

KRISHNAGAR ACADEMY

Reproductive Health

Class -12

Biology

CHAPTER -4



REPRODUCTIVE HEALTH—PROBLEMS AND STRATEGIES

Definition. According to WHO, reproductive health means a total well being in all aspects of reproduction *i.e.*, physical, emotional, behavioural and social. So the term reproductive health refers to healthy reproductive organs with normal reproductive functions. It forms a crucial part of general health.

A **reproductively healthy society** is a society with people having physically and functionally normal reproductive organs and normal emotional and behavioural interactions in all sex-related aspects.

PROGRAMMES INVOLVED IN MAINTAINING REPRODUCTIVE HEALTH

India was the first country to initiate action plans and programmes at the national level to attain total reproductive health as a social goal.

- Family Planning Programme (Explained ahead).
- Reproductive and Child Health Care (RCH) programme. It was launched in 1977.

PROBLEMS ASSOCIATED WITH REPRODUCTIVE HEALTH

- Lack of awareness in the people.
- A number of myths and misconceptions about sex-related aspects.

- Common occurrence of sexually-transmitted diseases.
- Rapid increase in human population called **population explosion**.
- Illegal abortion of female foetuses.
- Congenital or acquired infertility.

AIMS OF REPRODUCTIVE HEALTH PROGRAMMES

- To ensure a responsible, safe and satisfying reproductive life.
- **To create awareness** about various reproduction related aspects with the help of audio-visual and print media of both Government and non-government agencies. Parents, other close relatives, teachers and other friends can play important role in dissemination of such informations.
- To provide **sex education** in the schools to save the young school-goers from myths and misconceptions about the sex-related issues.
- **To prevent and control sexually transmitted diseases** by providing proper informations about reproductive organs, adolescence and safe and hygienic sexual practices.
- **To educate the fertile couples** and those in marriageable age-group about birth control measures, pre-natal and post-natal care of mothers and child, importance of breast feeding etc.
- To provide awareness about ill-effects of population explosion, sexual abuses, sexual discrimination and sex-related crimes.
- **To provide medical facilities** (e.g. for problems like pregnancy, delivery, STDs, abortions, menstruation, infertility, etc.) and **support** like infrastructural facilities, professional expertise and material support to decrease maternal and infant mortality rates.
- To improve the existing techniques and to develop new techniques.
- To raise the marriageable age.
- To impose statutory ban on amniocentesis, to check increasing female foeticide.
- **To manage disorders** related to reproductive system.
- To lessen the **problem of infertility** by promoting assisted reproductive activities (ARTs).

STEPS TAKEN TO MAINTAIN A REPRODUCTIVELY HEALTHY SOCIETY

- Imposing a statutory ban on amniocentesis to legally check increasing female foeticide.
- Massive child immunisation programmes being followed.
- Creation of specialised health centres like infertility clinics for the diagnosis and corrective treatment of some infertility disorders.

- MTP was legalised in 1971 to decrease the population size.

INDICATORS OF IMPROVED REPRODUCTIVE HEALTH

- Better awareness about sex-related matters.
- Better post-natal care resulting decline in maternal and infant mortality rates.
- More couples opting family planning measures.
- Better techniques of early diagnosis and cure of STDs.
- Improved and new medical facilities for sex-related problems.
- More number of ARTs so decreasing the problems of infertility.

DEMOGRAPHY : IN WORLD AND IN INDIA

DEFINITION

The scientific study of human population is called **demography**, while the persons involved in the scientific studies of human population are called **demographers**.

SIGNIFICANCE OF STUDYING HUMAN POPULATION

Population education has been introduced into the educational system of the country to make the students aware of :

1. The consequences of uncontrolled population growth;
2. The advantages of a small family norm;
3. The growth, distribution and density of population;
4. The relationship between the population to the standard of life.
5. Methods of control of human population growth.

DETERMINATION OF HUMAN POPULATION GROWTH RATE

Annual average growth rate is the percentage of increase in population size per year. It can be calculated with the help of following equation :

$$\text{Annual growth rate (\%)} = \left(\frac{P_2 - P_1}{P_1 \times N} \right) \times 100$$

where P_1 = Population size of previous census.

P_2 = Population size of present census.

N = Number of years between the two census.

Demographic study is done through **census**. **Census** is the complete count of individuals in an area and is done after every 10 years. It also includes collecting of informations like age and sex of the individuals, marital status, literacy, mother tongue, religion, race, occupation, etc. **First official census of Indian population was of 1891-1901 A.D**, while latest census was of 2001-2011 period.

Another important indicator of rate of human population growth is the **doubling time**. It is represented as the time required for a population to double itself. There is an inverse relationship between the rate of population growth and doubling time. Demographical studies have shown that human population doubled from 0.6 billion in 1700 A.D. to 1.2 billion in 1850 A.D. i.e., in about 150 years but during the next 150 years (i.e. between 1850 to 2000 A.D.), it increased from 1.2 to 6.1 billion so there is about 5-fold increase and doubling time for human population is about 30 years.

FACTORS DETERMINING GROWTH RATE

1. **Birth rate (Natality rate)**. Explained in Chapter 13.
2. **Total Fertility Rate (TFR)**. **Fertility** is the ability of the reproductively active individuals to produce the babies, while TFR is the average number of children which an average couple has or would have during their life time. According to report of Registrar General of India in July 1997, then TFR was 3.5 which has declined to 3.1 according to NCP report of April 2001. **According to 2011 census, National TFR is 2.68.**
3. **Replacement rate**. It is the number of children a couple must produce to replace themselves so that

there is **zero growth rate**. Average replacement rate is estimated to be 2.1 because some children will die before their sexual maturity. But the present TFR of 2.68 indicates no sign of stabilization in the near future.

4. Death rate or Mortality rate. Explained in chapter 13.

5. Number of female individuals in active reproductive age (usually between 15-44 years).

6. Emigration and Immigration Explained in chapter 13.

Both immigration and emigration bring about redistribution of population. Main reasons for migration are : to locate food or shelter, or to escape from competition from overcrowding.

LIMIT ON HUMAN POPULATION GROWTH

Human population growth is supported by life-supporting capacity of the environment which, in turn, is formed of productive systems and protective systems. Life-supporting capacity of environment has been increased many-fold by advancements made in science and technology like mechanization of agriculture; use of disease free, hybrid and high-yielding varieties of seeds; and use of fertilizers and pesticides; etc. But there is a limit on increase in life-supporting capacity of the environment. However, the exponential growth of human population will be accompanied with very fast increase in utilization of resources and generation of wastes which may cause environmental degradation. This will decrease the life-supporting capacity and limit the population growth.

POPULATION IN DEVELOPED V/s DEVELOPING COUNTRIES

On the basis of **population growth rate and per capita income**, countries are divided into **two categories**:

A. Developed countries. In these, there is low rate of population growth, better living facilities and high per capita income. These constitute about one-third of world's population and include USA, Russia, Canada, European nations, Australia and Japan.

CAUSES OF INCREASE IN HUMAN POPULATION

The major causes that have contributed towards increase in the human population are :

Decline in Death rate : Birth and death rates are two major factors that determine the population growth of a country. **The excess of births over deaths in a year per 1000 in the population is called the growth rate.** The birth rate, death rate and growth rate are called **vital rates** as a change in any of these affects population growth. Table 4.6 clearly shows that since the first census, a hundred years ago, the death rate has decreased considerably whereas the birth rate has not gone down considerably.

So it is decrease in death rate, maternal mortality rate (MMR) and infant mortality rate (IMR) as well as increase in longevity which are two primary factors for the increase in human population. The increase in birth rate has not led to the increase in population. The main reasons for rapid population growth are increased health facilities and better living

conditions. According to the 2011 census, the birth rate in India declined from 36 per 1,000 in 1981 to 30.5 in 1991 and then to 26 in 2001 and finally to 22.22 in 2011 while the **death rate** declined from 13.8 per 1,000 in 1981 to 9.4 in 1991 and then to 8 in 2001 and finally to 6.4 in 2011.

Various factors contributing to the decrease in death rate are :

(a) Control of Diseases. The advances made in the field of medicine and surgery have greatly controlled diseases and have protected man from unnatural death. Several bacterial and viral diseases can be treated by **antibiotics**.

(b) Decrease in Infant mortality. Due to better public health care, more and more people survive upto reproductive age. These measures also caused decline in infant mortality rate. Infant mortality rate (IMR) and maternal mortality rate (MMR) was 89 in M.P., 86 in U.P., 85 in Rajasthan while it was only 15 in Kerala. National average of IMR is 72 per 1000.

(c) **Better sanitation and Community health schemes.** These have increased average lifespan. According to 2011 census, life expectancy of an Indian is 69.89 years.

(d) **Improvement in Agriculture.** It included mechanization of agriculture; use of disease free, hybrid and high yielding varieties of seeds; and use of fertilizers and pesticides etc. These have tremendously increased food production and availability. This has guaranteed adequate food for all.

(e) **Better means of transport.** These have declined the number of deaths due to starvation and famines.

(f) **Better storage conditions.** These include warehouses etc., which have enabled the availability of food at all the times.

Not only these, there are many other socio-economic reasons (*e.g.*, signs of national strength, religious and economic beliefs, signs of security in old age, early marriages, more earning hands in family etc., that have led to an increase in the human population. A substantial number of Indian men, irrespective of their religion or community practise polygamy.

CONSEQUENCES OF OVERPOPULATION

Uncontrolled growth of population decreases the growth of any country and also causes many socio-economic disturbances. Overpopulation leads to a number of not only national but also individual's family problems. When the numbers increase, avenues decrease and the number of drop outs, unemployed and undernourished increase every day. Per capita income, availability of natural resources and basic necessities of life are adversely affected. Some of them are listed below:

1. **Space.** To accommodate increasing population, new cities and towns are developed at the cost of agriculture, forests etc. Deforestation in turn causes problems like soil erosion, floods etc.

2. **Food supply.** Due to rapid population growth but slower food increase, the people are not able to get balanced diet and suffer from malnutrition. So people become weak, anaemic, mentally retarded and less-fit members of society.

3. **Unemployment.** More people but less employment facilities lead to increasing unemployment which breeds frustration and agitations in unemployed youth.

4. **Education.** Overpopulation leads to rush in educational institutions which lowers educational standard, impairs teacher-taught relationship and increased dropouts.

5. Hygienic condition. More people in a small area breed unhygienic conditions which have ill-effects on human health.

6. Pollution. Overpopulation leads to increased industrialization and increased use of automobiles which cause environmental pollution.

7. Price-rise. Overpopulation causes deficiency of basic needs of life so causing hike in their prices.

8. Energy crisis. Population explosion accompanied with rapid industrialization and urbanization has led to greater demand for already deficient energy (fuel wood, fossil fuels and electricity).

9. Eco-degradation. Overpopulation leads to eco-degradation by : increasing air, water, soil and noise pollution; unhygienic conditions; deforestation leading to floods and soil erosion.

So rapid human population growth is creating increased pressure on the infrastructure, economy, environment, availability of primary health care and nutrition.

METHODS TO CONTROL OVERPOPULATION

1. Education. People, particularly those in reproductive age group, should be educated about the advantages of a small family and ill-effects of large families and overpopulation. In this, mass media like radio, television, newspapers, magazines, posters etc. and educational institutions can play important role. Government should provide free and compulsory primary education to the children below the age of 14 years. In China, there is a legislation making "basic primary education free, compulsory and universal."

2. Age of marriage should be raised. Demographers explain that postponement of female marriage age from 18 years to 20 or 22 years would bring down the birth rate by 20 to 30 per cent. Even a year's postponement in each age group will decrease total fertility rate much less than the present 2.68 per cent for the country. But according to an ICMR report, about 49 per cent women in India are married before the legal age of 18 years.

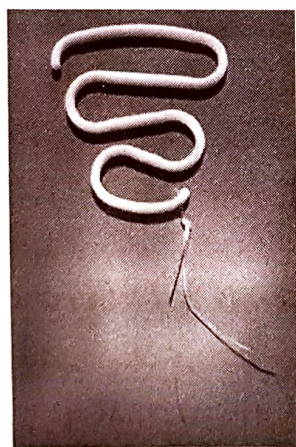
3. Family planning methods. India was the first country to adopt family planning (in 1951) as the government sponsored programme. But after the efforts of Indian government for about 50 years, birth rate in India has come down only slightly (only from 41.7 in 1951 to 28.3 in 1997 per 1,000 per year). This showed that voluntary family planning programme was not very successful.

Methods of Birth Control

These can be grouped under six headings: (i) Natural Methods, (ii) Barrier Methods, (iii) Intra Uterine Devices, (iv) Oral Contraceptives, (v) Injectables and Implants (vi) Surgical Methods.

- (i) *Natural Methods*: The principle behind these methods is to avoid chances of meeting of the sperm and the ovum. It can be done in the following ways:
 - (a) *Periodic Abstinence*: Couples abstain from coitus from day 10 to 17 of the menstrual cycle, when ovulation is expected.
 - (b) *Coitus Interruptus*: Withdrawal of penis from the vagina before ejaculation.

- (c) *Lactational Amenorrhoea*: Absence of menstrual cycle during the period of intense lactation after birth. This is, however, effective only for a period of 6 months.
- (ii) *Barrier Methods*: The principle behind these methods is to prevent the sperm and ovum coming closer by means of barriers. These barriers are available for both males and females.
- (a) *Condoms*: Barriers made up of latex or rubber sheath to cover penis in male or vagina/cervix in females. They also prevent sexually transmitted diseases, e.g., Nirodh.
- (b) *Diaphragms, Cervical Caps and Vaults*: These are made of rubber and inserted in the female genital tract to cover cervix during coitus.
- (c) *Chemical Barriers*: Include spermicidal creams, jellies and foams which are used with other contraception measures to increase contraceptive efficiency.
- (iii) *Intra Uterine Devices (IUDs)*
- These are devices which are inserted into the uterus of the female.
 - There are the following types of IUDs:
 - (a) Non-medicated IUDs, e.g., Lippes Loop.
 - (b) Copper-releasing IUDs e.g., Cu-T, Cu-7, Multiload 375.



(a) Lippes Loop



(b) Cu-T

Fig. 4.1: Intra uterine devices

- (c) *Hormone-releasing IUDs*, e.g., Progestasert, LNG 20. All these devices prevent contraception in the following ways:
- By increasing phagocytosis of sperms in the uterus.
 - By suppressing sperm motility and hence fertilising capacity (this is done by the Cu^{2+} ions).
 - By making uterus unsuitable for implantation.
 - By making cervix hostile to sperms.

(iv) *Oral Contraceptives*

- These are pills of hormonal preparations to be taken orally.
- These pills are either progestogens or progestogen-estrogen combinations.
- These pills inhibit ovulation and implantation. They also modify the quality of cervical mucus to prevent/retard entry of sperms.

- ‘**Saheli**’ is a modern, once a week oral pill that contains a non-steroidal principle called **centchroman**.
- Oral contraceptives should be taken daily for a period of 21 days starting within the first five days of the menstrual cycle.

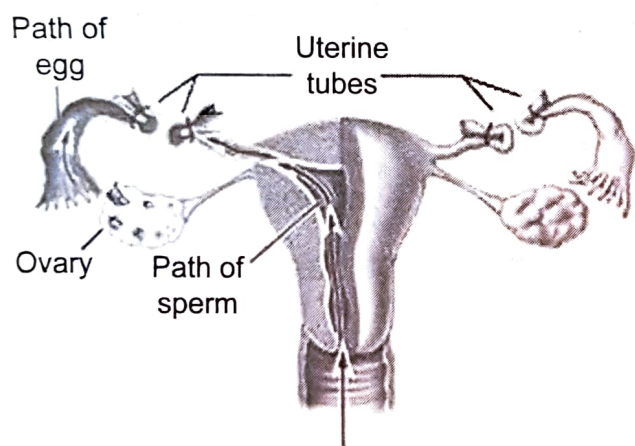
(v) *Injectables and Implants.*

- Progestogens or progestogen–estrogen combinations are also used as injections or implants under the skin.
- Although their action is similar to oral contraceptives, they are effective for a longer period.

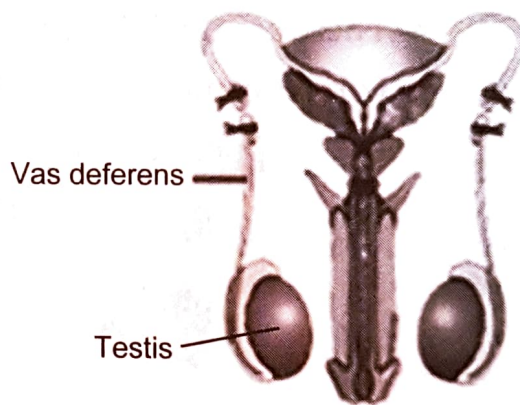
(vi) *Surgical Methods.* These are the terminal methods to prevent pregnancy. These block the transport of gametes and thus, prevent pregnancy. These are of two types:

(a) *Tubectomy*– cutting and ligating fallopian tubes in females.

(b) *Vasectomy*– cutting and ligating vas deferens in males.



(a) Tubectomy



(b) Vasectomy

Fig. 4.2: *Surgical methods of Birth control*

Medical Termination of Pregnancy (MTP)

- Medical termination of pregnancy involves intentional or voluntary termination of pregnancy before full term.
- It has been legalised by the Indian Government in 1971 with conditions to avoid misuse like female foeticide.
- It is essential where pregnancy can be harmful to the mother or the foetus.
- MTP is safe only up to 12 weeks of pregnancy, *i.e.*, the first trimester.

3. Infertility

- The inability to produce children in spite of unprotected sexual cohabitation for at least two years is called **infertility**.
- Causes of Infertility in Women:
 - damaged fallopian tubes,
 - ovulatory problems,
 - endometriosis,
 - age—fertility declines with age,
 - polycystic ovary,

- medical conditions like diabetes, epilepsy, thyroid and bowel disease,
- lifestyle factors like stress, being overweight or underweight and smoking.

- *Causes of Infertility in Men:*

- low sperm count,
- blocked tubes that carry sperms,
- having undergone certain treatments, e.g., drugs or radiotherapy or certain surgery,
- genetic problem,
- diabetes,
- advancing age.

- Reasons for infertility could be physical, congenital diseases, use of certain drugs, immunological reactions or even psychological.

- Specialised health care units (infertility clinics) can diagnose the problem and provide corrective treatments.

- Where corrective treatment is not possible, there are special techniques called **Assisted Reproductive Technologies (ART)** to produce children.

- Some examples of ART are:

- (i) *Test Tube Baby Programme*

- Ova from the wife or a donor female and sperms from the husband or donor are allowed to fuse under simulated conditions (similar to body). This is called **in vitro fertilisation (IVF)**.
 - The zygote or early embryo is transferred into the uterus or fallopian tube for development—embryo transfer (ET).

Embryo transfer can be done in two ways:

- (a) ZIFT or Zygote Intrafallopian Transfer—Embryo up to 8 blastomeres is transferred into the fallopian tube.
 - (b) IUT or Intrauterine Transfer—Embryo with more than 8 blastomeres are transferred into the uterus.

- (ii) *Gamete Intrafallopian Transfer (GIFT)*: Transfer of ovum from a donor female into another female who cannot produce ova but can provide suitable conditions for the fertilisation and development of foetus till parturition.

- (iii) *Intracytoplasmic Sperm Injection (ICSI)*: Sperm is directly inserted into the ovum to form an embryo in the laboratory and then the embryo is transferred to the uterus of the female.

- (iv) *Artificial Insemination*

- Semen is collected from husband or a healthy donor and artificially introduced into the vagina or uterus.
 - This method is used when the male partner cannot inseminate the female due to low sperm count.

. Amniocentesis

- It is a prenatal diagnostic technique in which a sample of amniotic fluid from the womb of a pregnant woman is taken during the early stages of foetal development and the cells are cultured and analysed.
- Chromosomal abnormalities like Down's syndrome, Klinefelter's Syndrome, sex of the foetus and developmental disorders, whether the growth of foetus is normal, can be detected by this method.
- However, it has been misused for destroying the female foetus.

. Sexually Transmitted Diseases (STDs)

- Diseases or infections transmitted through sexual intercourse are called **sexually transmitted diseases** or **STDs**.

Table 4.1: STDs and their Causative Agents

<i>Disease</i>	<i>Causative Agent</i>
1. Syphilis	<i>Treponema pallidum</i>
2. Gonorrhoea	<i>Neisseria gonorrhoeae</i>
3. Chlamydiasis	<i>Chlamydia trachomatis</i>
4. Trichomoniasis	<i>Trichomonas vaginalis</i>
5. AIDS	Human immunodeficiency virus (HIV)
6. Hepatitis-B	Hepatitis virus
7. Genital herpes	Herpes simplex virus, human papilloma virus
8. Genital warts	Human papilloma virus

- Of all these, the last four infections cannot be cured while others are curable.
- Early symptoms in the genital region are:
 - itching
 - fluid discharge
 - slight pain
 - swelling.
- The infected persons refrain from seeking help because of the following reasons:
 - Absence or less significant symptoms in the early stages of infection.
 - Social stigmas attached to STDs.

Prevention of STDs

- Avoid multiple sexual partners.
- Use condoms.
- Avoid sharing towels or underclothes.
- Wash before and after intercourse.
- Avoid sex with anyone who has genital sores, rash, discharge or other symptoms.

Table 4.8. Summary of Sexually Transmitted Diseases.

Disease	Cause	Symptoms	Effects on foetus	Treatment	Complications
1. Acquired Immuno Deficiency Syndrome (AIDS)	Human immunodeficiency virus (HIV)	Fever, weakness, infections, cancer	Exposure to AIDS virus and other infections.	Drugs to treat or delay symptoms; no cure	Dementia and death
2. Chlamydiasis	<i>Chlamydia</i> bacteria	Painful urination and intercourse, mucus discharge from penis or vagina	Premature birth, blindness, pneumonia	Antibiotics	Pelvic inflammatory disease, infertility, arthritis, ectopic pregnancy.
3. Genital herpes	Herpes simplex virus type I or II	Genital sores, fever	Brain damage, still birth	Antiviral drug (acyclovir)	Increased risk of cervical cancer.
4. Genital warts	Human papilloma virus	Warts on genitals	Not known	Chemical or surgical removal	Increased risk of cervical cancer.
5. Gonorrhoea	<i>Neisseria gonorrhoea</i> bacteria	In women, usually none; in men, painful urination.	Blindness, stillbirth	Antibiotics	Arthritis, rash, infertility, pelvic inflammatory disease
6. Syphilis	<i>Treponema pallidum</i> bacteria	Initial chancres sore usually on genitals or mouth; rash 6 months later; several years with no symptoms as infection spreads; finally damage to heart, liver, nerves, brain, etc.	Miscarriage, prematurity, birth defects, still birth	Antibiotics	Death.
7. Hepatitis B	Hepatitis B virus	Fatigue, persistent low grade, fever jaundice (yellowing skin), rash, abdominal pain	Low birth weight	Rest, alpha interferon	Cirrhosis, liver cancer

1. How can zero population growth be achieved?
2. Write a short note on test tube baby.
3. What do you understand by population explosion and how is it controlled?
4. What is amniocentesis? Give its significance.
5. What are STDs? Describe the mode of transmission of STDs. How they can be prevented?
6. Define contraception. Explain two methods of it in brief.
7. Write down the significance of Amniocentesis.
8. Write a short note on MTP (Medical termination of pregnancy).
9. What are the measures to safeguard yourself from contracting STDs?
10. Suggest some methods to assist infertile couples to have children.
11. Amniocentesis for sex determination is banned in our country. Is this ban necessary?
12. Explain the concept of amniocentesis.
13. What is STD? Write the preventive measures of STDs.
14. Explain mechanical methods of birth control.
15. Give positive and negative aspects of amniocentesis.
16. Write a short note on Sexually Transmitted Diseases.
17. Write a note on *In-vitro* fertilization.
18. Define amniocentesis. Give its advantages & disadvantages.
19. Name three sexually transmitted diseases of man.