

1. Details of Module and its structure

Module Detail	
Subject Name	Biology
Course Name	Biology 03 (Class XII, Semester - 1)
Module Name/Title	Reproductive Health – Part 2
Module Id	lebo_10402
Pre-requisites	Knowledge about how organisms reproduce?
Objectives	After going through this module the learners will be able to understand about: <ul style="list-style-type: none">• Medical Termination of pregnancy (MTP)• Sexually Transmitted Diseases (STD)• Infertility• Summary
Keywords	Reproductive health, Test tube baby, Infertility, Reproductive diseases. Sexually transmitted diseases (STD), Medical termination of pregnancy (MTP)

2. Development Team

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1. 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 the medical way of getting rid of unwanted pregnancy. Any qualified gynecologist (MD/DGO) can perform MTP. Any MBBS Doctor, who has obtained training in MTP, is allowed to perform this procedure under “**The Medical Termination of Pregnancy Act, 1971**”. However, MTP should always be performed at a place recognized by government authorities.

Nearly 45 to 50 million MTPs are performed in a year all over the world which accounts to 1/5th of the total number of conceived pregnancies in a year.

**Medical abortions as a percentage
of all abortions**

Country	Percentage
Finland	96% in 2015 ^[38]
Sweden	91% in 2015 ^[37]
Norway	86% in 2015 ^[36]
Scotland	81% in 2015 ^[35]
Switzerland	70% in 2015 ^[34]
Denmark	63% in 2013 ^[32]
France	57% in 2015 ^[33]
England and Wales	55% in 2015 ^[31]
Iceland	55% in 2013 ^[32]
United States	30% in 2014 ^[30]
Germany	22% in 2015 ^[29]
Belgium	22% in 2011 ^[28]
Spain	19% in 2015 ^[27]
Netherlands	12% in 2008 ^[26]

source : https://en.wikipedia.org/wiki/Medical_abortion

Obviously, MTP has a significant role in decreasing the population though it is not meant for that purpose. Whether to accept / legalise MTP or not is being debated upon in many countries due to emotional, ethical, religious and social issues involved in it. Government of India legalised MTP in 1971 with some strict conditions to avoid its misuse. Such restrictions are all the more important to check indiscriminate and illegal female foeticides which are reported to be high in India.

According to the WHO (2006) *Frequently asked clinical questions about medical abortion*, regarding factors that should be taken into account when counselling a woman about her choice between medical and surgical abortion:

There is little, if any, difference between medical and surgical abortion in terms of safety and efficacy. Thus, both methods are similar from a medical point of view and there are only very few situations where a recommendation for one or the other method for medical reasons can be given.

Why MTP? Obviously the answer is—to get rid of unwanted pregnancies either due to casual unprotected intercourse or failure of the contraceptive used during coitus or rapes.

Medical abortion may be preferred:

- a) if it is the woman's preference;
- b) in very early gestation; up to 49 days of gestation, medical abortion is considered to be more effective than surgical abortion, especially when clinical practice does not include detailed inspection of aspirated tissue;
- c) if the woman is severely obese (body mass index greater than 30) but does not have other cardiovascular risk factors, as surgical treatment may be technically more difficult;
- d) if the woman has uterine malformations or a fibroid uterus, or has previously had cervical surgery (which may make surgical abortion technically more difficult);
- e) if the woman wants to avoid a surgical intervention.

Surgical abortion may be preferred:

- a) if it is the woman's preference, or if she requests concurrent sterilization;
- b) if she has contraindications to medical abortion;
- c) if time or geographical constraints preclude the follow-up needed to confirm that abortion is complete.

b. Side effects

According to Women on Web, a telemedicine support service for women around the world who are seeking medical abortions: If performed in the first 9 weeks, a medical abortion

carries a very small risk of complications. This risk is the same as when a woman has a miscarriage. A doctor can easily treat these problems.

MTPs are also essential in certain cases where continuation of the pregnancy could be harmful or even fatal either to the mother or to the foetus or both. MTPs are considered relatively safe during the first trimester, i.e., upto 12 weeks of pregnancy. Second trimester abortions are much more riskier. Some other possible complications of medical surgical abortion like:

- Haemorrhage
- Incomplete abortion
- Uterine or pelvic infection
- Ongoing intrauterine pregnancy, requiring a surgical abortion for completion
- Misdiagnosed/unrecognized ectopic pregnancy

Although medical abortion is associated with more bleeding than surgical abortion, overall bleeding for the two methods is minimal and not clinically different.

c. Contraindications

According to the 2006 WHO there are very few absolute contraindications to medical abortion. They include:

- previous allergic reaction to one of the drugs involved;
- inherited porphyria;
- chronic adrenal failure;
- known or suspected ectopic pregnancy.

Caution is required in a range of circumstances including:

- a) if the woman is on long-term corticosteroid therapy (including those with severe, uncontrolled asthma);
- b) if she has a hemorrhagic disorder;
- c) if she has severe anaemia;
- d) if she has pre-existing heart disease or cardiovascular risk factors (e.g. hypertension and smoking).

One disturbing trend observed is that a majority of the MTPs are performed illegally by unqualified quacks which are not only unsafe but could be fatal too. Another dangerous trend is the misuse of amniocentesis to determine the sex of the unborn child. Frequently, if the foetus is found to be female, it is followed by MTP- this is totally against what is legal. Such

practices should be avoided because these are dangerous both for the young mother and the foetus. Effective counselling on the need to avoid unprotected coitus and the risk factors involved in illegal abortions as well as providing more health care facilities could reverse the mentioned unhealthy trend.

2. Sexually Transmitted Diseases (STDs)

Diseases or infections which are transmitted through sexual intercourse are collectively called sexually transmitted diseases (STD) or venereal diseases (VD) or reproductive tract infections (RTI). Gonorrhoea, syphilis, genital herpes, chlamydiasis, genital warts, trichomoniasis, hepatitis-B and of course, the most discussed infection in the recent years, HIV leading to AIDS are some of the common STDs. Among these, HIV infection is most dangerous and is discussed in detail in Chapter 8.

Some of these infections like hepatitis-B and HIV can also be transmitted by sharing of injection needles, surgical instruments, etc., with infected persons, transfusion of blood, or from an infected mother to the foetus too. Except for hepatitis-B, genital herpes and HIV infections, other diseases are completely curable if detected early and treated properly. Early symptoms of most of these are minor and include itching, fluid discharge, slight pain, swellings, etc., in the genital region. Infected females may often be asymptomatic and hence, may remain undetected for long. Absence or less significant symptoms in the early stages of infection and the social stigma attached to the STDs, deter the infected persons from going for timely detection and proper treatment. This could lead to complications later, which include pelvic inflammatory diseases (PID), abortions, still births, ectopic pregnancies, infertility or even cancer of the reproductive tract. STDs are a major threat to a healthy society. Therefore, prevention or early detection and cure of these diseases are given prime consideration under the reproductive health-care programmes. 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. There is no reason to panic because prevention is possible. One could be free of these infections by following the simple principles given below:

- a. Avoid sex with unknown partners/multiple partners.
- b. Always use condoms during coitus.
- c. In case of doubt, one should go to a qualified doctor for early detection and get complete treatment if diagnosed with disease.
- d. Getting vaccinated early, before sexual exposure.
- e. Avoid sharing of towels or under clothing.

3. Infertility

A discussion on reproductive health is incomplete without a mention of infertility. A large number of couples all over the world including India are infertile, i.e., they are unable to produce children in spite of unprotected sexual co-habitation. The reasons for this could be many—physical, congenital, diseases, drugs, immunological or even psychological. In India, often the female is blamed for the couple being childless, but more often than not, the problem lies in the male partner. Specialised health care units (infertility clinics, etc.) could help in diagnosis and corrective treatment of some of these disorders and enable these couples to have children. However, where such corrections are not possible, the couples could be assisted to have children through certain special techniques commonly known as assisted reproductive technologies (ART).

The World Health Organization defines infertility as follow:

“Infertility is “a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse (and there is no other reason, such as breastfeeding or postpartum amenorrhoea). Primary infertility is infertility in a couple who have never had a child. Secondary infertility is failure to conceive following a previous pregnancy. Infertility may be caused by infection in the man or woman, but often there is no obvious underlying cause”.

3.1. Causes of Infertility

3.1.1. Sexually transmitted diseases

Infections with the following sexually transmitted pathogens have a negative effect on fertility: *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. There is a consistent association of *Mycoplasma genitalium* infection and female reproductive tract syndromes. *M. genitalium* infection is associated with increased risk of infertility.

3.1.2. Genetic

Genetic factors including aneuploidies and single-gene mutations are also contributed to the male infertility. DNA damage reduces fertility in female ovocytes, as caused by smoking.

3.1.3. General factors

Diabetes mellitus, thyroid disorders, undiagnosed and untreated coeliac disease, adrenal diseases.

3.2. Infertility in Females

The following causes of infertility may only be found in females. For a woman to conceive, certain things have to happen: vaginal intercourse must take place around the time when an

egg is released from her ovary; the system that produces eggs has to be working at optimum levels; and her hormones must be balanced.

For women, problems with fertilisation arise mainly from either structural problems in the Fallopian tube or uterus or problems releasing eggs. Infertility may be caused by blockage of the Fallopian tube due to malformations, infections such as chlamydia and/or scar tissue. For example, endometriosis can cause infertility with the growth of endometrial tissue in the Fallopian tubes and/or around the ovaries. Endometriosis is usually more common in women in their mid-twenties and older, especially when postponed childbirth has taken place.

Another major cause of infertility in women may be the inability to ovulate. Malformation of the eggs themselves may complicate conception. For example, polycystic ovarian syndrome (PCOB) is when the eggs only partially developed within the ovary and there is an excess of male hormones. Some women are infertile because their ovaries do not mature and release eggs. In this case synthetic FSH by injection or Clomid (Clomiphene citrate) via a pill can be given to stimulate follicles to mature in the ovaries.

Other factors that can affect a woman's chances of conceiving include being overweight or underweight, or her age as female fertility declines after the age of 30.

Sometimes it can be a combination of factors, and sometimes a clear cause is never established.

Common causes of infertility of females include:

- a) ovulation problems (e.g. polycystic ovarian syndrome, PCOS, the leading reason why women present to fertility clinics due to anovulatory infertility.)
- b) tubal blockage
- c) pelvic inflammatory disease caused by infections like tuberculosis
- d) age-related factors
- e) uterine problems
- f) previous tubal ligation
- g) endometriosis
- h) advanced maternal age

3.3. Infertility in Males

The main cause of male infertility is low semen quality. In men who have the necessary reproductive organs to procreate, infertility can be caused by low sperm count due to endocrine problems, drugs, radiation, or infection. There may be testicular malformations, hormone imbalance, or blockage of the man's duct system. Although many of these can be

treated through surgery or hormonal substitutions, some may be indefinite. Infertility associated with viable, but immotile sperm may be caused by primary ciliary dyskinesia.

3.4. Combined infertility

In some cases, both the man and woman may be infertile or sub-fertile, and the couple's infertility arises from the combination of these conditions. In other cases, the cause is suspected to be immunological or genetic; it may be that each partner is independently fertile but the couple cannot conceive together without assistance.

3.5. Unexplained infertility

In the US, up to 20% of infertile couples have unexplained infertility. In these cases abnormalities are likely to be present but not detected by current methods. Possible problems could be that the egg is not released at the optimum time for fertilization that it may not enter the fallopian tube, sperm may not be able to reach the egg, fertilization may fail to occur, transport of the zygote may be disturbed, or implantation fails. It is increasingly recognized that egg quality is of critical importance and women of advanced maternal age have eggs of reduced capacity for normal and successful fertilization. Also, polymorphisms in folate pathway genes could be one reason for fertility complications in some women with unexplained infertility. However, a growing body of evidence suggests that epigenetic modifications in sperm may be partially responsible.

3.6. Treatment

Treatment depends on the cause of infertility, but may include counselling, fertility treatments, which include in vitro fertilization. According to ESHRE recommendations, couples with an estimated live birth rate of 40% or higher per year are encouraged to continue aiming for a spontaneous pregnancy. Treatment methods for infertility may be grouped as medical or complementary and alternative treatments. Some methods may be used in concert with other methods. Drugs used for both women and men include clomiphene citrate, human menopausal gonadotropin (hMG), follicle-stimulating hormone (FSH), human chorionic gonadotropin (hCG), gonadotropin-releasing hormone (GnRH) analogues, aromatase inhibitors, and metformin.

3.7 Medical treatments

Medical treatment of infertility generally involves the use of fertility medication, medical device, surgery, or a combination of the following. If the sperm are of good quality and the mechanics of the woman's reproductive structures are good (patent fallopian tubes, no adhesions or scarring), a course of ovarian stimulating medication maybe used. The physician or WHNP may also suggest using a conception cap cervical cap, which the patient uses at

home by placing the sperm inside the cap and putting the conception device on the cervix, or intrauterine insemination (IUI), in which the doctor or WHNP introduces sperm into the uterus during ovulation, via a catheter. In these methods, fertilization occurs inside the body.

If conservative medical treatments fail to achieve a full term pregnancy, the physician or WHNP may suggest the patient undergo in vitro fertilization (IVF). IVF and related techniques (ICSI, ZIFT, GIFT) are called assisted reproductive technology (ART) techniques. ART techniques generally start with stimulating the ovaries to increase egg production. After stimulation, the physician surgically extracts one or more eggs from the ovary, and unites them with sperm in a laboratory setting, with the intent of producing one or more embryos. Fertilization takes place outside the body, and the fertilized egg is reinserted into the woman's reproductive tract, in a procedure called embryo transfer.

Other medical techniques are e.g. tuboplasty, assisted hatching, and Preimplantation genetic diagnosis.

3.8. Fertility Tourism

Fertility tourism is the practice of travelling to another country for fertility treatments. It may be regarded as a form of medical tourism. The main reasons for fertility tourism are legal regulation of the sought procedure in the home country, or lower price. In-vitro fertilization and donor insemination are major procedures involved.

In vitro fertilisation (IVF–fertilisation outside the body in almost similar conditions as that in the body) followed by embryo transfer (ET) is one of such methods. In this method, popularly known as test tube baby programme, ova from the wife/donor (female) and sperms from the husband/donor (male) are collected and are induced to form zygote under simulated conditions in the laboratory. The zygote or early embryos (with upto 8 blastomeres) could then be transferred into the fallopian tube (ZIFT–zygote intra fallopian transfer) and embryos with more than 8 blastomeres, into the uterus (IUT – intra uterine transfer), to complete 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.

Transfer of an ovum collected from a donor into the fallopian tube (GIFT – gamete intra fallopian transfer) of another female who cannot produce one, but can provide suitable environment for fertilisation and further development is another method attempted. Intra cytoplasmic sperm injection (ICSI) is another specialised procedure to form an embryo in the laboratory in which a sperm is directly injected into the ovum. Infertility cases either due to inability of the male partner to inseminate the female or due to very low sperm counts in the

ejaculates, could be corrected by artificial insemination (AI) technique. 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.

Though options are many, all these techniques require extremely high precision handling by specialised professionals and expensive instrumentation. Therefore, these facilities are presently available only in very few centres in the country. Obviously their benefits are affordable to only a limited number of people. Emotional, religious and social factors are also deterrents in the adoption of these methods. Since the ultimate aim of all these procedures is to have children, in India we have so many orphaned and destitute children, who would probably not survive till maturity, unless taken care of. Our laws permit legal adoption and it is as yet, one of the best methods for couples looking for parenthood.

4. Summary

Reproductive health refers to a total well-being in all aspects of reproduction, i.e., physical, emotional, behavioural and social. Our nation was the first nation in the world to initiate various action plans at national level towards attaining a reproductively healthy society.

Counselling and creating awareness among people about reproductive organs, adolescence and associated changes, safe and hygienic sexual practices, sexually transmitted diseases (STDs) including AIDS, etc., is the primary step towards reproductive health.

Providing medical facilities and care to the problems like menstrual irregularities, pregnancy related aspects, delivery, medical termination of pregnancy, STDs, birth control, infertility, post natal child and maternal management is another important aspect of the Reproductive and Child Health Care programmes.

An overall improvement in reproductive health has taken place in our country as indicated by reduced maternal and infant mortality rates, early detection and cure of STDs, assistance to infertile couples, etc. Improved health facilities and better living conditions promoted an explosive growth of population. Such a growth necessitated intense propagation of contraceptive methods. Various contraceptive options are available now such as natural, traditional, barrier, IUDs, pills, injectables, implants and surgical methods. Though contraceptives are not regular requirements for reproductive health, one is forced to use them to avoid pregnancy or to delay or space pregnancy. Medical termination of pregnancy is legalised in our country. MTP is generally performed to get rid of unwanted pregnancy due to rapes, casual relationship, etc., as also in cases when the continuation of pregnancy could be harmful or even fatal to either the mother, or the foetus or both. Diseases or infections

transmitted through sexual intercourse are called Sexually Transmitted Diseases (STDs). Pelvic Inflammatory

Diseases (PID), still birth, infertility are some of the complications of them. Early detection facilitate better cure of these diseases. Avoiding sexual intercourse with unknown/multiple partners, use of condoms during coitus are some of the simple precautions to avoid contracting STDs.

Inability to conceive or produce children even after 2 years of unprotected sexual cohabitation is called infertility. Various methods are now available to help such couples. *In Vitro* fertilisation followed by transfer of embryo into the female genital tract is one such method and is commonly known as the 'Test Tube Baby' Programme.