

10th Science Lesson 21 Notes in English

21] Health and Diseases

Introduction

- Abuses occur in a variety of forms and are deeply rooted in cultural, social and economic practices.
- Solving this global problem however requires a much better understanding of its occurrence, causes and consequences with context to sexual and childhood abuse, this is followed by substance abuse.
- For instance, smoking cigarettes, alcohol addiction, use of drugs, eating high fat and cholesterol rich diets, excessive intake of junk foods, reduced physical activity are some of the risk factors for illness and early death.
- The role of behaviour in health has been receiving increased attention in countries around the world. The health habits of the individuals and their behaviour influence the development of chronic and fatal diseases such as **diabetes, obesity, heart disease, cancer and AIDS**.
- These conditions can be substantially reduced by adopting lifestyles that promote wellness and protect their health by taking **nutritious diet, regular exercise and by avoiding drugs, alcohol and smoking**.

Abuse and Types of Abuse

- Abuse refers to cruel, violent, harmful or injurious treatment of another human being. It includes **physical, motional or psychological, verbal, child and sexual abuses**.
- Abuse can occur within the family and with people who are not associated with the family.
- These days the use of drugs, alcohol and tobacco has been increasing especially among teenagers and adolescents for adventure, excitement, curiosity and experimentation.

Child Abuse

- Child abuse constitutes all forms of physical or emotional ill treatment, sexual abuse, exploitation resulting in child's ill health, survival and development.
- Physical abuse of a child is defined as those acts that cause physical harm such as **threatening, beating, kicking and hitting the child**.

Sexual Abuse

- Sexual harassment is a form of power and dominance of one person over another, which can result in harmful consequence to the victim.
- It refers to inappropriate or forced sexual contact. Adolescent girls and women encounter sexual harassment in different forms.

- Sexual abuse is more common at work places. Verbal remarks, comments, gestures and looks are the most common forms of abuse. This results in **psychological distress, physical illness and eating disorders in the affected individuals.**

Child Sexual Abuse

- Children are considered soft targets for sexual abuse because they may not realize that they are being abused.
- Commonly, abusers are persons well known to the child, may even be living in the same locality.
- Abusers also bribe (use chocolates and toys) to lure children and take advantage of the child's innocence.
- Sexually abused children show symptoms of genital injury, abdominal pain, frequent urinary infection and behavioural problems.

Approaches for Protection of an Abused Child

Measures adopted for monitoring and assessment of abused child who have undergone signs and symptoms of distress are:

Child Helpline:

The Child Helpline provides a social worker who can assist the child by providing food, shelter and protection.

Counselling the child:

Psychologists and social workers should provide guidance, counselling and continuous support to a victimized child.

Family support:

The victimized child should be supported by the family members. They should be provided with proper care and attention to overcome their sufferings.

Medical care:

A child victim of sexual offences should receive medical care and treatment from health care professionals to overcome mental stress and depression.

Legal Counsel:

The family or the guardian of the child victim shall be entitled to free assistance of a legal counsel for such offence.

Rehabilitation:

Enrolling in schools and resuming their education is an important step towards rehabilitation of the child. It is essential that the child's life is gradually returned to normal after the incidence of abuse.

Community based efforts:

Conducting awareness campaign on child abuse and its prevention.

Prevention of child sexual abuse

The most important social policy proclaimed universally is the prevention of child abuse. Taking steps to prevent childhood sexual abuse is parental and institutional responsibility. Instructions to be given by parents and teachers to the child are.

- Do not talk to any suspected person or strangers and to maintain a distance.
- Not to be alone with unknown person.
- To be careful while travelling alone in public or private transport.
- Not to receive money, toys, gifts or chocolates from known or unknown person to them without the knowledge of their parents.
- Not to allow known or unknown person to touch them.

It is the responsibility of every individual living in a society to ensure a safe and protected environment for our children to enable them to live with dignity and free from any form of violence.

Drug, Alcohol and Tobacco Abuse

- The physical and mental dependency on alcohol, smoking and drugs is called addiction. The addictive potential of these substances pulls an individual into a vicious cycle leading to regular abuse and dependency.
- This is of serious concern because abuse of **tobacco, alcohol or drugs produce many harmful effects in an individual, to the family and even to the society.**
- This dangerous behavior pattern among youth can be prevented through proper guidance.

Drug Abuse

- Drugs are normally used for the treatment of disease on advice of a physician and withdrawn after recovery.
- A person who is habituated to a drug due to its prolonged use is called drug addict. This is called drug addiction or drug abuse.
- A drug that modifies the physical, biological, psychological or social behaviour of a person by **stimulating, depressing or disturbing the functions of the body and the mind is called addictive drug.**
- These drugs interact with the central nervous system and affect the individual physically and mentally.

Types of Drugs

There are certain drugs called psychotropic drugs which acts on the brain and alter **the behaviour, consciousness, power of thinking and perception**. They are referred as mood altering drugs.

Drug Dependence

Persons who consume these drugs become fully dependent on them, they cannot live without drugs. This condition is referred as drug dependence.

- Physical and mental dependence Dependence on the drug for normal condition of well being and to maintain physiological state.
- Psychological dependence is a feel that drugs help them to reduce stress.

Behavioural Changes of Drug Users

Adverse effects of drug use among adolescents are

- Drop in academic performance, absence from school or college.
- Lack of interest in personal hygiene, isolation, depression, fatigue and aggressive behaviour.
- Deteriorating relationship with family and friends.
- Change in food and sleeping habits.

Fluctuation in body weight and appetite

- Always looking out for an easy way to get money for obtaining drugs.
- Prone to infections like AIDS and Hepatitis-B.

Drug De-addiction

Management of de-addiction is a complicated and difficult task. The path to recovery of drug addicts is long and often slow. **Family members, friends and society** on the whole have a very important role to play.

Detoxification:

The first phase of treatment is detoxification. The drug is stopped gradually and the addict is helped to overcome the withdrawal symptoms. The addict undergoes severe physical and emotional disturbance. This is taken care by specific medication.

Psychotherapy:

Individual and group counselling is given by psychologists and counsellors. The treatment includes efforts to reduce the addict's stress, taught new ways to solve everyday's problems, adequate diet, rest and relaxation.

Counselling to family members:

Social workers counsell family members in order to change the attitude of rejection so that the addict is accepted by the family and the society.

Rehabilitation:

They are given proper vocational training so that they can lead a **healthy life and become useful members of the society.**

Tobacco Abuse

- Tobacco is obtained from the tobacco plant **Nicotiana tobaccum and Nicotiana rustica**. The dried and cured leaves of its young branches make the commercial tobacco used worldwide.
- Addiction to tobacco is due to '**nicotine**' an alkaloid present in it. Nicotine is a stimulant, highly harmful and poisonous substance.

Tobacco Use

- Tobacco is used for smoking, chewing and snuffing. Inhaling tobacco smoke from **cigars, cigarettes, bidis, pipes, hukka is called smoking.**
- Tobacco in powder form is chewed with pan. When powdered tobacco is taken through nose, it is called snuffing.

Smoking Hazards and Effects of Tobacco

When smoke is inhaled, the chemicals get absorbed by the tissues and cause the following harmful effects

- Benzopyrene and polycyclic hydrocarbons present in tobacco smoke is carcinogenic causing lung cancer.
- Causes inflammation of throat and bronchi leading to conditions like bronchitis and pulmonary tuberculosis.
- Inflammation of lung alveoli, decrease surface area for gas exchange and cause emphysema.
- Carbon monoxide of tobacco smoke binds to **haemoglobin of RBC** and decreases its oxygen carrying capacity causing hypoxia in body tissues.
- Increased blood pressure caused by smoking leads to increased risk of heart disease.
- Causes increased gastric secretion which leads to gastric and duodenal ulcers.
- Tobacco chewing causes oral cancer (mouth cancer).

Prevention of Smoking

- Knowing the dangers of smoking and chewing tobacco adolescents and the old people need to avoid these habits.
- Proper counselling and medical assistance can help an addict to give up the habit of smoking

Alcohol Abuse

- The consumption of alcohol is a social evil practiced by the wealthier and poorer sections of the society. The dependence of alcohol is called alcoholism and the addict is termed as alcoholic. It is called alcohol abuse.
- Drinking of alcohol impairs one's physical, physiological and psychological functions.

Harmful Effects of Alcohol to Health

Prolonged use of alcohol depresses the nervous system, by acting as a sedative and analgesic substance. Some of the harmful effects are

- Nerve cell damage resulting in various mental and physical disturbances
- Lack of co-ordination of body organs
- Blurred or reduced vision, results in road accidents
- Dilation of blood vessels which may affect functioning of the heart
- Liver damage resulting in fatty liver which leads to cirrhosis and formation of fibrous tissues
- Body loses its control and consciousness eventually leading to health complications and ultimately to death



Rehabilitation Measures for Alcoholics

Education and counselling:

Education and proper counselling will help the alcoholics to overcome their problems and stress, to accept failures in their life.

Physical activity:

Individuals undergoing rehabilitation should be channelized into healthy activities **like reading, music, sports, yoga and meditation.**

Seeking help from parents and peer groups:

- When a problematic situation occurs, the affected individuals should seek help and guidance from parents and peers.
- This would help them to share their feeling of anxiety, wrong doing and get rid of the habit.

Medical assistance:

- Individual should seek help from psychologists and psychiatrists to get relieved from this condition and to lead a relaxed and peaceful life.
- **Alcohol de-addiction and rehabilitation programmes** are helpful to the individual so that they could get rid of the problem completely and can lead a normal and healthy life.

Diseases and Disorders due to Lifestyle Modifications

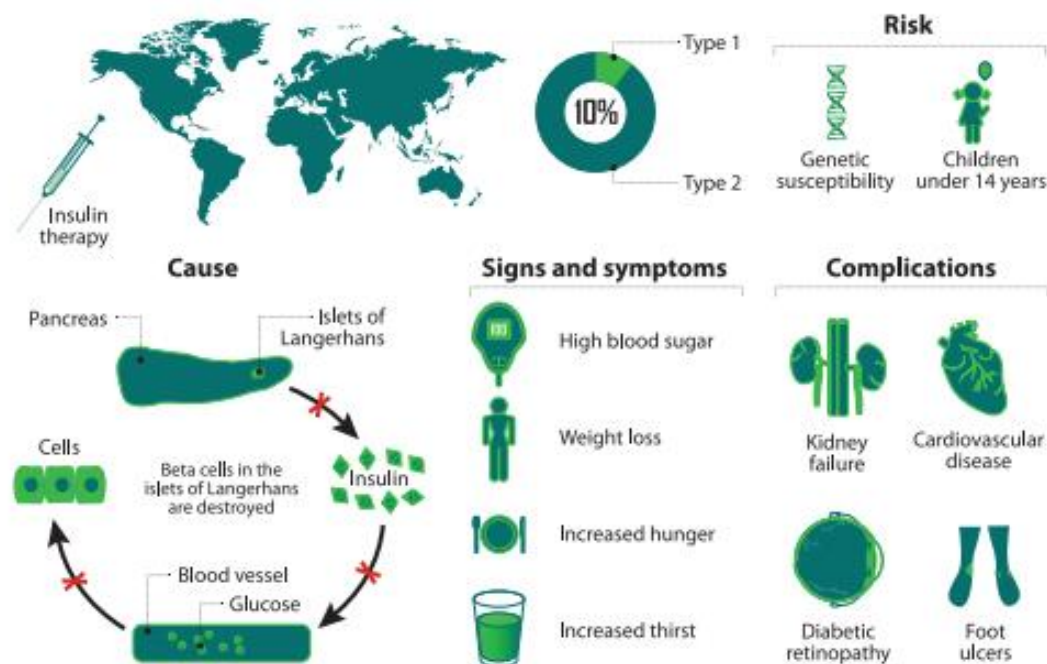
- Diseases are prevalent in our society due to our improper way of living, conditions of stress and strain.
- These diseases are non-communicable and affect the person who are suffering from particular symptoms.
- It is an impairment of the body tissue or organ, disturbances in metabolic function which require modification of an individual's normal life.

Diabetes Mellitus

- Diabetes mellitus is a chronic metabolic disorder. In **Greek (Diabetes – running through; mellitus- sweet).**
- It is characterised by increased blood glucose level due to insufficient, deficient or failure of insulin secretion.
- This is the most common pancreatic endocrine disorder. The incidence of Type-1 and Type-2 diabetes is increasing worldwide.

Type-1 Insulin Dependent Diabetes Mellitus (IDDM)

DIABETES MELLITUS type 1



- IDDM accounts for **10 to 20%** of the known diabetics. The condition also occurs in children (juvenile onset diabetes) and young adults, the onset is usually sudden and can be life threatening.
- This is caused by the destruction of β -cells of the pancreas. It is characterized by abnormally elevated blood glucose levels (hyperglycemia) resulting from inadequate insulin secretion.

Causes:

Genetic inheritance and environmental factors (**infections due to virus, acute stress**) are the cause for this condition.

Factors	Type-1 Insulin dependent diabetes mellitus (IDDM)	Type-2 Non-insulin dependent diabetes mellitus (NIDDM)
Prevalence	10-20%	80-90%
Age of onset	Juvenile onset (< 20 years)	Maturity onset (>30 years)
Body weight	Normal or Underweight	Obese
Defect	Insulin deficiency due to destruction of β -cells	Target cells do not respond to insulin
Treatment	Insulin administration is necessary	Can be controlled by diet, exercise and medicine

Type-2 Non-Insulin Dependent Diabetes Mellitus (NIDDM)

This is also called as adult onset diabetes and accounting for **80 to 90%** of the diabetic population. It develops slowly, usually milder and more stable. Insulin production by the pancreas is normal but its action is impaired. The target cells do not respond to insulin. It does not allow the movement of glucose into cells.

Causes:

The causes are multifactorial which include increasing age (**affecting middle aged and older people**), **obesity, sedentary life style, overeating** and physically inactive.

Symptoms:

Diabetes mellitus is associated with several metabolic alterations. The most important symptoms are

- Increased blood glucose level (Hyperglycemia)
- Increased urine output (Polyuria) leading to dehydration
- Loss of water leads to thirst (Polydipsia) resulting in increased fluid intake
- Excessive glucose excreted in urine (Glycosuria)
- Excess hunger (Polyphagia) due to loss of glucose in urine.
- Fatigue and loss of weight

Prevention and Control of Diabetes

Diet, hypoglycemic drugs, insulin injection and exercise are the management options based on the type and severity of the condition. The overall goal of diabetes management is to maintain normal blood glucose level.

Dietary management:

- Low carbohydrate and fibre rich diets are more appropriate. Carbohydrates should be taken in the form of starch and complex sugars.
- Refined sugars (sucrose and glucose) should be avoided. Diet comprising whole grains, millets (**jowar, bajra, ragi**), green leafy vegetables, wheat and unpolished rice should be included in diet regularly.
- Carbohydrates is maintained to about **50-55%** of the total calories. High protein content of 10-15% of the total intake is required to supply essential amino acids.
- Fat content in the diet should be **15-25%** of the total calories. Saturated fat intake should be reduced. Polyunsaturated fatty acid content should be higher.

Management with insulin:

Commercially available insulin preparations (short and long acting) are also used to maintain blood glucose levels.

Physical activity:

Exercise plays an important role in facilitating a good control of diabetes, in addition to strengthening and toning up the muscles.

Education and Awareness:

People with diabetics should be educated on the nature of disease they have and the possibility of complications of the disease, if blood sugar is not kept under control. Instructions regarding diet, exercise and drugs should be explained.

Obesity

- Obesity is the state in which there is an accumulation of excess body fat with an abnormal increase in body weight.
- Obesity is a complex multifactorial chronic disease developing from **influence of social, behavioural, psychological, metabolic and cellular factors**.
- Obesity occurs if intake of calories is more than the expenditure of energy.
- Over weight and obesity are conditions where the body weight is greater than the mean standard weight for age and height of an individual. Body mass index (BMI) is an estimate of body fat and health risk.

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m)}^2$$

Causes and risk factors:

Obesity is due to genetic factors, physical inactivity, eating habits (overeating) and endocrine factors. Obesity is a positive risk factor in development of **hypertension, diabetes, gall bladder disease, coronary heart disease and arthritis**.

Prevention and Control of Obesity**Diet Management:**

Low calorie, normal protein, vitamins and mineral, restricted carbohydrate and fat, high fiber diet can prevent overweight. Calorie restriction for weight reduction is safe and most effective.

Physical exercise:

A low calorie diet accompanied by moderate exercise will be effective in causing weight loss. Meditation, yoga and physical activity can also reduce stress related to overeating.

Heart Disease

- **Cardiovascular disease (CVD)** is associated with diseases of the heart and blood vessels. Coronary heart disease (CHD) is the most common form and is caused by deposition of cholesterol in the blood vessels. It usually develops slowly over many years beginning from childhood, they may form a fatty streak to a fibrous complicated plaque.
- It leads to the narrowing of blood vessels leading to atherosclerosis in the large and medium sized arteries that supply the heart muscle with oxygen.
- It leads to sudden ischemia (deficient blood supply to heart muscle) and myocardial infarction (death of the heart muscle tissue).

Risk factors:

Hypercholesterolemia (High blood cholesterol) and high blood pressure (Hypertension) are the major causes and contributing factors for heart disease and if untreated may cause severe damage to brain, kidney and eventually lead to stroke.

Causes:

Heredity (family history), diet rich in saturated fat and cholesterol, obesity, increasing age, cigarette smoking, emotional stress, sedentary lifestyle, excessive alcohol consumption and physical inactivity are some of the causes.

Symptoms:

Shortness of breath, headache, tiredness, dizziness, chest pain, swelling of leg, and gastrointestinal disturbances.

Prevention and Control of Heart Disease**Diet management:**

- Reduction in the intake of calories, low saturated fat and cholesterol rich food, low carbohydrates and common salt are some of the dietary modifications.
- Diet rich in polyunsaturated fatty acids (PUFA) is essential. Increase in the intake of fibre diet, fruits and vegetables, protein, minerals and vitamin are required.

Physical activity:

Regular exercise, walking and yoga are essential for body weight maintenance

Addictive substance avoidance:

Alcohol consumption and smoking are to be avoided.

Cancer

- Cancer causes about 4 million deaths annually throughout the world. In India more than one million people suffer from cancer.
- Cancer is derived from Latin word meaning crab. The study of cancer is called Oncology (Oncos- Tumor).
- Cancer is an abnormal and uncontrolled division of cells that invade and destroy surrounding tissue forming a tumor or neoplasm (new growth).
- It is a heterogenous group of cells that do not respond to the normal cell division. The cancerous cells migrate to distant parts of the body and affect new tissues.
- This process is called metastasis. The frequent sites of metastasis are **lungs, bones, liver, skin and brain.**

Types of Cancers

Cancers are classified on the basis of the tissues from which they are formed.

- Carcinomas arise from epithelial and glandular tissues. They include cancers of skin, lung, stomach and brain. About 85% of the tumours are carcinomas
- Sarcomas are occur in the connective and muscular tissue. They include the cancer of bones, cartilage, tendons, adipose tissue and muscles. These form 1% of all tumours.
- Leukaemia are characterized by an increase in the formation of white blood cells in the bone marrow and lymph nodes. Leukaemia are called blood cancers. Most common type of cancer which also affect children **below 15 years of age.**

Carcinogenic Agents

Cancer causing agents are called carcinogens. They are physical, chemical agents, ionizing radiations and biological agents.

Physical Irritant:

- Heavy smoking causes lung cancer and cancers of oral cavity, pharynx (throat) and larynx. Betel and tobacco chewing causes oral cancer.
- Excessive exposure to sunlight may cause skin cancer.

Chemical agents:

Nicotine, caffeine, products of combustion of coal and oil, pesticides, asbestos, nickel, certain dyes and artificial sweetners induce cancer.

Radiations:

Ionizing radiations like X-rays, gamma- rays, radioactive substances and nonionising radiations like UV rays cause DNA damage leading to cancer.

Biological agents:

Cancer causing viruses are called oncogenic viruses.

Treatment of Cancer

The treatment of cancer involves the following methods:

Surgery:

Tumours are removed by surgery to prevent further spread of cancer cells.

Radiation therapy:

Tumour cells are irradiated by lethal doses of radiation while protecting the surrounding normal cells.

Chemotherapy:

It involves administration of anticancerous drugs which prevent cell division and are used to kill cancer cells.

Immunotherapy:

Biological response modifiers like interferons are used to activate the immune system and help in destroying the tumors.

Preventive measures for Cancer

- Cancer control programmes should focus on primary prevention and early detection.
- To prevent lung cancer tobacco smoking is to be avoided and protective measures to be taken against exposure to toxic pollutants of industries.
- Excessive exposure to radiation is to be avoided to prevent skin cancer.

AIDS (Acquired Immune deficiency Syndrome)

- AIDS is a severe viral disease and caused by Human Immunodeficiency Virus (HIV).
- It is a condition in which immune system fails and suppress the body's disease fighting mechanism.
- They attack the lymphocytes and the affected individual is prone to infectious diseases.

Transmission of HIV

- AIDS virus has been found in urine, tears, saliva, breast milk and vaginal secretions. The virus is transmitted by an infected patient who comes in contact with blood of a healthy person.
- HIV/AIDS is not transmitted by touch or any physical contact. It spreads through contact of body fluids or blood.

HIV is transmitted generally by

- Sexual contact with infected person
- Use of contaminated needles or syringes especially in case of intravenous drug abusers
- By transfusion of contaminated / infected blood or blood products
- From infected mother to her child through placenta.

Symptoms and Treatment of AIDS

Symptoms:

- Infected individuals become immunodeficient. The person becomes more susceptible to viral, bacterial, protozoan and fungal infections.
- Swelling of lymph nodes, damage to brain, loss of memory, lack of appetite and weight loss, fever, chronic diarrhoea, cough, lethargy, pharyngitis, nausea and headache.

Diagnosis:

The presence of HIV virus can be confirmed by **Western Blot analysis or Enzyme Linked Immunosorbent Assay (ELISA)**

Treatment:

Anti-retroviral drugs and immunostimulative therapy can prolong the life of the infected person.

Prevention and Control of AIDS

The following steps may help in controlling and prevent the spreading of HIV infection

- Screening of blood from blood banks for HIV before transfusion.
- Ensuring the use of disposable needles and syringes in hospitals and clinics.
- Advocating safe sex and advantages of using condoms.
- Creating awareness campaign and educating people on the consequences of AIDS.
- Persons with HIV/AIDS should not be isolated from the family and society.

More to Know:

1. Dr. Suniti Solomon, pioneered HIV research and treatment in India. She set up the first voluntary testing and counselling centre and an AIDS Research group in Chennai during 80's. Her team was the first to document evidence of HIV infection in India in 1985 (First Indian AIDS patient in Chennai).

2. Types of Tumours

Benign tumours or Non malignant tumours:

Remain confined in the organ affected and do not spread to other parts of the body.

Malignant tumours:

Mass of proliferating cells which grow very rapidly invading and damaging the surrounding normal tissues.

3. World Cancer Day - 4th February

4. National Cancer Awareness Day - 7th November

5. Desirable level for blood cholesterol should be less than 200 mg/dl for Indians. The risk of coronary heart disease increases slowly as blood cholesterol levels increases from **200 to 300 mg/dl**.

6. HDL (High Density Lipoprotein) or "good" cholesterol lowers risk of heart disease while LDL (Low Density Lipoprotein) or "bad" cholesterol increases risk of heart disease.

7. Every 7 calories of excess consumption leads to 1 gm fat deposit and increase in body weight. Weight due to fat in adipose tissue exceeds more than 20% to 25 % of body weight. An adult weighing 10% more than the standard weight is **OVERWEIGHT** and 20% more is **OBESE**.

8. Flax seeds containing insoluble fibre, Guavas, Tomatoes and Spinach are foods which help reduce blood sugar levels.

9. According to WHO recommendation, if the fasting blood glucose is greater than 140 mg/dl or the random blood glucose is greater than 200 mg /ml on more than two occasions, diagnosis for confirming diabetes is essential.

10. One in every 8 individuals in India is a diabetic. The revised WHO estimates for the year 2025 is 57.2 million diabetics in India. The average age for the onset of diabetes is 40 years, while it is 55 years in other countries. **World Health Organization projects that diabetes will be 7th leading cause of death by the year 2030.**

11. Anti Tobacco Act was passed on May 1st 2004. By 2030 tobacco is expected to be single biggest cause of death worldwide accounting for 10 million deaths per year. **May 31st is observed as No Tobacco Day (World Anti-Tobacco Day)**

12. World Health organization (WHO) 1984 suggested the use of the term drug. WHO issued a directive under which all cigarette advertisements and packs carry a statutory warning "Smoking is injurious to Health".

13. International Day against Drug Abuse and Illicit Trafficking - June 26.

14. Narcotic Drugs and Psychotropic Substances Act was introduced in 1985.

15. **World Health Organization (WHO) 1984** suggested the use of the term drug dependence in place of drug addiction or drug abuse.

16. The National Commission for Protection of Child Rights (NCPCR) was set up in March 2007 under the Commissions for Protection of Child Rights (CPCR) Act, 2005. This act emphasizes the principle of universality and inviolability of child rights and recognizes the tone of urgency in all the child related policies of the country. Protection of all children of all age group upto 18 years of age is of equal importance. Policies define priority actions for the most vulnerable children.

16. The Ministry of Women and Child Development championed the introduction of the **Protection of Children from Sexual Offences (POCSO) Act, 2012**. People who traffic children for sexual purposes are also punishable under the provisions relating to the Act.

17. Objectives of the POCSO Act, 2012

- To protect children from the offences of
- Sexual assault
- Sexual harassment
- Pornography
- To establish Special Courts for speedy trial of such offences.

18. Many people are ignorant about AIDS and it has been said that – “don’t die of ignorance”. In our country **NACO (National AIDS Control Organization) and other NGO’S (Non- Governmental Organizations)** are educating people about AIDS. Every year December 1st is observed as the “World AIDS Day”.