approximately 3 million people die each year.

c) Pneumonia:- It is the disease of lungs due to the infection of bacteria, virus, fungi that cause inflammation of air sacs in the lungs. A variety of organism including bacteria and virus like coronavirus can cause pneumonia. It kills million of people annually. Pneumonia is a leading cause of death among children under the age of

d) Lung cancer:- It is the disease of lungs which are characterized by chronic coughing, change in voice etc. It is lung tumour characterized by the uncontrolled and unnecessary growth of the tissues in the lungs. This growth can spread beyond the lungs into the nearby tissue or other parts of the body by the process of metastasis. The most common symptoms are coughing, weight loss, shortness of breath, chest pain etc. Lung cancer kills approximately 2.6 million people each year.

e) Cystic fibrosis:- It is a pulmonary disease which is characterized by the condition where the epithelial cells of lungs over produce thick and sticky mucus that blocks normal airway for the lungs. It cause persistent cough, excessive sputum production and recurrent pulmonary infections.

Emphysema: Emphysema is a respiratory disease which destroys the wall of the alveoli of the lungs, resulting in a loss of the surface area available for the exchange of oxygen and carbon dioxide while breathing. This produces the symptoms of shortness of breath, coughing and wheezing. In severe emphysema, difficulty in breathing leads to decreased oxygen intake, which causes headaches, in addition to the symptoms of impaired mental ability.

Coronavirus disease (COVID-19): COVID-19 is a severe disease with the acute respiratory syndrome. This disease is a contagious disease. The first known COVID-19 case was identified in Wuhan, China in December 2019. This disease has been spread worldwide leading to an ongoing pandemic.

The symptoms of COVID-19 are fever, cough, headache, fatigue, the symptoms of COVID-19 are breathing difficulties and loss of smell and taste. The symptoms may begin from one to fourteen days after an exposure to the

1) Tuberculosis:-

Tuberculosis is a bacterial infection caused by a bacterium Mycobacterium tuberculosis that affects the lungs and other parts of the body. TB can be inactive or latent for many years. In 2021, 13.6 million people developed tuberculosis (TB) and approximately 1.8 million people died of it.

Concept of Renal Disorders:-

Kidney does not work properly that cause disorders. The common symptoms are:-

- Decreased urine output
- Fluid re causing swelling in legs, ankles or feet.
- shortness of breathing.
- fatigue, nausea, weakness etc.
- Irregular heartbeat, chest pain.

The most common renal disorder are as follows:-

- Renal failure:- Sometimes kidney are not ~~available~~ able to filter and clean blood. This is known as kidney or renal failure.

There are two main types of renal failure:-

- a. Acute kidney failure:-

When the kidney suddenly stop filtering waste product from blood called acute kidney or renal failure (AKF)

- b. Chronic renal failure:- It is a progressive disease and takes long time. A patient with chronic condition may not have any symptoms until kidney function declines to 20% or less.

Nephritis:- It is the inflammation of nephron in the kidney. There are two types of Nephritis:-

1. Glomerulonephritis :-> It is the inflammation of
 2. Interstitial nephritis ~~or~~ or tubule -> It is the inflammation of the spaces between renal tubules or the medullary tissue.
- Nephritis is characterized by reduce glomerular

blood flow, reduced Urine output, blood in

Urinary Tract Infection (UTI):-

It is a infection of Urinary system. It may occur in any part of the Urinary system including: Urethra, Ureters, Urinary bladder and kidney. UTI is a bacterial infection.

The common UTI are:-

1. Cystitis:- It is the inflammation of the Urinary bladder that may cause by an infection that has spread from the Urine. It is characterized by frequent, painful and burning Urination.

2. Pyelonephritis:- It is the inflammation of renal pelvis and the Medullary tissue of the kidney. It is usually caused by bacteria. The patient is unable to concentrate his urine and characterized by frequent and painful Urination, fever etc.

3. Urethritis:- It is the inflammation of Urethra. It is characterized by painful Urination, feeling frequent or urgent need to Urinate etc.

4. Renal Stone:-

Kidney stones or renal calculi occur when salts in the urine form a solid crystal. These stones can block the flow of Urine and infection, kidney damage or kidney failure.

Disease:-

Disease refers to the any body disorder that affects the normal function of body or body parts.

'socially significant diseases' are abnormal changes that cause distress and suffering to the concerned person and other people around them. The disease that cause mental illness due to smoking, drug, alcohol etc are collectively called mental disorder or disease. 2% of world population suffer from mental illness and 10% from mild mental disorders.

1. Drugs and their addiction:

Drugs is any chemical substance having physiological effect. Drugs are normally used for treatment of diseases.

Taking a drug for medical purpose to treat body disorder or injury is called drug's use. However intake of drug for non-medical purpose in large quantities and frequencies for non. that affect the mental and physical function is called its abuse. Drug abuse is misuse of drugs. It may result in social, physical or emotional harms. A person who take drugs for non-medical use called drug abuser.

Drug addiction:

Addiction is habitual, for physiological and physical dependence on some substance. A person who is habituated to a drug is called drug addict and the condition of feeling that compels the person to take certain drugs is called drug addiction. Drugs include those substance that works on nervous system and act either as stimulants or as depressants. Some

may act as sedative and other are hallucinatory.

Types:-

A. Psychotropic drugs:-

These drugs act on brain and alter to behaviour, consciousness and capacity of perception. They are also called mood altering drugs and of three types:

i. Sedative / Tranquillizers:-

These drugs depress the activity of CNS. They give a feeling of calmness, relaxation and sleepiness in the body. They provide some relief to users from worries and anxieties - Example: Benzodiazepines, barbiturates, etc.

ii. Opiate Narcotics:-

These drugs suppress the activity of brain and also produce temporary feeling of well and freedom from anxiety, called pain killers. These drugs produce deep sleep and relieve pain. They include:-

a. Opium:- Commonly called opium. It is extract from unripe capsule of poppy plant.

b. Morphine and cocaine:- They are derived from opium. They are commonly used in many medicines and cough syrups.

c. Diacetylmorphine / Heroin:- It is formed from morphine by acetylation. It is highly addictive. It is taken either orally, inhaled or injected.

iii. Stimulants / Antidepressants:-

These drugs stimulates Nervous system by increasing mental alertness and self confidence temporarily. Hence, called mood elevators. They includes:

- a. Caffeine:- It is derived from leaves of tea, seeds of coffee plant and cacao plants. It increase alertness and thought.
- b. Cocaine:- It is extracted from leaves and young twigs of *Erythroxylon coca*. Its effect are lack of sleep, loss of appetite and hallucinations which ultimately leads to damage mental function.
- c. Amphetamines:- They are commonly called anti-sleep drugs or pep pills. They are taken by truck drivers, night workers to keep them awake and by athlete to increase self confidence and physical strength.

B. Psychedelic drugs:-

These drugs mainly act on CNS and greatly affect feelings thoughts and perceptions. They cause optical or auditory hallucination, i.e. illusion, perception of the external objects or illusion to have heard the sound actually not present. Hallucinogens are called vision-producing drugs.

Hallucinogens:- These drugs cause hallucinations and have a strong effect on the cerebrum and the sense organ which bring the person to the world of fantasy giving them false and temporary happiness. These drugs includes:-

a. LSD (Lysergic Acid Diethylamide):-

It is derived from a fungus - Ergot (*Claviceps purpurea*) which is parasitic over rye or wheat plants. It is one of the most dangerous drugs of modern times. It causes nightmares, floating sensations and horrible dreams.

b. Products of hemp plant:-

Two species of hemp i.e. *Cannabis sativa* and *Cannabis indica*. The products of the hemp plant are Bhang, Ganja, Charas and Marijuana.

Bhang:- It is obtained from the leaves and the flowering parts of the plant.

Ganja:- It is obtained from the unfertilized female inflorescence.

Charas (Hashish):- It is obtained from the flowering plant tops.

Marijuana:- It is obtained from dried flowering plants.

Reasons for drug addiction:-

- i. Curiosity.
- ii. Family history.
- iii. Group or peer pressure.
- iv. Relief from pain.
- v. Overcome frustration and depression.
- vi. Pleasure or fun.

Symptoms of drug addiction

- i. Loss of appetite and body weight.
- ii. Loss of interest in sports and daily routine.
- iii. Reddening and puffiness of the eyes and unclear vision.
- iv. Numerous injection marks on the body and the blood stains on clothes.
- v. Sleeplessness, lethargic and passive body.
- vi. Changing mood, temper and tantrums.
- vii. Presence of needles and syringes in pockets.

Effects of drug abuse on health.

1. Depressant (example: barbiturates).
 - Depress brain activity.
 - Produce the feeling of calmness and relaxation.
 - Drowsiness and deep sleep.
2. Stimulants (example:- caffeine, nicotine, cocaine)
 - Lack of sleep.
 - Loss of appetite.
 - Increased BP.
 - Increase alertness and confidence.
3. Narcotics (example:- opium, morphine, heroin)
 - Reduce respiratory and cardiovascular activities.
 - Nausea and vomiting.
 - Reduce anxiety and tension.
 - Painful gastro intestinal disruption.

4. Hallucinogens (Example:- Bhang, Charas, Ganja)
- Severe damage to CNS leading to suicide.
 - Sugar level in blood increase.
 - Thought, feelings and perception alert.

Effects of drug addiction on the drug addict, on the family and on the society.

1. Effect on the drug addict.

- Affect CNS which may be permanently damaged.
- Victims of various disease - psychosis, Hepatitis - B, AIDS, etc.
- Dull and unhappy daily life.
- Suffers from insecurity.
- Abnormal and defective child birth.

2. Effect on the family.

- Neglects the duty, responsibility and job.
- Deprives the basic needs of their family.
- Frustrations and insecurity in children.
- Spouses and children may copy and become drug addicts.

3. Effect on the society.

- Encourages smuggling to get drugs from illegal sources.
- Increases traffic, industrial accidents and trafficking.
- Increases social crimes and violence.
- Loss of social reputation and personality.

Control measures of drug Addictions:-

- i. Treatment and hospitalization of sick or addict persons.
- ii. Rehabilitation for the addict person and psychological treatment.
- iii. Banning illegal activities like production and selling of the drugs.
- iv. Providing school education, community and health education.
- v. Smuggling of drugs should be strictly prohibited.
- vi. Anti-drug campaign to discourage the use of drugs.

2. Alcoholism (Alcohol addiction)

A regular consumption of alcohol either in low concentration or in high concentration cause dependency on it which is called alcoholism. Alcohol is manufactured by fermentation of sugar by microorganism like yeast. The major source of commercial alcohol is molasses which is by-product of sugar industry. There are variety of alcoholic beverages.

i. Malted liquors:- They are made by the fermentation of germinating cereals. The alcohol content is 3-6%. Example: Beer and stout.

ii. Wines:- They are made by the fermentation of natural sugars as present in grapes and other fruits. The alcohol content is 5-6-16%.

iii. Spirits:- They are distilled after the fermentation. The alcohol content is 40-55%. Examples:- Rum, Whisky, Vodka, Brandy, etc.

Reasons of alcohol addiction

- i. Feeling of independence.
- ii. Overcoming frustration, failures and disappointments.
- iii. Desire for excitement and doing more work.
- iv. Pressure of friends.
- v. Relief from pains and worries.
- vi. Use of drinks in social, cultural and religious functions.

Effect of alcoholic drugs.

1. Ill-effects of alcoholic drink on individual and health

- loss of sensation and memory.
- Visual problems.
- Inflammation of gastric mucosa leading to gastritis.
- Liver cirrhosis.
- Increase in blood pressure.
- Lower down the sugar level in blood.
- In women, affect ovulation and menstrual cycle.

2. Ill-effects of alcoholic drinks on the family.

- loss of money spent on expensive alcohol leads to economic crisis.
- children are deprived of their basic needs.
- children suffer from frustration, anxiety and insecurity.
- Also cause family problems like divorce and anti-social activities.
- Disturb the peaceful atmosphere of the family.

3. II - effects of alcoholic drinks on the community or society.
- Social crimes like corruption, rapes etc increase
 - High risk of road and industrial accidents.
 - More chances of rape incidences.
 - Loss of social reputation and personality.

Symptoms of alcoholism.

- loss of will power, self-control, judgement and emotional control.
- Visual problems like blurred vision, double vision etc
- leads to neuritis, amnesia and gastritis.
- Increase blood pressure and lowers the sugar level in the blood.
- In women, it particularly affects ovulation and menstrual cycle.

Control of alcoholism.

- Treatment and hospitalization of sick persons.
- Rehabilitation and psychological treatments.
- Banning illegal activities like production and selling of alcohol.
- Providing education in schools and communities about the adverse effects of alcohol.
- Heavy taxation on alcohol to restrict people to buy.
- Sales should be allowed only from the authorized shops. Age bar must be determined.
- Drinking should be prohibited at public place, parties and family celebrations.

3. Smoking:-

A regular consumption of tobacco in the form of either cigarette or chewing cause dependency on tobacco which is called smoking. A prolonged use of the tobacco may lead to the dependence of the body on it which is called tobacco addiction. Tobacco is one of the most abused substances in the world which is made from the leaves of the tobacco plant are dried and processed to make a variety of products. Tobacco contains the highly poisonous alkaloid drug called nicotine. Nicotine is an addictive toxic alkaloid chemical. If nicotine is injected intravenously, it can kill human body.

Effect of nicotine:-

- Stimulate the conduction of nerve impulses.
- Increase the rate of heartbeat and the blood pressure.
- Increase the constriction of the blood vessels.
- paralyse the neurons and nerve conduction.
- relax the muscles.
- decrease breathing capacity.

Effect of smoking and chewing tobacco in human health.

1. The smoke of cigarettes contain chemical substances called carcinogens which cause cancer. The carcinogens in cigarette are a group of sweet smelling chemical which is called tar. Tobacco cause lung cancer and oral cancer.
2. Tobacco also caused an inflammation of the bronchial tubes leading to Bronchitis.

3. Nicotine affect the heart which increase the heartbeat.
4. Tobacco smoke contain carbonmonoxide which reduce the ~~add~~ ability of blood to carry oxygen.
5. Asthma is also caused by prolonged use of tobacco which leads to difficulty in breathing.
6. Smoking also cause gastric, duode all ulcers and pulmonary tuberculosis.
7. In a women, it affect ovulation and menstrual cycles.

Symptoms of smoking

- a nagging morning cough.
- Shortness of breath, wheezing and frequent occurrences of respiratory illness such as bronchitis.
- Redness of eyes.
- decrease the smokers sense of smell and taste.
- drying of mouth and lips.

Treatment of smoking

1. Hypnotherapy:- encouraging a smoker to give up smoking.
2. Herbs:- herbs can help a smoker to withdraw smoke.
3. Acupuncture:- the points in the ear and the feet are stimulated to help smokers overcome their addiction.

Control of Smoking:-







- providing school, education, community and health education.
- Banning illegal activities like production and selling tobacco.
- Effective use laws should be made to restrict teenagers from smoking.
- Implement heavy taxation to discourage people to buy them.
- Strong legislative measures to control sales promotion, health warning on cigarette packets and the advertisement on the use of tobacco through any media.
- Restrictions on smoking in public places such work place and in cinema halls, buses, education institutions and hospitals.
- Treatment and hospitalization of sick persons.
- Rehabilitation and psychological treatment.


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Class 12 complete notes and paper collection.

Folders Name ↑

 Biology	 chemistry
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