

DIPLOMA IN PHARMACY- 1st YEAR.

SOCIAL PHARMACY

CHAPTER- 2

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DEMOGRAPHY.

Introduction/Definition→ Demography is the systematic/periodic study of population growth. The term demography is of Greek origin and is composed of the two words, demos (people) and graphein (describe), implying the description of people.

In the demographic studies we will discuss about the population size, growth (births, deaths, and migration), composition, and structure as well as the geographical distribution of the human population. It is also called rational/quantitative study about the women, men and different age groups.

Demography is a field that is of special importance to sociology – in fact, the emergence of sociology and its successful establishment as an academic discipline owed a lot to demography.

There are different varieties of demography, including formal demography which is a largely quantitative field, and social demography which focuses on the social, economic or political aspects of populations. All demographic studies are based on processes of counting or enumeration – such as the census or the survey – which involve the systematic collection of data on the people residing within a specified territory.

IMPORTANCE OF DEMOGRAPHY—

Due to involvement of demographic study we will control the population growth by adding any modus.

By the demography we will define the health status of any population or community and provide the regular health services.

After demographic study, we can fulfill the nutritional supplement, regular medicine and also fulfill the population needs.

Demographic studies, also improve the education level of any nation or state by providing the usable/accessory study materials and equipments.

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COMMON SOURCES & INDICATORS OF DEMOGRAPHY.

1. **Birth rate**— Birth rate is the statistic or rational expression about the, number of live births in a given area during a given time per 1000 population.
2. **Death rate**— Death rate is the statistic or rational expression about the, number of deaths in a given area during a given time per 1000.

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NOTE-- The rate of natural increase or the growth rate of population refers to the difference between the birth rate and the death rate. When this difference is zero then we say that the population has stabilized or has reached the replacement level. Sometimes, societies can experience a negative growth rate – that is, their fertility levels are below the replacement rate.

3. **Migration rate**—Due to the migration of people, it indicates the demographical changes in the population and affect the rational presentation. It is effect by two ways.
 - a) **Emigration**—Emigration is the process of relocation, in which people replace our residential place by another place.
 - b) **Immigration**—Immigration is also the process of relocation, in which people comes from their residential area and live another developed or suitable area.
4. **Fertility rate**— The fertility rate refers to the number of live per births per 1000 women in the child bearing age group, usually taken to be 15 to 49 years. It also refers as, total number of live births that a hypothetical woman would have if she lived through the reproductive age group and had the average number of babies in each segment of this age group as determined by the age specific fertility rates for that area.
5. **Infant mortality rate**— Number of death of babies before the age of one year per 1000 live births.
6. **Maternal mortality rate**—Number of women who die in child birth per 1, 00,000 live birth
NOTE-- High rates of infant and maternal mortality are an unambiguous indicator of backwardness and poverty, development is accompanied by sharp falls in these rates as medical facilities and levels of education, awareness and prosperity increase.
7. **Sex ratio**— Sex ratio refers to the number of females per 1000 males in a given area at a specified time period.
8. **Age** – Age structure of the population refers to the proportion of persons in different age groups relative to the total population.
NOTE—The dependency ratio is measure comparing the portion of a population which is composed of dependents with the portion that is in the working age group, generally defined as 15 to 64 years. The dependency ratio is equal to the population below 15 or above 64, divided by population in the 15-64 age group. This is usually expressed as a percentage.

DEMOGRAPHIC CYCLE—

1. **High stationary (first stage)**—This stage is characterized by, high birth rate and high death rate no any change in size of population.
2. **Early expanding (second stage)** -- This stage is characterized by, death rate begins to decline and birth rate no change initial increase in population.
3. **Late expanding (third stage)** — This stage is characterized by, birth rate begins to decline while the death rate still decrease. Continue increase in population.

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4. **Low stationary (fourth stage)**— This stage is characterized by, low birth rate and low death rate stability in population.
5. **Declining (fifth stage)**-- This stage is characterized by, birth rate is lower than the death rate. Decrease in population.

Some theories or concept on Demography—

- The Malthusian theory of population growth(1798)
Scientist—Thomas Robert Malthus (1766 – 1834)
- The theory of Demography transition.

FAMILY PLANNING.

Definition/Introduction—Family planning is a practice to controlling the number of children one has and maintain the intervals between their births, particularly by means of contraception or voluntary sterilization.

According to WHO in 1971 it is defined as ‘ a way of thinking and living that is adopted voluntarily, upon the basis of knowledge, attitudes and responsible decisions by individuals and couples, in order to promote the health and welfare of the family group and thus contribute effectively to the social development of a country.

AIM OF FAMILY PLANNING---

- Control population—
- Improve the health (Physical, mental and social)
- Reduce hunger and poverty—
- Reduce maternal mortality—
- Reduce infant mortality and morbidity—
- Improve the reproductive health—
- Decrease the STDs—
- Improve the education level—
- Reduce MTPs—
- Provide all the government services and resources.

Methods of family planning—

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1. Natural/Traditional methods— Natural methods work on the principle of avoiding chances of ovum and sperm meeting. It follows many ways—
 - Periodic abstinence—It is one such method in which the couple avoid or abstain from coitus from day 10 to 17 of the menstrual cycle when ovulation could be expected. As chances of fertilization are very high during this period, it is called the fertile period.
 - Withdrawal or coitus interruptus—It is the another method in which the male partner withdraws his penis from the vagina just before ejaculation so as to avoid insemination.
 - Lactational amenorrhea— During the lactational period following parturition ovulation are absence. Completely absence of menstruation only up to a maximum period of six months following parturition.
2. Physical/barriers methods — In barrier methods, ovum and sperms are prevented from physically meeting with the help of barriers. It is available for both—
 - For male—Male condoms are barriers made of thin rubber/latex sheath that are used to cover the penis in the male, just before coitus so that the ejaculated semen would not enter into the female reproductive tract. It also prevented the STDs.
 - For female—Female condom are also a barrier method made of thin rubber/latex sheath that are used to cover the vagina and cervix in female. They prevent conception by blocking the entry of sperm in female reproductive tract. It also prevented the STDs.
 - Diaphragms, cervical caps and vaults are also barrier made of rubber that are inserted into the female reproductive tract to cover the cervix during coitus.
3. Chemical/hormonal methods— Chemical and hormonal substances also overcome the conception and work as contraceptive.
 - Oral contraceptives—In the oral contraceptive tablets or pills are used which contains either progestogens or progestogen-estrogen combination. Pills have to taken daily for a period of 21days starting preferably within the first five days of menstrual cycle. 'Saheli' the new oral contraceptive for the females contains a non-steroidal preparation. It is 'once a weak' pill with very few side effects and high contraceptive value.
4. IUDs—Intra Uterine Device are most effective and popular method are inserted by doctors or experts nurses in the uterus through vagina. Many types of IUDs are used—
 - Non-mediated IUDs— Example- Lippes loop.
 - Copper releasing IUDs— Example- CuT, Cu7, Multiload 375.
 - Hormone releasing IUDs—Example- Progestasert, LNG-20.
 - Implants and injection—Progestogens alone or in combination with estrogen can also be used by female as injections or implants under the skin. Their effective period are much longer.

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5. Surgical methods— Surgically method is perform in both male and female. Surgical method is also called sterilization method which blocks gamete transport and thereby prevent conception. It is two types.
- Tubectomy— In tubectomy, a small part of the fallopian tube removed or tied up through a small incision in the abdomen or through vagina.
 - Vasectomy— In vasectomy, a small part of the vas deferens is removed or tied up through a small incision on the srotum

Family planning program—India was amongst the first countries in the world to initiate action plans and programmes at a national level to attain total reproductive health as a social goal. These programmes called ‘family planning’ were initiated in 1951 and were periodically assessed over the past decades.

With the help of audio-visual and print- media governmental and non-governmental agencies have taken various steps to create awareness among the people about reproduction-related aspects. Introduction of sex education in school, teachers, friends should be encouraged to provide right information to the young so as to discourage children from believing in myths and having misconceptions about sex-related aspects.

For creating awareness among people about various reproduction related aspects and providing facilities and support for building up a reproductively healthy society are the major tasks under these programmes. Some program given below—

- a) Reproductive and Child health care (RCH).
- b) International conference on population and development (ICPD).
- c) National Health Mission (NHM).
- d) National Population Policy (NPP).
- e) National Health Policy (NHP).
- f) Millennium development goals (MDG).
- g) Sustainable development goals (SDG).

BREASTFEEDING.

BREASTFEEDING—Breastfeeding is the activity by which, the nourishing the new born baby with milk from the breast and complete their nutritional demands stands for proper growth and development upto a certain period. Breast milk contains the water, proteins, carbohydrates, antibodies, fats, hormone, vitamins, minerals and other immune cells etc.

During the pregnancy female mammary glands undergo differentiation and starts producing milk towards the end of pregnancy by the process called lactation.

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The milk produced during the initial few days of lactation is called colostrums which contains several antibodies absolutely essential to develop resistance for the new-born babies.

Breastfeeding during the initial period of infant growth is recommended by doctors for bringing up a healthy baby.

IMPORTANCE OF BREASTFEEDING---

Benefit for Child—Milk are the essential nutrients for the growing baby. It helps many ways like...

- Improve resistance power—Mother milk contains the many antibodies, which are responsible for the protection of child against the disease. IgA is the major immunoglobulin in human colostrums and milk. Resistance provide by milk against disease like....
- Asthma, respiratory disease, obesity, diabetes, ear infections, gastro- intestinal infections, cancer and any syndrome etc.
- Fulfill nutrients supply—Milk are the best food supplement for the growing baby because it contains the essential supplement (vitamins, minerals, proteins, amino acids, fat or lipids etc) in required and abundant amount.
- Proper growth and development—Due to involvement of supplement, it helps in proper growth and development and of body parts (bone, muscle, liver, brain, heart etc.) and also provided the strength to body parts.

Benefits for Mother—Breastfeeding is simply not responsible for a baby growth apart from this, it is also responsible for mother health. In mother keep it safe from many conditions.

Diabetes, ovarian cancer, regulated cholesterol level, breast cancer, high blood pressure etc.

PHARMACISTS ROLE IN MOTHER AND CHILD HEALTH.

If any problem come regarding to the mother or child health then pharmacists supply various contraceptive options and prescribe initiate emergency contraception.

- Aware the parents and supply vitamins and nutritional supplements, including folic acid and iron supplements and also promote cessation of alcohol and nicotine use.
- Pharmacists recommend drug therapy, dosages, and duration of the essential medicine during the pregnancy and also decide the drug for developing embryo.
- Pharmacists make decisions regarding accessibility of critical medications in labor and delivery and provide required sterile medication products during delivery.

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- Pharmacists, support breastfeeding (when replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all breast feeding by HIV- infected mother is recommended).
- Pharmacists supply the effective treatment to the child and drug therapy (Oral rehydration salts and Zinc therapy) and also insure no deficiencies quality, purity, or potency of medicinal products.
- Pharmacist also participated in health program and aware the parents to any disease conditions and provide the proper precaution.

SUBSTITUTES FOR INFANT MILKS—Some conditions mother are not able to breast feeding due to reasons (low milk production, severe disease condition etc.) then substitute or alternative milk are the one way to fulfill the baby needs other than the mother milk. Substitute milk is a synthetic form of liquid/powder nutrition designed to closely mimic the nutrient quality and composition of breast milk. It provides a similar amount of calories, fat, and proteins as breast milk.

In dire situations, you may offer pasteurized cow, sheep, or goat milk (full fat) and alternative milks (pea protein or soy are best) for 2-3 days as long as these are not the primary source of nutrition. 12 – 24 Months.

IDEAL CHARACTERISTIC OF INFANT SUBSTITUTE MILK.

- Almost equal to the breast milk like(color, smell, taste, texture)
- Provide all the nutrition(calorie, protein, fat, vitamin, minerals)
- Do not cause any allergic reaction.
- Easily digestible for infant.
- Easily absorbable for infant.
- Easily available and low economy.
- Do not cause any disease condition.

Disease/ill related to substituted milks.

- Substituted milk some time causes the severe allergic reaction in infants and cause eczema, rashes.
- Some infants are not able to digest the substitute milk, so it cause the diarrhea and increase the risk of necrotizing enterocolitis (NEC).

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- Due to lack of nutritional value it is not improve the proper growth and development of the infants.
- Due to lack of nutrition proper immunity are not developed against the infections or disease. So baby faces many diseases like diabetes, pneumonia, obesity, leukemia, respiratory disease etc.
- Substituted milk is easily deteriorated by the bacterial or fungal growth so it also harms the infants.
- Due to lack of nutrition it also causes the malnutrition.

BOTTLE FEEDING— Bottle feeding is a system, which provide the identical condition/environment that is similar to breast feeding and nourish the baby by providing the nutrient full supplements.

During the bottle feeding, hold your baby in proper manner and take the bottle come close to the baby and incline the bottle at an angle (45-90).

Some precautions/activities required for bottle feeding.

- Proper cleaning and hygiene required for the bottle feeding.
- To ensure the feeding supplement, which are healthy for baby or not.
- To ensure the feeding bottle (plastic, stainless steel) are compatible with the feeding supplement.
- Try that as much as the feeding is made , give the baby drink immediately and do not leave it for later because supplement are easily deteriorate by the environment.
- Proper condition and proper position are required for the best feeding.

VACCINE.

Introduction—Vaccine is the chemical substances or biological preparation which provides the active acquired immunity against any disease. Generally vaccine contains the resemble microorganism or chemical substances (toxins, surface protein etc.) in inactive/killed form.

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During the vaccination, vaccine are injected in the body, after that it behaves as a antigen or foreign substance to the body, so our body work against this substances and produced the antibodies create a immunity. It is called that primary response against disease.

After that immunity are developed and stored in the memory cells of the brain regarding to the previous infections. In future any similar infections are cause then our immune system give rapid response and fight against disease this is called secondary response by producing antibodies.

Vaccines play a major role in prophylactic and therapeutic role in many disease.

Antigen— Antigen are those substances that stimulate the immune system to produce antibodies (protective body). It behaves like foreign particles (bacteria, virus) for recipient body and cause undesirable changes, then recipient body protects itself by producing the antibodies.

Antibody—Antibody is the proteinaceous protective modification produced by the immune system in response to the presence of the foreign substances like bacteria, viruses etc and neutralize their activities. It is also called immunoglobulin and each molecule contains four peptide chains, two small called light chains and two heavy chain/longer chain (H₂L₂)

History of Vaccine — Discovery of Immune system- Edward Jenner (1749-1823). Edward was creating the concept of vaccines and formulated the small pox vaccine.

After that Louis Pasteur (1878) discovered the rabies and anthrax vaccine.

Types of vaccine—The development of more effective and even safer vaccines as well as developing vaccines for more diseases that are serious is always ongoing. Vaccine formulations affect how they are used, how they are stored, and how they are administered. There are four types of vaccines, categorized by the antigen (inactive microbes, toxins, surface protein) used in their preparation.

1. **Live attenuated vaccine (LAV)**-- Live attenuated vaccines (LAV) is prepared by pathogens (virus or bacteria) which causes the infections or disease, that have been weakened under laboratory condition. Live microorganisms provide continual antigenic stimulation giving sufficient time for memory cell production. Due to their weak activity it cause no or very mild disease.
Example-- – Tuberculosis (BCG), Oral polio vaccine (OPV), Measles, Rotavirus, Yellow fever.
2. **Inactivated vaccine (Killed vaccine)**-- Inactivated vaccines are prepared by the method of killing antigens through the physical or chemical processes. These killed organisms cannot cause risk of inducing the disease and they are also considered more stable than LAV vaccines.

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Example-- – Whole cell pertussis, Inactivated polio virus (IPV)

3. **Subunit vaccine (Purified antigen)**—Subunit vaccines contain the antigenic parts (disease causing portion) of antigen. Like inactivated vaccine it also does not contain the live components of antigen, it only contains the antigenic parts like surface protein, conjugated chemicals, polysaccharide etc. Example-- Acellular pertussis, Haemophilus influenza type b Pneumococcal, Hepatitis B.
4. **Toxoid vaccine (Inactivated Toxoid)**-- Toxoid vaccines are based on the toxin produced by certain bacteria (e.g. tetanus or diphtheria). Released toxin is used to prepare the vaccine and these parts are necessary to elicit a protective immune response and produce antibody. Example-- Tetanus Toxoid (TT), Diphtheria Toxoid.

On the basis of components vaccine are also divided into two parts—

- a) **Monovalent and polyvalent vaccine**— A monovalent vaccine contains a single strain of disease causing specific antigen. Example—Measles vaccine while, Polyvalent vaccine contains two or more strains/serotypes of disease causing specific antigen. Example—OPV
- b) **Combination vaccine**—In combination vaccine many antigens are combined in the single injection that can prevent different diseases or that protect against multiple strains of infectious agents causing the same disease. Example-- Combination vaccine DPT(Diphtheria, Pertussis and Tetanus antigens)

Ideal characteristics of vaccine—

- Not cause any allergic reaction.
- Easily administrable without any harm.
- Easy to store not shows any incompatibility with storage materials.
- Easily available and low economic value.
- Not cause any disease condition and rapidly produces antibody effects.

IMMUNITY.

Immunity—Immunity is defined as the ability of immune system to produce the immune response against the disease causing organisms like bacteria, virus, fungus, and other foreign agent.

Types of Immunity—Immunity is of two types.

- a) **Innate Immunity.**
- b) **Acquired Immunity.**

NOTESKARTS

Innate immunity.

Innate immunity is non-specific type of defense, that is present at the time of birth. This is accomplished by providing different types of barriers to the entry of the foreign agents into our body. Innate immunity consists of four types of barriers. These are —

1. Physical barriers -- Skin on our body is the main barrier which prevents entry of the micro-organisms. Mucus coating of the epithelium lining is also provide the barrier and also prevents the microbes entering in our body. It is present in respiratory, gastrointestinal and urogenital tracts.
2. Physiological barriers—Due to the physiological activity of secreting substances of our body create a barrier that is, acid in the stomach, saliva in the mouth; tears from eyes—all prevent microbial growth.
3. Cellular barriers—Certain type of leukocytes (WBC) of our body like polymorpho-nuclear leukocytes (PMNL-neutrophils) and monocytes and natural killer (type of lymphocytes) in the blood as well as macrophages in tissues can phagocytose and destroy microbes.
4. Cytokine barriers—Virus infected cells secrete proteins called interferon's which protect non-infected cells from further viral infection.

ACQUIRED IMMUNITY.

Acquired immunity—It is the pathogen specific immunity which is characterized by memory. This means that our body when it encounters a pathogen for the first time produces a response called primary response which is of low intensity. Subsequent encounter with the same pathogen elicits a highly intensified secondary or anamnestic response.

The primary and secondary immune responses are carried out with the help of two special types of lymphocytes present in our blood that is B-lymphocytes and T-lymphocytes. The B-lymphocytes produce an army of proteins in response to pathogens into our blood to fight with them. These proteins are called antibodies. The T-cells themselves do not secrete antibodies but help B cells produce them. Different types of antibodies are produced in our body. **IgA, IgM, IgE, IgG, IgD** are some of them.

Two types of our acquired immune response present in our body –

1. **Antibody mediated immune response**—These antibodies are found in the blood, the response is also called as humoral immune response.
2. **Cell Mediated Immunity (CMI)**—The T-lymphocytes mediate CMI. Very often, when some human organs like heart, eye, liver, kidney fail to function.
 - The body is able to differentiate 'self' and 'nonself' and the cell-mediated immune response is responsible for the graft rejection.

Types of Acquired Immunity--

- A. Active Acquired Immunity—When a host is exposed to antigens, which may be in the form of living or dead microbes or other proteins, antibodies are produced in the host body. This type of immunity is called active immunity. Injecting the microbes deliberately during immunization or infectious organisms gaining access into body during natural infection induce active immunity.
- B. Passive Acquired Immunity—When ready-made antibodies are directly given to protect the body against foreign agents, it is called passive immunity. Example-- During the insects bite, colostrums milk (IgA).

Vaccination and Immunization—

The principle of immunization or vaccination is based on the property of 'memory' of the immune system. In vaccination, a preparation of antigenic proteins of pathogen or inactivated/weakened pathogen (vaccine) is introduced into the body. The antibodies produced in the body against these antigens would neutralize the pathogenic agents during actual infection. The vaccines also generate memory – B and T-cells that recognize the pathogen quickly on subsequent exposure and overwhelm the invaders with a massive production of antibodies.

Immune system in the body--

The human immune system consists of lymphoid organs, tissues, cells and soluble molecules like antibodies

Lymphoid organs—These are the organs where origin and/or maturation and proliferation of lymphocytes occur.

The primary lymphoid organs are bone marrow and thymus where immature lymphocytes differentiate into antigen-sensitive lymphocytes. Both bone-marrow and thymus provide micro-environments for the development and maturation of T-lymphocytes. The bone marrow is the main lymphoid organ where all blood cells including lymphocytes are produced . After maturation the lymphocytes migrate to secondary lymphoid organs like spleen, lymph nodes, tonsils, Payer's patches of small intestine and appendix.

The secondary lymphoid organs provide the sites for interaction of lymphocytes with the antigen, which then proliferate to become effectors cells.

- The spleen is a large bean shaped organ. It mainly contains lymphocytes and phagocytes. It acts as a filter of the blood by trapping blood-borne microorganisms. Spleen also has a large

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reservoir of erythrocytes. The lymph nodes are small solid structures located at different points along the lymphatic system.

- Lymph nodes serve to trap the micro-organisms or other antigens, which happen to get into the lymph and tissue fluid. Antigens trapped in the lymph nodes are responsible for the activation of lymphocytes present there and cause the immune response.
- There is lymphoid tissue also located within the lining of the major tracts (respiratory, digestive and urogenital tracts) called mucosa associated lymphoid tissue (MALT). It constitutes about 50 per cent of the lymphoid tissue in human body.

POLLUTION.

Any environmental/natural disturbances create by the Physical, chemical, and biological resources are called as pollutions.

Pollution is any undesirable change in physical, chemical or biological characteristics of air, land, water or soil. Agents that bring about such an undesirable change are called as pollutants. In order to control environmental pollution, the Government of India has passed the Environment (Protection) Act, 1986 to protect and improve the quality of our environment (air, water and soil).

Types of pollution—On the basis of sources many types of pollution given below—

- Water pollution.
- Noise pollution.
- Air pollution.
- Plastic pollution.
- Radioactive pollution.
- Soil pollution.

Water pollution.

Any undesirable changes in the water properties by physical, chemical and biological method is called as water pollution. Human beings have been abusing the water-bodies around the world by disposing into them all kinds of waste. Due to such activities of human kind, the ponds, lakes, stream, rivers, estuaries and oceans are becoming polluted in several parts of the world. Realizing the importance of maintaining the cleanliness of the water bodies, the Government of India has passed the Water (Prevention and Control of Pollution) Act, 1974 to safeguard our water resources.

Presence of large amounts of nutrients in waters also causes excessive growth of planktonic (free-floating) algae, called an algal bloom which imparts a distinct color to the water bodies. Algal blooms cause deterioration of the water quality and fish mortality. Some bloom-forming algae are extremely toxic to human beings and animals

Source of water pollution—

- Household wastes are one of the sources which contaminate/pollute the water. Wastes contain like vegetables peel, rotten materials and other food wastes.
- Industry is one of the sources of water pollution by draining the wastes material into the river or in water sources.
- Chemical fertilizer and pesticides are also polluted the water.
- Accidental Oil Leakage is also contaminating the water.
- Acidic rain is also a one of the source which caused the water pollution.
- Some human activities like, cloth cleaning, animal bath in river are water sources are also cause the pollution.
- High amount uses of detergent and soap are also contaminate the water.

Effects on health of water pollution/water born disease—

- Polluted water cause the metabolism defect in the body and produce the many disease like Gastroenteritis, Diarrhea, Cholera, dysentery.
- Polluted water also effects the brain activity and can cause brain related severe problem.
- Many infectious disease agent transfer from one place to another through flowing of contaminated water like- Typhoid, Giardiasis, Amoebiasis, Ascariasis, Hookworm.
- Polluted water effects the normal growth and development and also induced the infant mortality.
- Polluted water can cause the impotency in both male and female.
- Due to the pollution BOD are increases so oxygen contents are low in water sources and water animals face many problems.
- Due to the pollution water harms the many organs and causes the serious problem. Kidney disease, heart disease, lungs disease, etc.
- **It causes the Eutrophication**—Eutrophication is the natural aging of a lake by nutrient enrichment of its water. Nutrients such as nitrogen and phosphorus, which encourage the growth of aquatic organisms. As the lake's fertility increases, plant and animal life burgeons, and organic remains begin to be deposited on the lake bottom. After some time Marsh plants take root in the shallows and begin to fill in the original lake basin. Eventually, the lake gives way to large masses of floating plants (bog), finally converting into land.
- **Biomagnifications**— Biomagnifications refers to increase in concentration of the toxicant at successive trophic levels. This happens because a toxic substance accumulated by an organism cannot be metabolized or excreted, and is thus passed on to the next higher trophic level. This phenomenon is well-known for mercury and DDT.

NOTESKARTS

Treatment of water pollution—They waste water potable and usable by employing wastewater treatment technologies that filter and treat the wastewater by removing contamination such as sewage and chemicals. Four common ways to treat the water.

- ❖ **Physical treatment**— In this methods are used for cleaning the waste water processes like screening, sedimentation and skimming are used to remove the solids no chemical are involved in this process.

The main techniques of physical waste water treatment including sedimentation which is a process of suspending the heavy particles from the waste water.

- ❖ **Chemical treatment**— the use of chemicals in water chlorine an oxidising chemical is commonly used to kill bacteria which decomposes water by adding contaminate to it. Another oxidizing agent used for purifying the waste water is Ozone. Neutralization is a technique where an acid or base is added to bring the water to its natural pH of 7 chemicals prevents the bacteria from reproducing in water thus making the water pure.

- ❖ **Biological treatment**— this use various biological processes to break down the organic matter present in wastewater such as soap, human waste oil and food etc. It can be divided into three categories.

- **Aerobic processes**— Bacteria decomposes the organic matter and converts it into carbon dioxide that can be used by plants. Oxygen is used in this process.
- **Anaerobic Processes**— Here fermentation is used for fermenting the waste at a specific temperature. Oxygen is not used in anaerobic process
- **Composting**— A type of Aerobic process where wastewater is treated by mixing it with sawdust or other carbon sources.

- ❖ **Sludge treatment**— This is a solid liquid separation process where the least possible residual moisture is required in the solid phase and the lowest possible solid particles residuals are required in the separated liquid phase.

Importance of safe drinking water—

- Water which is suitable for drinking is called potable water.
- Due to use of clean and safe water we always will be safe from disease.
- Due to the safe water drinking, metabolism activity perform properly, Then you will always be healthy.
- We always away from infectious disease and water borne diseases.

Air pollution.

We can survive for some time without food, but we cannot survive even for a few minutes without air. This simple fact tells us how important clean air is to us. When air is contaminated by unwanted

NOTESKARTS

substances which have a harmful effect on both the living and the non-living, it is referred to as air pollution. Air consists of a mixture of gases. By volume, about 78% of this mixture is nitrogen and about 21% is oxygen. Carbon dioxide, argon, methane, ozone and water vapors are also present in very small quantities. According to Central Pollution Control Board (CPCB), particulate size 2.5 micrometers or less in diameter (PM 2.5) are responsible for causing the greatest harm to human health.

Source of air pollution—the substances which contaminate the air are called air pollutants. Sometimes, such substances may come from natural sources like smoke and dust arising from forest fires or volcanic eruptions. Pollutants are also added to the atmosphere by certain human activities. The sources of air pollutants are factories, power plants, automobile exhausts and burning of firewood and dung cakes.

- Smog is also a air pollution which is made up of smoke and fog. Smoke may contain oxides of nitrogen which combine with other air pollutants and fog to form smog. The smog causes breathing difficulties such as asthma, cough and wheezing in children.
- Chlorofluorocarbons (CFCs) which are used in refrigerators, air conditioners and aerosol sprays. CFCs damage the ozone layer of the atmosphere it is also behaves as air pollution.

Effects on health—

- A. Air pollution cause serious health disease for long term, Heart disease, lung cancer, and respiratory diseases such as emphysema etc.
- B. Air pollution can also cause long-term damage to people's nerves, brain, kidneys, liver, and other organs some time it causes the birth effects.
- C. Acid Rain—Acidic rain is damages the monuments like 'Taj Mahal'. Pollutant like sulphur dioxide and nitrogen dioxide gases react with the water vapors present in the atmosphere to form sulphuric acid and nitric acid. The acids drop down with rain, making the rain acidic. This is called acid rain.
- D. Depletion of the Ozone Layer—CFCs are major cause of Ozone layer depletion.
- E. Green house effect—Sunlight is the essential source of energy. During sunlight clouds and gases reflect about one-fourth of the incoming solar radiation, and absorb some of it but almost half of incoming solar radiation falls on Earth's surface heating it, while a small proportion is reflected back earth's surface re-emits heat in the form of infrared radiation but part of this does not escape into space as atmospheric gases (e.g., carbon dioxide, methane, etc.) absorb a major fraction of it.

The molecules of these gases radiate heat energy. This cycle repeated many times and causes the green house effects. Increase in the level of greenhouse gases has led to considerable heating of

NOTESKARTS

Earth leading to global warming. Green house gases mainly — CO₂(60%),CH₄(20%),CFCs(14%),N₂O(6%).

Control of Air Pollution-- Smokestacks of thermal power plants, smelters and other industries release particulate and gaseous air pollutants together with harmless gases, such as nitrogen, oxygen, etc. These pollutants must be separated/ filtered out before releasing the harmless gases into the atmosphere. There are several ways of removing particulate matter, the most widely used—

- Scrubber
- Electrostatic precipitator.

For prevention of air pollution many country are used CNG and LPG for vehicles or automobiles.

Noise pollution.

Noise is undesired high level of sound. We have got used to associating loud sounds with pleasure and entertainment not realizing that noise causes psychological and physiological disorders in humans.

A brief exposure to extremely high sound level, 150 dB or more generated by takeoff of a jet plane or rocket, may damage ear drums thus permanently impairing hearing ability.

Source of noise pollution—

- Noise pollution refers to a sound that is annoying a nuisance or undesired for the ears and that which can impact the activity or behavior of the animal and human life
- The industrial source includes the noise from various industries and big machines working at a very high speed and high noise intensity.
- Noise pollution can come from outdoor sources, such as road traffic, jet planes, garbage trucks, construction equipment.
- Some of the main sources of noise in residential areas include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators, wind turbines, explosions

Effects on health—

- Long term exposure of loud sound it caused the Noise Induced Hearing Loss (NIHL).

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- It also induced the sleeping disorder due to listening of sound long term.
- Exposure to loud noise can also cause high blood pressure, heart disease, and stress.
- Trouble Communicating is the major problem due to high loud noise.
- Hearing system is also control our balancing system so high frequency sound can cause disturbance.
- It is also cause many brain related problem.

Control of Noise Pollution—

- Reduction of noise in our industries can be affected by use of sound absorbent materials or by muffling noise.
- A man inserting an earplug in his ear to reduce the noise exposure.
- Permissible sound-levels of crackers and of loudspeakers, timings after which loudspeakers cannot be played, etc need to be enforced to protect ourselves from noise pollution.

NOTE-- In India, the Air (Prevention and Control of Pollution) Act came into force in 1981, but was amended in 1987 to include noise as an air pollutant.

Sewage and solid waste disposal.

Solid waste Disposal-- Solid wastes refer to everything that goes out in trash. Municipal solid wastes are wastes from homes, offices, stores, schools, hospitals, etc., that are collected and disposed by the municipality. The municipal solid wastes generally comprise paper, food wastes, plastics, glass, metals, rubber, leather, textile, etc.

Burning reduces the volume of the wastes, although it is generally not burnt to completion and open dumps often serve as the breeding ground for rats and flies. Sanitary landfills were adopted as the substitute for open-burning dumps. In a sanitary landfill, wastes are dumped in a depression or trench after compaction, and covered with dirt every day. A solution to all this can only be in human beings becoming more sensitive to these environment issues. All waste that we generate can be categorized into three types – (a) bio-degradable, (b) recyclable and (c) the non-biodegradable.

Hospitals generate hazardous wastes that contain disinfectants and other harmful chemicals, and also pathogenic micro-organisms. Such wastes also require careful treatment and disposal. The use of incinerators is crucial to disposal of hospital waste.

Irreparable computers and other electronic goods are known as electronic wastes (e-wastes). E-wastes are buried in landfills or incinerated.

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Over half of the e-wastes generated in the developed world are exported to developing countries, mainly to China, India and Pakistan, where metals like copper, iron, silicon, nickel and gold are recovered during recycling process.

Sewage Treatment Plant—A major component of this waste water is human excreta. This municipal waste-water is also called sewage. It contains large amounts of organic matter and microbes. Many of which are pathogenic. Before disposal, hence, sewage is treated in sewage treatment plants (STPs) to make it less polluting. Treatment of waste water is done by the heterotrophic microbes naturally present in the sewage. This treatment is carried out in two stages.

Methods—

Primary treatment—these treatment steps basically involve physical removal of particles large and small from the sewage through filtration and sedimentation. Initially, floating debris is removed by sequential filtration. Then the grit (soil and small pebbles) are removed by sedimentation. All solids that settle form the primary sludge, and the supernatant forms the effluent.

Secondary treatment or Biological treatment—The primary effluent is passed into large aeration tanks where it is constantly agitated mechanically and air is pumped into it. This allows vigorous growth of useful aerobic microbes into flocs (masses of bacteria associated with fungal filaments to form mesh like structures). While growing, these microbes consume the major part of the organic matter in the effluent. This significantly reduces the BOD (biochemical oxygen demand) of the effluent.

BOD refers to the amount of the oxygen that would be consumed if all the organic matter in one liter of water were oxidized by bacteria. The sewage water is treated till the BOD is reduced.

The greater the BOD of waste water more is its polluting potential. Once the BOD of sewage or waste water is reduced significantly, the effluent is then passed into a settling tank where the bacterial 'flocs' are allowed to sediment. This sediment is called activated sludge. A small part of the activated sludge is pumped back into the aeration tank to serve as the inoculums.

The remaining major part of the sludge is pumped into large tanks called anaerobic sludge digesters. Here, other kinds of bacteria, which grow anaerobically, digest the bacteria and the fungi in the sludge. The effluent from the secondary treatment plant is generally released into natural water bodies like rivers and streams.

Occupational illnesses.

Occupational illnesses are the serious problem for the working person due to workplace specific hazards. It is arising out of in the course of employment or work environment. It occurs as a result of exposure to physical, chemical, biological and physiological factors in the workplace.

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Generally harmful chemical are present in the workplace area and cause the adverse health conditions and damage the people. Example- Lead, Arsenic, Pesticides, mercury, silica.

Sources of Occupational illness—

- Paint industries—
- Cement industries.
- Coal industries.
- Pesticides industries
- Pharmaceutical industries.
- Radioactive manufacturing industries.
- Mineral extraction—heavy metal extraction.

Occupational disease—

- ❖ Skin disorders— Allergic reactions, dermatitis, skin rashes, itching, skin cancer.
- ❖ Respiratory disorders— Shortness of breath, Chest pain, Chest tightness, Abnormal breathing pattern, asthma etc
- ❖ Neurological disorders— headache, memory disturbance, and peripheral neuropathy, multiple sclerosis, Alzheimer's disease, Parkinson's disease, epilepsy, and stroke.
- ❖ Hematological disorders— Leukemia, blood disorders etc.
- ❖ Musculoskeletal disorders— Muscular spasm, Tendinitis, Carpal tunnel syndrome, Osteoarthritis, Rheumatoid arthritis, Fibromyalgia, Ligament Sprain.
- ❖ Hepatic disorders— Hepatitis A, B, and C, cirrhosis.
- ❖ Cardiovascular disorders— Ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD, Coronary Artery Disease (CAD), Heart Arrhythmia, Dilated Cardiomyopathy, Pulmonary Stenosis.
- ❖ Renal and Urinary disorder— urinary defects, prostate cancer, kidney failure.
- ❖ Reproductive and development disorder—Reproductive tract infections, congenital abnormalities, cancers of the reproductive system and sexual dysfunction.

Precaution against occupational disease—

To prevent occupational disease efficiency, health professionals must know how to anticipate and recognize conditions in those who present with symptoms and those who are pre-symptomatic.

- Regular replacement of the non-hazardous substance for hazardous one.
- Job redesign, work organization, work practices regular necessary condition and alternative.
- Installation of engineering control and devices and provide the educational knowledge and advice.

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- For the worker, provide high quality of personal protective equipment.

Environmental pollution due to pharmaceuticals.

- Pharmaceutical companies' release the harmful gaseous like carbon dioxide, nitrous oxide, methane, sulphur compounds etc. which effects the air and cause the air pollution. Due to air we face many problem like—respiratory disease(Emphysema, breathing in comfort, suffocation, etc), ischemic heart disease, stroke, chronic obstructive pulmonary disease (COPD),brain disease. It also a causative agent of green house effects.
- When the pharmaceutical wastes are thrown in the soil then its chemical directly involved in soil and causes the soil pollution and affects the productivity.
- Pharmaceutical drainage directly affects the water and causes the water pollution. Due to pollution many disease borne like diarrhoea, cholera, dysentery, typhoid and poliomyelitis etc.
- In pharmaceutical companies, machinery work performs which produced loud noise and cause the noise pollution.
- Many radioactive materials are released by the pharmaceutical company like X-Ray, Gamma-Ray, heavy metal ions etc. which directly affects the health and causes the chronic disorders.

PSYCHOSOCIAL PHARMACY.

Definition—The term psychosocial refers to the psychological and social factors that influence mental health. Social influences such as peer pressure, parental support, cultural and religious background, socioeconomic status, and interpersonal relationships all help to shape personality and influence psychological makeup.

Drugs and their Misuses

Psychotropics products.

Psychotropic drugs are those drugs which affect the mood, thoughts, and behaviours. It is directly belongs to the mental activity. Psychotropic are generally used to maintain brain chemicals, or neurotransmitters, like dopamine, GABA (gamma amino butyric acid), nor epinephrine, and serotonin.

There are five major classes of legal psychotropic medications:

- Antipsychotics.
- Antidepressants.
- Anti-anxiety agents.

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- Mood stabilizers.
- Stimulants.

Misuse of the drugs—many people are used to psychotropic drug to release the stress and anxiety but long terms use it causes the addictive effects on the brain and causes the dependency. Some people are also use to increase working efficiency.

Narcotics product—

Narcotics products are those substances, which is directly binds to the brain opioids receptors and relieves the moderate to severe pain. The drugs, which are commonly abused, are opioids, cannabinoids and coca alkaloids. Majority of these are obtained from flowering plants. Some are obtained from fungi.

Misuse of the drugs— these types of drugs is a prescribed type of drugs, without any prescription it is not use because it causes the dependency.

Many people are used this substances as a stimulants it is one of the major misuse of this products.

Alcohol.

Alcohol generally used alcohol used by the person is known as ethyl alcohol. It is also used as medication in limited amount for releases the stress, depressions etc.

Misuse of the drugs— It is one which are also cause the addictive effect. High dose of alcohol causes the dangerous effects and causes the severe effects. Due to high dose person loss their mental alertness and behaves as wild types (bad habits).

Tobacco

Tobacco contains a large number of chemical substances including nicotine, an alkaloid. Nicotine stimulates adrenal gland to release adrenaline and nor-adrenaline into blood circulation, both of which raise blood pressure and increase heart rate. Smoking is associated with increased incidence of cancers of lung, urinary bladder and throat, bronchitis, emphysema, coronary heart disease, gastric ulcer, etc. Tobacco chewing is associated with increased risk of cancer of the oral cavity.

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Smoking increases carbon monoxide (CO) content in blood and reduces the concentration of haembound oxygen. This causes oxygen deficiency in the body.

Smoked tobacco products include cigarettes, cigars, bidis, etc. Some people also smoke loose tobacco in a pipe or hookah (water pipe). Chewed tobacco products include chewing tobacco, snuff, dip.

Misuse of the drugs—Tobacco addiction is caused by a dependency on nicotine and habits formed by smoking or using chewing tobacco. Some people are used as stimulant but high amount causes the severe problems.

Adolescence and Drug/Alcohol Abuse.

Surveys and statistics show that use of drugs and alcohol has been on the rise especially among the youth. This is really a cause of concern as it could result in many harmful effects. Proper education and guidance would enable youth to safeguard themselves against these dangerous behavior patterns and follow healthy lifestyles.

Adolescence means both 'a period' and 'a process' during which a child becomes mature in terms of his/her attitudes and beliefs for effective participation in society. The period between 12-18 years of age may be thought of as adolescence period. In other words, adolescence is a bridge linking childhood and adulthood. Adolescence is accompanied by several biological and behavioral changes. Adolescence thus is a very vulnerable phase of mental and psychological development of an individual.

Social Impact of these habits on social health— due to the addictive effects of these drugs, it alters our social activities and affects the social health. It causes the adverse effects on the brain and promote the bad habits by reducing the brain activities so it creates the negative impacts in between citizens.

It also promoted the poverty and hunger conditions in the family.

Now days these drugs use are vigorously grow in the population and effects our nation developments

Suicidal behaviours.

Suicide is not a mental illness but a serious potential consequence of treatable mental disorders that include major depression, bipolar disorder, posttraumatic stress disorder, borderline personality disorder, schizophrenia, substance use disorders, anxiety disorders, and eating disorders like bulimia.

Social Impact of these habits on social health and productivity .

- Suicidal behaviours is not a solution of any problems. Its leave a negative impression in the social community.
- Alcohol abuse among adolescents are unstable or unsupportive family structures and peer pressure.

Prevention and control of these habits.

- Teacher and educational, play a major role to control this activity.
 - Parenting that combines with high levels of nurturance and consistent discipline, has been associated with lowered risk of substance (alcohol/drugs/tobacco) abuse. Some of the measures mentioned here would be particularly useful for prevention and control of alcohol and drugs abuse among adolescents.
1. Avoid undue peer pressure.
 2. Education and counseling.
 3. Seeking help from parents and peers.
 4. Looking for danger signs.
 5. Seeking professional and medical help.

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