

## Chapter –2

# REPRODUCTIVE HEALTH

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According to the World Health Organisation (WHO), reproductive health means a total well-being in all aspects of reproduction, i.e., physical, emotional, behavioural and social. 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.

Improved programmes such as ‘Reproductive and Child Health Care (RCH) programmes’ are currently in operation. These programmes help in spread of proper information about reproductive organs, adolescence and related changes, safe and hygienic sexual practices, sexually transmitted diseases (STD), AIDS, etc., would help people, especially those in the adolescent age group to lead a reproductively healthy life.

## HUMAN POPULATION

### Terminology

- **Demography** – Study of population.
- **Population Size** – The number of individuals living in the given area in a particular time is called population of that area.
- **Population density** - It is the number of individuals present per unit area at a given time.

$D = \frac{N}{S}$ , where D is density; N is number, S is space (area). Space is indicated in two dimensions ( $m^2$ ) for

land organism and in three dimensions ( $m^3$ ) for aquatic and aerial organisms.

- **Natality or Birth rate** – Number of birth per 1000 per year.
- **Mortality or Death rate** – number of death per 1000 per annum.
- **Sex ratio** – It is defined as “the number of females per 1000 males”. The sex ratio is decreasing day by day. Kerala has the highest sex ratio whereas Haryana has the lowest sex ratio.
- **Age ratio** – Three age groups can be recognized in a population :
  - Pre reproductive : Individuals below 18 years of age.
  - Reproductive : Individuals in the age group of 19-45 years.
  - Post – reproductive : Individuals after the age of 45 years.

The ratio of different age groups can give an idea of trend in human population. In increasing population young individuals are more, stable population has even distribution of three age groups and in declining population, old individuals are more.

- **Biotic potential** - The physiological capacity to produce offspring is known as **biotic potential** or **reproductive potential**.
- **Environmental resistance** - All offsprings of an organism do not survive. They die due to disease, paucity of food or predation etc. Such factors which check the population size are called environmental resistance.
- **Carrying capacity** - It is the maximum number of individuals which environment can support or sustain is called carrying capacity and its represented by symbol ‘k’

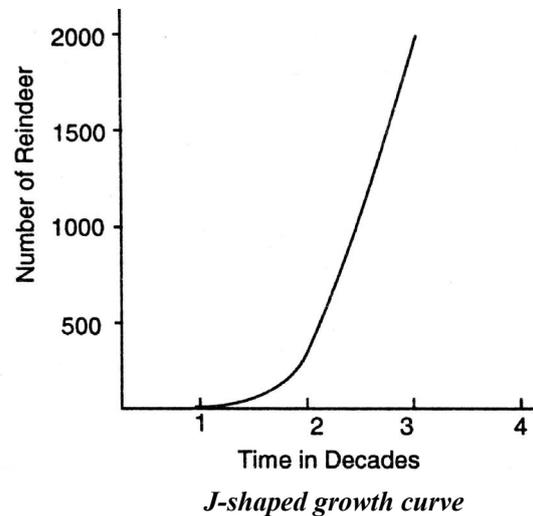
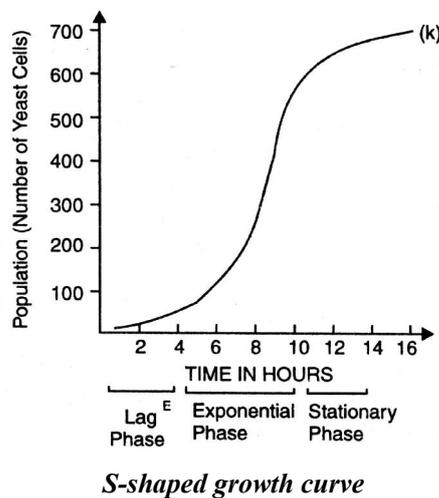
### Population Growth

- Population growth is determined by the number of individuals added to the population either through birth or through immigration minus the number of individual lost by death or emigration.
  - When the number of individuals added is equal to the number of individuals lost, the population remains constant or shows zero growth of population.
  - Malthus (1798) in his *Essay on population* stated that the “population if unchecked increases in geometric ratio while the food resources increase in arithmetic ratio. Therefore, after a certain limit, there is acute shortage of food and death occurs due to starvation and malnutrition.
  - According to the 2001 census report, the population growth rate was still around 1.7 percent, i.e., 17/1000/year, a rate at which our population could double in 33 years. This time is called **doubling time**.
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## Population Growth Curve – Two types

### *S-shaped or sigmoid growth curve*

- In the sigmoid form of growth, the population under favourable conditions initially increases slowly, then multiplies or reproduces rapidly and finally slows down gradually due to carrying capacity which provides environmental resistance.
- This type of growth pattern is shown in the **yeast cells** grown in laboratory conditions.



### *J-shaped growth curve*

- This type of curve was shown by small population of **reindeer** experimentally reared in natural environment where there were no predators and sufficient food was provided to maintain themselves.
- Rapid multiplication continued as long as enough food was available. In the absence of environmental resistance, the population increased above saturation level and food supply gets exhausted. This led to mass starvation and death. This caused extinction of species or **crash phase** of the population.

## Population Explosion

- The world population which was around 2 billion (2000 million) in 1900 rocketed to about 6 billions by 2000. A similar trend was observed in India too. Our population which was approximately 350 million at the time of our independence reached close to the billion mark by 2000 and crossed 1 billion in May 2000. That means, every sixth person in the world is an Indian.

### Causes of population explosion

- The chief cause for population explosion had been a rapid decline in death rate, **maternal mortality rate** (MMR) and **infant mortality rate** (IMR) as well as an increase in number of people in reproductive age. Other causes includes
- Advances in science and technology has improved the production of food drastically hence there is adequate food for all.
- Natural calamities like flood, storm, cyclones, tornadoes, earthquakes, etc. kill thousands of people every year but due to large birth rate the same number is replaced in a short time. For example, 50,000 people were killed in Bangladesh cyclone but because of 3.3% birth rate, this number was replaced within 40 days.

### Check to population explosion – these include

***Non-family planning methods***

- **Marriage age** - Raising of marriageable age of the female to 18 years and that of males to 21 years.
- **Education**- Once the education level in the society is raised, people will be able to understand the consequences of the population explosion. Scientific temperament is essential to be developed towards the means and goals of life. Attitude of people needs be changed. Kerala state has 100% literacy and lowest population growth. Mass media, voluntary organisations, government agencies and the educated people in the society could play their role in motivating the people.
- **Industrialization** - In more developed or industrialized places the population growth is less.

***Family planning methods (Birth Control Methods)***

- Birth control, also called contraception, is any method used to prevent pregnancy. Most women can become pregnant from the age when they start their menstrual periods until their late 40s or early 50s. During the many years before menopause, using birth control is key to avoiding an unplanned pregnancy. The different measures to birth control are :

<b>Method</b>	<b>How it prevents pregnancy</b>
<b>Hormonal</b>	<ul style="list-style-type: none"> <li>▪ Prevents ovulation</li> <li>▪ Thickens mucus at the cervix so sperm cannot pass through</li> <li>▪ Changes the environment of the uterus and fallopian tubes to prevent fertilization and implantation, should fertilization occur.</li> </ul>
<b>Intrauterine device (IUD)</b>	<ul style="list-style-type: none"> <li>▪ The progestin released by the levonorgestrel (LNG) IUD prevents fertilization by making the mucus in the cervix thick and sticky, so sperm can't get through to the uterus. The progestin and IUD change the uterine lining; preventing implantation in the rare case that fertilization occurs.</li> <li>▪ The copper in the copper IUD is toxic to sperm. It causes changes in the uterus and fallopian tubes that kill sperm. The IUD changes the uterine lining, which prevents implantation in the rare case that fertilization occurs.</li> </ul>
<b>Barrier methods</b>	<ul style="list-style-type: none"> <li>▪ Block sperm from reaching the egg.</li> <li>▪ Some are used with spermicides, which kill sperm.</li> </ul>
<b>Fertility awareness (natural family planning)</b>	<ul style="list-style-type: none"> <li>▪ Identifies the time during a woman's cycle when she is most likely to become pregnant (fertile). An additional method or abstinence should be used during this time of fertility.</li> </ul>
<b>Permanent birth control (sterilization)</b>	<ul style="list-style-type: none"> <li>▪ Men: Vasectomy blocks the release of sperm.</li> <li>▪ Women: Tubal ligation surgery or tubal implants block the movement of an egg through the fallopian tube, preventing fertilization.</li> </ul>

***Hormonal methods***

- Hormonal methods are very reliable means of birth control. Hormonal methods use two basic formulas:
  - Progestin-only hormonal methods include pills, also called "mini-pills," and injections (Depo-Provera).
  - Combination hormonal methods contain both estrogen and progestin (synthetic progesterone). Combination methods include pills ("the Pill"), skin patches, and rings.
- Combination pills may reduce acne, pain during ovulation, and premenstrual symptoms. Both types of pill reduce heavy bleeding and cramping. Unlike the combination pill, the progestin-only pill can be

taken by almost all women, including those who are breast-feeding, although it must be taken at the *same time each day* to be effective. (Combination pills are also taken daily but without as much attention to time of day.)

- Patches or vaginal rings are similar to combination pills, but they don't require taking a daily pill. The patch is changed weekly, and the ring is changed monthly (with 1 off-week after 3 weeks of use).
- '*Saheli*' – A new oral contraceptive for the females contains a non-steroidal preparation. It is a 'once a week' pill with very few side effects and high contraceptive value. It was developed by scientists at Central Drug Research Institute (CDRI) in Lucknow, India?
- Administration of progestogens or progestogen-estrogen combinations or IUDs within 72 hours of coitus have been found to be very effective as emergency contraceptives.

#### ***Intrauterine Device (IUD)***

- An intrauterine device (IUD) is a small device that is placed in the uterus to prevent pregnancy. IUDs are wrapped with copper (Copper T 380-A, CuT, Cu7, Multiload 375) or contain a hormone (the Mirena IUD releases a progestin called levonorgestrel (LNG-20), Progestasert etc.). Once an IUD is in place, it can provide birth control for 5 to 10 years, depending on the type. These are small, safe, and highly effective.
- IUDs increase phagocytosis of sperms within the uterus and the Cu ions released suppress sperm motility and the fertilising capacity of sperms. The hormone releasing IUDs, in addition, make the uterus unsuitable for implantation and the cervix hostile to the sperms.
- If a sexually transmitted disease is present at the time the IUD is inserted, the infection can be carried into the uterus. This can lead to pelvic inflammatory disease (PID), which can lead to infertility.

#### ***Barrier Methods***

- Barrier methods (including the diaphragm; cervical cap; Vaults; Lea's Shield; male condom ("Nirodh"); female condom; and spermicidal foam, sponge, gel, suppository, or film) prevent sperm from entering the uterus and reaching the egg. Barrier methods are effective, reusable and generally have fewer side effects than hormonal methods or IUDs. Spermicides and condoms should be used together or along with another method to increase their effectiveness.
- Male or female condoms are the only birth control methods that protect against sexually transmitted diseases (STDs), including infection with the human immunodeficiency virus (HIV).

#### ***Fertility Awareness (Periodic Abstinence or Natural Family Planning)***

- Fertility awareness requires that a couple charts the time (day 10 to 17 of the menstrual cycle when ovulation could be expected *i.e.* a high probability of fertilization hence called *fertile period*) during a woman's menstrual cycle when she is most likely to become pregnant and avoid/abstain intercourse or use a barrier method during that time.
- **Withdrawal or coitus interruptus** is another method in which the male partner withdraws his penis from the vagina just before ejaculation so as to avoid insemination.
- Breast-feeding can be an effective means of birth control in the first 6 months after giving birth, if you follow specific guidelines, such as breast-feeding your baby every feeding. This is called the ***lactational amenorrhea method (LAM)*** *i.e.* absence of menstruation. During the period ovulation does not take place.

#### ***Permanent Birth Control (Sterilization)***

- ***Sterilization*** is a surgical procedure done for men or women who decide that they do not want to have any (or more) children. Sterilization is one of the most effective forms of birth control.
- **Tubectomy** - It is the surgical cutting of the fallopian tubes. The oogenesis and ovulation continues but sperm and ovum are not able to meet with each other.

- **Tubal ligation or implants** - Tubal ligation is a surgical procedure where the fallopian tubes, which carry the eggs from the ovaries to the uterus, are tied, cut, or blocked. A new non-surgical sterilization technique uses a small metal coil, or tubal implant, inserted up into each fallopian tube. Over time, scar tissue grows around each tubal implant, permanently blocking the tubes. Most women are able to return home within a couple of hours after either procedure. However, tubal implants can require a repeat procedure.
- **Vasectomy** - In this minor surgery, the vas deferens, the tube that carries sperm from the testicles to the seminal fluid (semen), are cut and blocked so that the semen no longer contains sperm. This does not interfere with a man's ability to have an erection or enjoy sex.
- Female sterilization is more complicated, has higher risks of problems after surgery, and is more expensive than male sterilization.

*There have been many new developments in birth control in the past 10 years.*

- The hormone skin patch, shot, or vaginal ring is helpful for women who sometimes forget to take a daily pill.
- A new birth control pill called **Seasonale** is taken for 84 days rather than the normal 21 days. When taking Seasonale, you have only 4 menstrual periods each year.
- A new IUD called **Mirena** releases a hormone into the uterus. This not only prevents pregnancy but also relieves menstrual cramping and bleeding after a few months of use.
- Low-dose hormonal birth control limits or does away with side effects of the older, higher-dose pill. With a low dose, you are less likely to have nausea, breast tenderness, bloating, and weight gain.

#### **MEDICAL TERMINATION OF PREGNANCY (MTP)**

- Intentional or voluntary termination of pregnancy before full term is called **medical termination of pregnancy (MTP)** or **induced abortion**. It is used to get rid of unwanted pregnancies caused due to casual unprotected intercourse, failure of the contraceptive used, or harmful, fatal or ectopic pregnancies.
- MTPs are considered relatively safe during the first trimester, *i.e.*, upto 12 weeks of pregnancy.
- Government of India legalised MTP in 1971 with some strict conditions to avoid its misuse such as illegal female Foeticides.

#### **SEXUALLY TRANSMITTED DISEASES (STDs)**

- Diseases or infections which are transmitted through sexual contact, vaginal intercourse, oral sex, or anal sex are collectively called *sexually transmitted diseases (STD)* or *venereal diseases (VD)* or *reproductive tract infections (RTI)*. Some of the STIs (*sexually transmitted infections*) can be transmitted through birth, IV needles, or breastfeeding
- These include Gonorrhoea, syphilis, genital herpes, chlamydia, genital warts, trichomoniasis, hepatitis-B, AIDS etc.

S. No.	STD	Causal agent	Detection techniques
1.	Syphilis	<i>Trepanoma pallidum</i>	Clinical, culture
2.	Gonorrhoea	<i>Neisseria gonorrhoeae</i>	Gram-staining of discharge, culture
3.	Trichomoniasis	<i>Trichomonas vaginalis</i>	Microscopic examination, culture.
4.	Genital herpes	<i>Herpes simplex virus</i>	Clinical, antigen test, PCR
5.	Genital warts	<i>Human papiloma virus</i>	Clinical, antibody detection, culture, DNA hybridization
6.	Chlamydia	<i>Chlamydia trachomatis</i>	Clinical, Gram-staining of discharge, antigen detection, nucleic acid hybridization
7.	Chancroid	<i>Haemophilus ducret</i>	Clinical, culture
8.	Hepatitis – B	<i>Virus</i>	
9.	AIDS	<i>HIV virus</i>	

- Except for hepatitis-B, genital herpes and HIV infections, other diseases are completely curable if detected early and treated properly.
- Early symptoms include itching, fluid discharge, slight pain, swellings, etc., in the genital region. If not timely detected and properly treated, it may lead to complications later, which include pelvic inflammatory diseases (PID), abortions, still births, ectopic pregnancies, infertility or even cancer of the reproductive tract.
- Though all persons are vulnerable to these infections, their incidences are reported to be very high among persons in the age group of 15-24 years – the age group to which you also belong.
- Prevention includes
  - Avoid sex with unknown partners/multiple partners.
  - Always use condoms during coitus.
  - In case of doubt, go to a qualified doctor for early detection and get complete treatment if diagnosed with disease.

## INFERTILITY

- Inability to conceive or produce children even after 2 years of unprotected sexual co-habitation is called **infertility**. The reasons for this could be many—physical, congenital, diseases, drugs, immunological or even psychological.
- Various methods are now available to help such couples. Such methods are commonly known as **assisted reproductive technologies** (ART). Some of these are:
  - **IVF-ET (In vitro fertilization and embryo transfer)** - Fertilisation outside the body in almost similar conditions as that in the body followed by **embryo transfer** (ET). It is popularly known as **test tube baby** programme. The first successful IVF-ET was performed by Dr. Steptoe and Dr. Edward.
  - **ZIFT (Zygote intra fallopian transfer)** – It include IVF and then zygote/early embryo (with upto 8 blastomeres) transfer into the fallopian tube.
  - **IUT (Intra uterine transfer)** - It include IVF and then embryo (with 32 or more blastomeres) transfer into the uterus its further development. Embryos formed by **in-vivo fertilisation** (fusion of gametes within the female) also could be used for such transfer to assist those females who cannot conceive.
  - **GIFT (Gamete intra fallopian transfer)** - Transfer of an ovum collected from a donor into the fallopian tube of another female who cannot produce one, but can provide suitable environment for fertilisation and further development.
  - **ICSI (Intra cytoplasmic sperm injection)** – In the technique a sperm is directly injected into the ovum.
  - **AI (artificial insemination)** – In this technique, the semen collected either from the husband or a healthy donor is artificially introduced either into the vagina or into the uterus (IUI – **intra-uterine insemination**) of the female. It is helpful in the cases where the male partner is unable to inseminate the female or is with very low sperm counts in the ejaculates.