

India is an agricultural country. We all totally depend on agriculture for our basic needs like food, clothing and shelter. Food is essential for our survival. It provides energy and materials required for the growth and maintenance of our body. Indian population had grown by 21.34% between 1991 and 2001. It is expected to exceed by 20% in 2050. How do you think food can be provided to such a large number of people? In order to provide sufficient food for a larger population, regular production, proper management, storage and application of recent technology are to be implemented in agriculture.

MORE TO KNOW

- Population of India in 2010 is

around 1,192,196,919
(billion) people.

(1.19

- It is growing faster than its ability to produce rice and wheat.

1.1. AGRICULTURAL PRACTICES

With the increase in population, the demand for food has also gone up. The available land for agriculture has been decreasing. Therefore improved, agricultural practices have to be introduced.

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Crop Production and Management

All the activities which are involved in the cultivation of crops from sowing to harvesting are known as agricultural practices.

o Promote growth of useful micro-organisms to bring nutrient rich soil to the top

to harvesting are known as agricultural

organisms to bring nutrient rich soil

practices. to the top
Agriculture : Science that deals with the growing of plants and animals for human use is called agriculture. Ploughing is done in two ways

for human use is called agriculture. Ploughing is done in two ways

i) Manual ploughing: It is one of the old and traditional methods of crop production in agriculture. A farmer ploughs the field

Production of crops involves several activities carried out by the farmers over a period of time. These activities are given below.

- o Preparation of soil and sowing
- o Adding manure and fertilizer
- o Irrigation
- o Protection from weeds
- o Harvesting
- o ITI

Storage and Marketing

1.2.1. PREPARATION OF SOIL AND SOWING

ii) Machinery ploughing: Now a days ploughing is done by tractor driven by the cultivator. The use of cultivator saves labour and time.

Before sowing the seeds, we have to prepare the soil. Preparation of soil is the first essential stage for cultivation of crops. Turning and loosening the soil involves,

i) Ploughing or tilling

ii) Levelling and

iii) Manuring

i) Ploughing: It is the

process of loosening soil.

Ploughing is important because it,

- o Provides good aeration to roots in order to breathe

Tractor and cultivator

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The other ploughing tools are spade, shovel, hoe and pick-axe.

ii) Levelling: The ploughed field may have big pieces of soil crumbs, so, it is necessary to break these crumbs with the leveller. It also ensures uniform irrigation.

iii) Manuring: Sometimes manure is added before tilling. It helps in proper mixing of manure with soil.

Sowing: It is the most important step of crop production. The process of putting seeds into the soil is called sowing. Before sowing, the land must be watered. Seeds used for sowing should be of good quality, healthy and free from infection. Sowing is done by two methods.

i) Manual sowing: It is the traditional method of sowing where the seeds are sown manually by scattering them in the moist soil.

Maa/sowin.

ii) Seed Drill: It is a method of sowing the seeds through the tunnel or

using two or three pipes having sharp ends.

Seed drill helps in uniform distribution of seeds, covering the seed after sowing and preventing the seeds from being damaged by birds.

Swing y sed //.

1.2.2. ADDING MANURE AND FERTILIZERS

All the plants get their nutrients from the soil. Repeated cultivation of crops make the soil deficient in minerals. So farmers add manure and fertilizers to the soil to ensure that the crops get proper nutrients.

The substances which are added to the soil in the form of nutrients for the healthy growth of plants are called

manure or fertilizers.

1.2.3. IRRIGATION

Plants need water for germination, drawing nutrients and preparing their food by photosynthesis.

The process of supplying water to crops in the field at different intervals is called irrigation. It varies from crop to crop, season to season and soil to soil.

Some of the sources of irrigation are well, tube wells, ponds, lakes, rivers, dams and canals.

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Methods of irrigation

i) Traditional Method

In our country traditional systems of irrigation like,

- o pulley system (moat)

- o chain pump and

- o lever system (rahat)

have been used for centuries to lift water from water reservoirs and supply it to the field for irrigation. These methods are cheaper but not much efficient.

ii) Modern Methods

Furrow

irrigation

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Modern methods of irrigation

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basin drip

irrigation irrigation

Sprinkler

irrigation

Furrow irrigation: In this method water is allowed to enter the field through channels of furrows made between two rows of crop. e.g., sugar cane, banana, paddy, etc.

Furrow irrigation

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Basin irrigation: In this method the field is just filled with water.

e.g. Paddy field.

Basin irrigation

Sprinkler irrigation: This irrigation is used where the soil cannot retain water for a long time. Here the water is sprinkled by sprinklers. e.g. Lawn

Sprinkler irrigation

Drip irrigation: In this irrigation the water falls drop by drop direct at the position of the roots, so it is called drip irrigation. It is the best method to save water. It helps to irrigate grapes, banana, brinjal, etc.

Drip irrigatn

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Care must be taken not to water. They compete with crops for water, the field excessively. Excess water on nutrients, space and light therefore the field may cause a condition called affect their growth.

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'grits; Oggmg W IC may arm I e Some weeds become poisonous.

The common types of weeds are

. Grass

Select a small place in your garden. . Amaramhus

Use a spade or a shovel, plough the soil and sow seeds with the help of a funnel and sprinkle water. Meih°d5 °i Weedi"-9

i) Manual weeding: Weeds may

be manually removed by hand by

MORE 1-0 KNOW uprooting them or by using some

. The Karakum Canal in tools like hand fork, khurpa and

Turkmanistan is the longest harrow
LU irrigation canal in the world. It is
U over 1300 km long.

2 - PAP - Parambikulam Aliyar

LIJ Project ranks first in India in the top
8 10 list of the World for its massive
U) storage capacity. -

- Indira Gandhi Canal - It is one of -
the biggest canal project in India. -
Starts from Harike Barrage at T
Sultanpore. -

Tools used for weeding

ii) Chemical Control: The chemical

1-2-4- PROTECTION FROM 3l'eI;ii\$"\$3f dowhiét" ha'3?.fI{fiZ CID:

WEEDS (UNWAN-I-ED are called weedicides. eg. Dalapon,

PI-ANTS) metachlor, 2-4- Dichlorophenoxy-

Weeds are undesirable plants aeeie acid-

9i0Wiii9 iiaiiiiiai)' ai0ii9 Wiiii iie Ci0P- Excess use of chemical weedicides

Rem0VaI Of these Weeds IS CaIIed Cause water and |and p0||uti0n_

WeeCiiii9- Weeding Sii0UiCi be Cieie Tracesofthesepoisonouschemicals
iieie and iieie- may remain in crops themselves.

Therefore it is very important to use
them with extreme caution.

The weeds must be removed
because,

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Weedicide sprayer

Does it affect the

.. person who sprays it?.

7) I. Yes certainly. But we can

5} ..

prevent by using the mask.

MORE TO KNOW

Bio-weedicides are the mechanism
of using microorganism such as
fungi and bacteria used to destroy
weeds.

1.2.5. HARVESTING

Once the crop gets matured, it has to be gathered. The process of cutting and gathering a matured crop is known as harvesting.

All over the world harvest season is celebrated with excitement. Pongal (Tamilnadu), Bihu (Assam), Holi (Punjab), Onam (Kerala), etc., are the harvest festivals celebrated in India.

What is your experience in harvesting? Harvesting of paddy in our country is either done manually by sickle or a machine called harvester.

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In small farms crops are usually cut down using a hand held tool called

Manual Harvesting

a sickle. In big farms a large vehicle called harvester combine is used.

. __, §.
Harvester combine

Grains are separated from the stalks by the process of threshing. This is carried out by beating the cut stalks against hard floor or a machine called mechanical thresher.

Threshing

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The chaff (pieces of straw and husk after threshing) is separated from the whole grain by winnowing.

MORE TO KNOW

Green Revolution: The massive step taken to augment food production by adopting modern agricultural practices in India.

1.2.6. STORAGE AND MARKETING

Grains are kept safe from moisture, insects and microorganisms. If they are not kept in a proper manner they will get spoiled and cannot be consumed.

Farmers store grains in jute bags and metallic-bins. In a large scale the grains are stored in godowns, silos, (very tall cement tanks) and granaries.

Fresh fruits and vegetables have much moisture content. And thus they get spoilt soon. Therefore they are stored in cold storage.

MORE TO KNOW .

Neem leaves, salt, turmeric and castor oil also prevent pests and microorganism.

MARKETING

Increase in agricultural production alone will not bring about prosperity for farmers. It is important that agricultural product fetches a remunerative price. Warehousing and marketing facilities are essential to ensure this strategy.

Government has taken more steps to assist marketing of agricultural product and to promote the status of small farmers. Tamilnadu Government has established "Uzhavar Sandhai" to satisfy the need of consumer and the small scale village farmers.

" Uzhavar Sandhai"

Regulated markets eliminate unhealthy marketing practices and exploitation of the products by middleman. The government provides loan at very low rate of interest to the farmers for cultivation.

MORE TO KNOW

State warehousing corporations provide storage facilities for agricultural product, fertilizers etc.,

Thanjavur is said to be the Rice Bowl of Tamilnadu.

Agmark: Agmark grading and standardization is a central sector scheme to check the quality and standard for agricultural products. The grades given are Grade 1, 2, 3, 4 or Special, Good, Fair and Ordinary.

1.3. CROP ROTATION

What will happen if the same crop is grown again and again on the same land? By repeated planting of the same plant a part of minerals gets depleted in the soil. It then leads to very poor yield. One way of improving the crop yield is by crop rotation. In this method different crops are grown alternately.

The practice of growing a cereal crop and the pulse crop alternately in

ACTIVITY 1.2

Take a trowel and carefully dig up a pea plant or any leguminous plant from the garden. Wash off the mud and observe the bead like structures on the roots called nodules.

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the same field in successive season is called as crop rotation.

Leguminous plants have root nodules associated with symbiotic bacteria which fix atmospheric

nitrogen.

For example wheat and paddy (plants need nitrogen to make protein, they can't use nitrogen directly from the air) absorb more nitrogen from soil.

This loss of nitrogen can be replaced naturally by leguminous plants which has symbiotic bacteria in their root nodules.eg. pea, soya, bean are cultivated after wheat or paddy.

1.4. BIOTECHNOLOGY IN AGRICULTURE

Biotechnology is the field of applied biology that involves the use of living organisms and bioprocesses in engineering, technology, medicine and other field requiring bioproducts.

Biotechnology has also revolutionised research activities in the area of agriculture.

There are seven different techniques that are used in plant improvement.

1. Selection: It is a process of choosing a desirable crop.
2. Hybridisation: A hybrid (new variety) is produced by crossing the already existing two varieties with desirable qualities.
3. Polyploid breeding: Method to increase the chromosomal number.

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4. Mutation breeding: Radiations(UV and X-rays) induces mutation to develop new variety of crops.
5. Protoplast fusion: Production of hybrids by the fusion of protoplasts along with nuclei of two different species.
6. Tissue culture: Culturing the plant tissue in artificial, controlled, aseptic

conditions (in vitro) to raise plantlets.

7. Genetic engineering: Its objective is to identify, isolate and introduce a desirable gene/genes into a crop plant that normally do not possess them. These new plants whose genes are modified/transferred are called transgenic plants.

Genetic engineering

Genetic engineering is a part of biotechnology. It offers new hope to the farmers who are struggling hard with plant pests and diseases.

The aim of agricultural biotechnology is to give transgenic plants carrying desirable traits like

- o Disease / Insect / Herbicide

resistant.

- o Increased photosynthetic efficiency.

- o Nitrogen fixing ability.

- o Increased size of storage roots, seeds, fruits and vegetables.

- o Oil seeds (soya) rich in PUFA (poly unsaturated fatty acid) recommended for heart patients.

- o Potatoes with vaccines, improves starch and vitamin A is produced.

Genetically modified (GM) seeds,

biofertilizers, biofuels are also produced.

1.5. BIOTECHNOLOGY IN FOOD PROCESSING

Food processing industry is the oldest and largest industry using biotechnological processes.

Biotechnology in food processing is used to improve existing processes such as

- o Production of additives and
- o Processing aids.

Improving of microorganisms in order to improve process, control, yield, safety and quality of the processed products.

Application of biotechnology in

processing of food

- o Gene modification and transfer.

- o Development of recombinant vaccines vitamins and proteins.

- o Improving the quality, safety and consistency of fermented foods.

- o Improving of microorganisms in order to improve process, control and yield of the processed products.

- o Improving the processing properties eg., Development of the "flavr Savr, tomato" variety, genetically modified to reduce its

ripening rate.

Bioethics of genetic engineering

Besides many benefits, the ethical, social and legal implications of these potent gene

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technologies have led to considerable concern about the possibility of accidentally producing new pathogens responsible for fatal diseases or developing 'genetic monsters'.

MORE To Know

Biotechnology Can we list the processed foods helps in used in your daily life?
p r o m o t i n g

greater fruit 1. Soft drinks.

and vegetable 2_ Chips
consumption 3
for healthy '
nutrition. 4.
5.

ADOLESCENCE: It is the fact that, flesh, blood and bones are hidden under a cover of skin in your body. You also have thoughts and feelings, that are not visible. But they have an important role in making you the special person that you are.

2.1. ADOLESCENCE AND

PUBERTY: The word 'Adolescence' is derived from the Latin word 'adolescere' which means 'to grow'. The period of transition from childhood to adulthood is called adolescence. The World Health Organization (WHO) defines adolescence as the period of life between 11 and 19 years of age. Since adolescent period covers the "teens period", adolescents are usually called teenagers. It is a period when lots of changes take place in the body and mind. Hormonal changes result in unusual swings in emotions. Adolescents shoot up in height and gain

weight. The growth spurt begins two years earlier for girls than for boys. But it lasts longer for boys. The rapidly changing body proportions and the new sensations attributed to sexual development confuse and cause anxiety to the adolescents.

Puberty: puberty is the period in life when the body's reproductive system gets ready to work. Generally, boys attain puberty at the age of 14 to 15 years, while girls reach puberty at a comparatively lower age of 11 to 12 years.

Changes at Puberty: The following changes take place in the body of boys and girls at Puberty

1. Increase in Height: There is a sudden increase in the height of both boys and girls during puberty.

The rate of growth in height varies from person to person. Some may grow rapidly at the start of puberty and then slow down, while as others may grow gradually. The height of an individual depends upon the genes which are inherited from parents.

2. Change in Body Shape: The changes occurring in adolescent boys and girls are different. In girls hips become broader and the pelvic region widens. In boys, shoulders broaden and the body muscles grow more than that of the girls.

3. Change in Voice: At puberty the voice box or the larynx begins to grow. The larynx in boys is larger than that in girls. The voice box in boys can be seen as the Adam's Apple, in their throat. In boys, the voice becomes deep and harsh, where as girls have high pitched voice.

4. Increased activity of Sweat and Sebaceous glands: The secretion of sweat and sebaceous glands (Oil glands) increases during puberty. This causes acne and pimples on the face of boys and girls at this time.

5. Development of Sex Organs: The Reproductive Organs in boys and girls become fully functional at Puberty. In boys, the male sex organs like the testes and penis develop completely. The testes start producing sperms.

In girls, the ovary enlarges and eggs begin to mature. Ovaries start releasing matured eggs. These sex organs produce sex hormones, which play an important role in the process of reproduction and in the development of secondary sexual characteristics. Apart from these changes that are taking place in emotional, mental and intellectual areas, they may experience various moods such as being happy, sad, angry, excited or irritated.

2.2. SECONDARY SEXUAL CHARACTERS: Certain characters help to distinguish the male from the female. They are called secondary sexual characters. Some of the secondary sexual characters that develop in girls and boys are as follows:

Boys: 1. Facial hairs such as beard and moustaches develop. 2. Hair develops under the armpit, under chest and in the pubic regions. 3. Voice becomes deeper. 4. Muscles develop, and shoulder becomes broad. 5. Increase in weight.

Girls: 1. Development and enlargement of breasts. 2. Hair develops under the armpit and in the pubic regions. 3. Hips broaden and pelvic region widens

4. Initiation of menstrual cycle. 5. Deposition of fat around hips, these changes which occur at adolescence are controlled by hormones.

2.3. DUCTLESS GLANDS

The word gland means having some secretions. There are two types of glands.

(Pimple: A small papule or pustule. Pimples are sebaceous glands that are infected by bacteria, become inflamed and fill with pus.)

1. Exocrine gland – gland with duct 2. Endocrine gland – gland without duct.

The exocrine gland secretes enzymes which are important for digestion. The ductless or endocrine glands secrete hormones. They are special chemical substances that make wonders in our body.

The following are the important Endocrine Glands (Ductless) present in our body.
Pancreas - Ovary (Female), Testes (Male) Pituitary, Thyroid, Pancreas, Adrenal

The secretions of the ductless glands (hormones) are carried away by the blood stream.

functions of these glands: 1. Pituitary gland: It is located just below the brain. It is called as the master gland because it controls the functioning of all other endocrine glands. Your growth depends on the secretion of the

pituitary gland. It secretes growth hormone. A person having less growth hormone remains very short (Dwarfism) ; on the other hand, a person having much growth hormone . becomes very tall (Gigantism). secretion leads to a condition called acromegaly.

2. Thyroid gland: It is located in the throat region. It secretes a hormone called thyroxine. In adults, excess thyroxine leads thyroid disease. The function of thyroxine is to control the rate of Metabolism, growth and respiration.

The deficiency of thyroxine hormone in children is known as cretinism. It slows down growth and mental development. Sometimes the gland may enlarge causing a disease called Goitre.

3. Pancreas: Pancreas is located just below the stomach in the body. Pancreas is both exocrine and endocrine. The endocrine part is called Islets of Langerhans. It has alpha and beta cells, which secretes glucagon and insulin. Both control sugar metabolism in the body.

Deficiency of insulin in the body causes a disease known as diabetes mellitus.

4. Adrenal gland: These are also known as supra renal glands, as they are located just on the top of the kidneys. It secretes adrenalin hormone. This hormone is produced during stress or emergency situations. It regulates heart beat, breathing rate, blood pressure etc.

5. Testes and ovaries: Testes and ovaries secrete sex hormones. Testes produce testosterone and ovaries produce oestrogen hormone.

2.4. ROLE OF HORMONES IN REPRODUCTION

Most hormones are at work from the moment you are born. Sex hormones are different because they start to work later on. They gradually prepare the body for reproduction. The sex hormones are responsible for the fundamental change in growth and development and stimulate the developments of secondary sexual characters.

The testes and the ovaries are the reproductive Organs; both are stimulated by the pituitary hormone during puberty.

In male, the testes produces the male sex hormone testosterone. This hormone helps in the development and maintenance of the primary and secondary sexual characters and functions of sperms.

In female, the ovaries secrete estrogen and progesterone responsible for the primary and secondary sexual characters.

Apart from testes and ovaries the Adrenal Cortex also secretes steroid hormones in both the sexes. These hormones are responsible for adolescent growth spurt.

2.5. REPRODUCTIVE PHASE OF LIFE IN HUMANS

The phase in an individual's life during which there is production of gametes is called Reproductive Phase. In females it is normally between 13 to 50 years, and in males, it is from the age of 13 to life long. The reproductive age may vary from person to person.

The following are the various reproductive phases in the life of a female.

1. Ovulation: Release of an ovum from the ovary – usually one egg is released every month.

2. Menstruation or the period: This is the outward sign of the routine cycle of egg production and hormone change in a woman's body. It takes about 3 – 5 days.

3. Pregnancy: When the egg gets fertilized by the sperm, the zygote is implanted in the uterus for further development this results in pregnancy.

4. Menopause: The menopause marks the end of the reproductive phase of a woman's life, the chief outward sign is the cessation (stop) of the monthly flow of menstrual blood. The usual age is around 50.

2.6. SEX DETERMINATION

Chromosomes are thread like structures present in the nucleus of the cell. All the cells contain 23 pairs of chromosomes, The last pair of chromosome is different in males and females. The last pair determines the sex, so it is called as sex chromosome.

Sex chromosomes are of two types, These are named as X. and Y chromosomes.

Usually a woman has two 'X' chromosomes (XX) and male has one 'X' and one Y chromosome (XY), in their cells. During gamete (reproductive cell) formation the

number of chromosomes is reduced into half. (46 chromosomes are reduced into 23). When a sperm containing 'X' chromosome fertilizes the egg, the zygote will have two 'X' (XX) chromosomes. The zygote will develop into a female child. Similarly, when a sperm containing 'Y' chromosome fertilizes the egg, the fertilized egg will have one 'X' chromosome and one 'Y' chromosome (XY), and it will develop into a male child.

Now you know that the sex chromosomes of the father determine the sex of a child. The belief that the mother is responsible for the sex of her baby is completely wrong.

2.7. REPRODUCTIVE HEALTH: during adolescence growing children need special attention towards diet, exercise and personal hygiene. The personal hygiene includes female and male reproductive health.

The following are some of the measures that girls and boys need to take to maintain personal hygiene.

- o Take bath atleast once a day, paying special attention to underarms, groins and genitals.
- o Change the underwear daily. The underclothes should be made of cotton.

Menstrual hygienics: Menstruation in females is as natural as our regular physiological

activities like breathing, drinking, eating, urinating and defecation etc., It is a cyclical process that is present in all the mammalian females. So It is a natural phenomena, that

is neither to be worried nor to be ashamed. Sanitary napkins (pads) or a pad made of clean soft cloth which can absorb moisture should be used for absorbing menstrual flow.

- o Sanitary napkins or cloth should be changed frequently depending upon the menstrual flow. If a cloth is being used repeatedly, it should be cleaned with soap and hot water and dried in sunlight for reuse.
- o Wash with soap and water before using a fresh napkin.

2.7.1. Nutritional Needs: The adolescents need more calories and other nutrients due to spurt in growth and increase in physical activity. The nutritional deficiencies during this period not only retard the physical growth, but also impair the intellectual development and delays sexual maturation. The diet of adolescents should meet the demands of physical and intellectual growth, provide adequate reserves for illness / pregnancy and prevent onset of adulthood diseases related to nutrition. e.g., Hypotension and osteoporosis. (Bones become brittle)

A very good amount of proteins and carbohydrate is necessary during this growth period. Apart from that, adolescents need to keep in mind the following dietary consideration:

Minerals: Since there is an increase in skeletal mass and blood volume, the body needs calcium, phosphorous and iron.

Calcium: Calcium intake needs to be increased to prevent osteoporosis in later life. It is present in milk and milk products.

Iodine: It helps to prevent thyroid gland related diseases.

Iron: Lack of iron in the diet results in anemia. To make up for the loss, have a diet rich in iron. In boys, iron deficiency occurs due to muscle spurt if it is not adequately supplemented. In girls, iron deficiency occurs due to menstruation in addition to the spurt in muscular growth if it is not adequately supplemented.

Green leafy vegetables, jaggery and whole pulses are rich sources of iron. During adolescent period, take hygienic balanced diet.

2.7.2. Personal Hygiene: personal hygiene is a clear indicator of man's personality. It should start from the hair tip and ends down at the toes.

10 tips for your personal hygiene:

1. Shower or bath daily.
2. Always wash your hands before and after meals.
3. Keep fingernails clean, and avoid wearing nail polishes or jewellery.
4. Wash your teeth and mouth before and after each meal.
5. Avoid touching your face, nose, or mouth, while preparing food.
6. Avoid coughing or sneezing around food.
7. If you want to taste the food, use a clean spoon.
8. Change your clothes, especially undergarments, everyday.
9. Do not defecate in open field. Use clean toilets for defecatio
10. If you are not well, do no take self medication.

2.7.3. Prevention and protection from sexual and other abuses

Preventing childhood sexual abuse: Taking steps to prevent childhood sexual abuse is an ongoing parental responsibility. In 80% of cases the abuser is someone the child knows as a trusted or loved adult or older child who may use threats, bribery or tricks to take advantage of the child's innocence.

There are three stages in the Prevention of sexual abuse. They are 1. Primary Prevention 2. Secondary Prevention 3. Tertiary Prevention

Primary Prevention: It involves preventing the abuse from happening in the first place. Avoid being alone in company of suspected person. Don't wear provocative dresses. Do not let allow anyone to hug, pet or kiss you. Take care of the way you sit. When you are going to school by auto, bus or by train keep distance from the other sex.

Secondary Prevention: It includes early detection and reporting of perpetrators for the purpose of stopping the perpetrators and minimizing the negative effect on the child.

Tertiary prevention: It focuses on the treatment of abused children and adults who have developed signs and symptoms of distress.

Warning signs of sexual abuse: Children who have been sexually abused often show the following signs

- o A sudden dramatic change in behaviour or personality.
- o Recurring nightmares.
- o Regression to early behaviour patterns such as bed wetting.
- o Withdrawal from friends and family members.
- o Imitating adult sexual behaviour.
- o Hostile, aggressive behaviour.

Substance abuse: To pre-teens and teens, alcohol, tobacco and drugs may seem like a quick way to move into the adult world. These substances cause serious problems, and their use leads to addiction. Alcohol is the most abused substance among teenagers. Consumption of alcohol leads to frequent memory loss and hepatitis (liver damage).

Drug: (Fr. drogue – a dry herb) is a chemical which is taken for some illness and is withdrawn when the desired effect is achieved.

Illegal Drugs: Illegal drugs are drugs used for recreation, but it is against the law to take them, because it is extremely dangerous. The side effects are serious and the drugs are highly addictive, ruining people's lives. The effects of the drug on the addict's life style can lead to a very unpleasant death. These drugs slowly reduce the functioning of nervous system and heart functions. Opium, Heroine, Marijuana and Cocaine are some of the illegal drugs. These drugs slowly change the behaviour of the users: some of the behavioural changes are as follows:

1. Rejection of old friends and the acquiring of new ones.
2. Sudden lack of interest in hobbies or extracurricular activities.
3. Staying away from home after school.
4. Drop in grades and disinterest in school work.
5. Less concern with appearance.
6. Mood swings or extreme irritability.

Prevention of drug abuse: 1. Children should avoid the company of drug addicts. 2. Advertisements of drugs on public media should be banned 3. Doctor's advice and prescriptions should be strictly followed.

2.7.4. Smoking hazards: Cigarettes have been deemed one of the greatest health hazards of the 20th century and are now widely regarded as the chief preventable cause of death. Tobacco products such as cigarettes, cigars, smokeless tobacco (like snuff and chewing tobacco) are more dangerous. When a cigarette is burned, it is broken down into its chemical elements from which lethal chemical compounds are created. The period between puffs allows time for nicotine, ammonia, acetone, formaldehyde, hydrogen cyanide and some 4000 other chemical constituents to become irritants, poisons, mutagens and more than 40 types of carcinogens.

Some of the evil effects of smoking are

- o Raising bad cholesterol (Low Density Lipid), decreasing good cholesterol (High Density Lipid)
- o Blood vessels are constricted, damages the lining of the arteries making the blood more sticky. This increases the risk of blood clots and dramatically raises the risk of a heart attack or stroke.
- o 80% of cancerous deaths are linked to it.

Smoking aggravates asthma, bronchitis, pneumonia and emphysema.

o Also the causative agent for peptic ulcers, cataracts.

o Cigarettes increases the risk of infertility in both men and women.

o Children of smokers are also far more susceptible to asthma and ear infections.

Healthy food

2.7.5. SPROUTING: Sprouts are a living, enzyme-rich food, natural and low in calories. Their vitamin A content will usually double, various B group vitamins will be 5 – 10 times higher, and vitamin C will increase by a similar order. Their protein content becomes easily digestible and rich new nutrients such as enzymes are created. They contain significant amounts of bio-available calcium, iron and zinc.

When a dormant seed sprouts, its starch is converted into simple sugars and long chain proteins are split into smaller, easily digestible molecules. Sprouted beans and seeds are like a predigested food, one of the most enzyme-rich and nutritious foods known. Most seeds sprout easily, as do many legumes. Nuts are more difficult to sprout. It is recommended that soaking all the nuts, legumes and grains that we consume, which then become a wonderful, highly nutritious and essential component of a living food diet. Best sprouting results in sunflower seeds and mung beans. This may be a reflection of the local conditions and suppliers. Mung beans make an excellent sprout, used widely in cooking. However, they primarily use the sprouts and not the beans, and the sprouts are often stir-fried. Soya and kidney bean sprouts are toxic and may be avoided. Bean sprouts are easy and cheap to grow at home.

1. First remove the damaged bean seeds. 2. Soak them in a clean water overnight or for about 12 hours. 3. Drain, rinse and place them in a wide mouthed bottle. Allowing room for the sprouts to grow. 4. Cover the jar with cotton cloth. 5. Keep it in the dark area of your house as sunlight makes them taste bitter. As soon as the bean germinate, all the starches, oil and other nutrients packed into it – to nourish the tiny plant begin to turn into vitamins, enzymes and other forms of proteins mineral and sugars. The Vitamin C content of the bean increases, when it starts sprouting. Rinse the bean sprouts two to four times a day. They will be pale green fresh and ready for eating in two to six days.

Cancer:

Normally body cells grow and reproduce in an orderly way. In contrast cancerous cells multiply rapidly. This is due to damaged genetic material of the cell. This stage is known as initiation. It can be influenced by external factors like radiation, viral infections and certain chemicals. These cancerous cells create lots of problem in our metabolism and invade to the other areas through blood streams, where they cause secondary tumours. This stage is called metastasis. Cancer is ultimately the result of cells that uncontrollably grow and do not die. Normal cells in the body follow an orderly path of growth, division and death. Programmed cell death is called apoptosis, and when this process breaks down, cancer begins to form. Unlike regular cells, cancer cells do not experience programmatic death and instead continue to grow and divide. This leads to a mass of abnormal cells that grows out of control.

Cancer symptoms are quite varied and depend on where the cancer is located, where it has spread, and how big the tumour is. Some cancers can be felt or seen through the skin - a lump on the breast or testicle can be an indicator of cancer in those locations. Skin cancer (melanoma) is often noted by a change in a wart or mole on the skin. Some oral cancers present white patches inside the mouth or white spots on the tongue. Other cancers have symptoms that are less physically apparent. Some brain tumours tend to present symptoms early in the disease as they affect important cognitive functions.

Pancreas cancers are usually too small to cause symptoms until they cause pain by pushing against nearby nerves or interfere with liver function to cause a yellowing of the skin and eyes called jaundice. Symptoms also can be created as a tumour grows and pushes against organs and blood vessels. For example, colon cancers lead to symptoms such as constipation, diarrhoea, and changes in stool size. Bladder or prostate cancers cause changes in bladder function such as more frequent or infrequent urination.

There are five broad groups that are used to classify cancer. 1. Carcinomas are characterized by cells that cover internal and external parts of the body such as lung, breast, and colon cancer.

2. Sarcomas are characterized by cells that are located in bone, cartilage, fat, connective tissue, muscle, and other supportive tissues.

3. Lymphomas are cancers that begin in the lymph nodes and immune system tissues.
4. Leukaemia are cancers that begin in the bone marrow and often accumulate in the blood stream.
5. Adenomas are cancers that arise in the thyroid, the pituitary gland, the adrenal gland, and other glandular tissues.

Prevention: The following are some of the ways to prevent diseases like heart attack, cancer, diabetes and hypertension. Smoking causes lung cancer. It also affects mouth, throat, oesophagus, pharynx, larynx liver etc. Smoking should be totally avoided. High intake of fruits and vegetables are protective against many forms of diseases like heart attack, cancer, diabetes and hypertension. High intake of beta carotene, vitamin C and other vitamin containing food should be taken. Apart from citrus variety of fruits, bean sprouts is also an excellent source of vitamin C. Try to weight, if your obese. Avoid pickles and salty foods. A Vegetarian diet is typically high in fibre, low in saturated fat compared to meat eaters.