# UNIVERSITY OF MEDICAL SCIENCES, ONDO

## DEPARTMENT OF PHYSIOLOGY

# ENDOCRINOLOGY AND REPRODUCTION

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# OBJECTIVES

- Definition of fertility
- Fertility in male
- Fertility in female
- Definition of infertility
- Causes of infertility in male
- Causes of infertility in female

# FERTILITY

- Fertility is the ability to conceive a new human being. Or the capacity of both male and female to procreate. i.e. it is the transfer of life by the fusion of male and female reproductive cells.
- The male fertility is the ability to produce male gametes (sperms).
  - This is constant from puberty until death.
- The female fertility is the ability to produce female gametes (ova or eggs).
  - This is periodic, cyclical and disappears about the age of 55.
- It means that the fertility of couples, is periodic and is determined by the rhythm of the woman's fertility.
- Therefore, awareness of the sperm production mechanism in the male as well as the changes in a woman's body relating to her cycle of fertility is the basic knowledge which each mature person should know.

# FERTILITY IN MALE

- The male fertility is the ability to produce male gametes (sperms).
- Sperms contain the genetic material.
- They are produced in the seminiferous tubules of male testes, and mature in the epididymis.
- The production and maturation of sperm (spermatogenesis) is stimulated by hormones: follicle stimulating hormone (FSH), luteinizing hormone (LH) and testosterone and leads to the formation of sperm and seminal fluid (semen).
- Sperms are only about 5% of the semen and it is mildly alkaline (pH 7.2).
- At orgasm during coitus, the sperm is transferred from the epididymis to the vas deferens, then to the ejaculatory duct and urethra, and eventually it leaves the male body (ejaculation).

- The expelled sperm (ejaculate) is usually milky white, sometimes with a yellowish tinge.

- The amount of ejaculate ranges from about 2 to 6 ml and in the case of a healthy man, and it consists of at least 500 million sperms.

- The production of mature sperm ready for fertilization takes about 10 weeks.

# FERTILITY IN FEMALE

- Woman's fertility requires a number of complex cyclical processes leading to periodic production of a mature egg and preparing the environment for its fertilization, development and maintenance as a new human being.
- The female reproductive cell (egg or ovum), is released regularly in the mature woman's ovaries from adolescence to menopause (about the age of 55).
- Every woman at birth has the ovarian reserve i.e. a number of primary follicles with immature eggs.
- This reserve amounts to about 300 thousand follicles and steadily decreasing with age to less than one thousand before menopause.
- During the life of the woman, only about 400 eggs from her ovarian reserve become mature.
- The cyclical follicular growth process start at sexual maturity and lasts until the menopause.

- In this process, groups of primary follicles containing oocytes become the developing follicles.
- In each cycle one of them (and sometimes more than one) becomes dominant and then turns into a Graafian follicle which releases the egg into the fallopian tubes (ovulation).
- About 50 to 300 primary follicles begins to grow, but only one (in some cases more than one) becomes dominant after 10 weeks.
- The egg released during ovulation lives up to 12 hours (or 24 hours in the case of a multiple ovulation).
- The processes of follicular growth, eggs release and endometrial preparation for conception is associated with a woman's hormonal cycle.
- These processes is regulated by estrogens, progesterone, FSH and LH.

- Estrogens and FSH trigger the development of the follicles containing the eggs.
- LH maintains its levels until the egg is matured, and it is in that moment when it increases its levels, reaching a LH surge that triggers ovulation.
- Progesterone prepares the endometrial lining so that the embryo can implant if fertilization occurs.

# INFERTILITY

- Infertility is the inability of a person or a couple to reproduce by natural means.

- Or it is the inability to carry pregnancy to full term.

- The World Health Organisation defines infertility as a disease of the reproductive system whereby a couple fail to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.

# CAUSES OF INFERTILITY

Involuntary loss of fertility may result from the following:

- Failure of gamete production or abnormal development of gonads in utero due to:
  - Chromosomal defects.
  - Deleterious influence of external agents (teratogen) during pregnancy.
  - Hormonal defects, interfering with spermatogenesis or ovulation e.g. gonadotrophin deficiencies causing decreased production of testosterone and oestrogen.
  - Hyperprolactinaemia also inhibit gonadotrophin production preventing ovulation and spermatogenesis.
- Failure of gamete transport due to:
  - Mechanical blockage of fallopian tube caused by pelvic infections in case of STDs preventing fertilization.

- Inhibition of sperm motility by antibodies produced by either man (auto-antibodies in semen) or woman (female antisperm antibodies in cervical mucous).

➢Failure of implantation due to:

- Progesterone deficiency causing poor endometrial secretory phase or pathology of the uterus e.g. endometrial infection or abnormal endometrial proliferation (endometriosis).

➢Decreased sperm count (oligozoospermia) due to:

- Disruption of seminiferous tubules or acute infection in testis.
- Normal sperm count is about 100 to 150 millions/mL of semen. Infertility occurs when the sperm count decreases below 20 millions/mL of semen.

- Abnormalities of ovary: A thick capsule may develop around the ovaries and prevents ovulation.
- Abnormal Sperms: sperm count may be normal but production of large amount of abnormal sperm may lead to infertility e.g. tailless, double headed and sperm with abnormal head.
- Ovaries may also develop cysts (membranous sac containing fluid) or become fibrotic (hardened tissues resulting from lymphedema). These conditions prevent maturation and release of ovum.
- Other Disorders: Cryptorchidism, Long term use of drugs, Alcoholism, Genetic disorders, Hypothalamic disorders, Disorders of pituitary.