

# MOG Entrance Examination

What do you need to know?

## Basic Sciences in Obstetrics & Gynaecology

### a) Anatomy

#### 1. *Bony pelvis*

Detailed knowledge of the gross structure, ossification and landmarks of the pelvic bones and their associated joints and muscles. Shape and dimensions of the normal female pelvis and its commoner variants. Relationship between pelvic architecture and reproductive function.

#### 2. *Vertebral column*

Anatomy of the thoracic, lumbar and sacral spine with special emphasis on its relation to the spinal cord, meninges, nerve roots, vascularity and surface anatomy.

#### 3. *Pelvis*

Detailed knowledge of the gross and microscopic anatomy of pelvic structures, the vulva and perineum.

#### 4. *Abdomen*

Topographical anatomy of all intra-abdominal structures, including the vascular, lymphatic and nerve supply of all intra-abdominal organs. A detailed knowledge of the structure and nerve supply of the abdominal wall.

#### 5. *Breast*

Gross and microscopic anatomy.

#### 6. *Endocrine system*

Gross and microscopic anatomy of the adrenal glands, hypothalamus, pituitary and their relations.

#### 7. *Cardiorespiratory systems*

Gross anatomy of the larynx, trachea, main bronchi, pericardial and pleural cavities and heart.

#### 8. *Female & male genital tract*

A knowledge of the anatomy & embryology of the female & male genital tract.

#### 9. *Nervous system*

A knowledge of the major sensory and motor pathways within the central nervous system with particular regard to the nervous connections of the pelvic organs and the lumbo-sacral plexus.

The autonomic nervous system related to pelvic viscera and the genital tract.

## **b) Histology**

A knowledge of the histology of the female genital tract including the placenta.

## **c) Biochemistry**

1. Carbohydrate, protein and fat. Their general properties and an outline of the knowledge of the main metabolic pathways. Phospholipid metabolism.
2. Enzymes. Their nature, function, and relation to intermediary metabolism.
3. Iron metabolism, haemoglobin, haemopoiesis and bilirubin.
4. Prostaglandins and allied substances.
5. Steroid pathways and formulae – see under endocrinology.

## **d) Cell biology and genetics**

1. Structure and function of the normal cell. Cell ultra-structure and methods of its investigation. Function of nuclei, mitochondria, endoplasmic reticulum etc., and relationships of one cell to another.
2. Transfer of substances across the cell membrane, including active and passive transport mechanism.
3. Protein and steroid hormone receptors and their action on appropriate cells. Receptor assays and their significance.
4. Principles of genetic code. RNA and DNA metabolism.
5. Mitosis and meiosis. The cell cycle.
6. Cytogenetics including techniques of cell structure.
7. Chromosome constitution and the anomalies associated with common abnormalities of the karyotype.
8. Mechanism of inheritance of genetically determined abnormalities.
9. Features associated with cell damage including those associated with ionizing radiations, hypo- and hyperthermia and cytotoxic agents.

## **e) Statistics**

The candidate should be able to understand the common terminology and methods used in the obstetrics and gynaecology literature.

### **1. Descriptive statistics**

Measurements of central tendency, mean, mode, median.

Measurements of dispersion. Normal and skewed distribution, standard deviation and variance.

Measurements of proportions and percentages.

Concepts of probability, survey, experiment, random error and experimental control.

### **2. Descriptive epidemiology**

Rates, prevalence, incidence, mortality and perinatal mortality

Standardization – particularly age-standardisation as a means of eliminating the effect of age from a comparison of rates between populations or over time.

### **3. *Method of testing epidemiological hypotheses***

Risk and relative risk.

Cohort studies.

Case-control studies.

Distinction between association and causation.

### **4. *Hypothesis-testing statistics***

Measuring differences in proportions: chi square test.

Measuring differences in measurements : Student's 't' test.

Measuring relationships : correlation and regression.

### **5. *Special topics in clinical research***

Principles of randomized controlled trial.

Analysis of survival or outcome following treatment.

Evaluation of diagnostic of diagnostic/ screening test.

Sensitivity, specificity and predictive value.

## **f) Embryology**

1. Oogenesis and spermatogenesis.
2. Fate of spermatozoa in the male and female reproductive tracts.
3. Ovulation, transport of the ovum and sperm, fertilization, and implantation.
4. Blastula and trophoblast developments.
5. Development, structure, and function of the placenta.
6. Development of amnion, chorion and yolk sac. The origin, transfer, contents and function of amniotic fluid.
7. The general pattern and timing of organogenesis in the fetus.
8. The factors concerned in the determination of sex. The effects of drugs, infections, radiation and other deleterious agents on embryo development.
9. Development of mullerian and wolffian duct system, the gonads, proctodaeum and coelomic cavity.

## **g) Endocrinology**

1. Hypothalamic releasing hormones. Hormones of the anterior and posterior pituitary gland and control of their secretion.
2. Pineal gland.
3. Ovarian hormones. An understanding of the basic pathways involved in their synthesis. The control of ovarian steroid metabolism and feedback mechanisms. The action of ovarian hormones.
4. Fetoplacental steroid hormone metabolism: placental hormones. Adrenal gland. The action of ACTH, aldosterone, cortisone and catecholamines. A general understanding of the metabolic pathways involved in the production of these hormones.
5. Pancreas. A detailed knowledge of the pancreatic hormones, and their effect on carbohydrate/ lipid metabolism.

6. Thyroid. Control and secretion of thyroid hormones. The action of thyroxine.
7. Parathyroid function.
8. Testicular steroid production and its control.
9. Hepatic and alimentary tract hormones.

#### **h) The fetus**

1. Knowledge of the gross anatomy of the fetus with particular reference to the skull and cardiovascular system.
2. Fetal growth and maturation.
3. Oxygen and carbon dioxide transport in the fetus.
4. Fetal lung development and factors involved in the initiation of respiration.
5. Physiological adaptation of the neonate to extra-uterine life during first few days.

#### **i) Immunology**

1. The principles of immunology including antigens, antibodies, and their reactions. Blood grouping. Function of the reticulo-endothelial system, lymphocytes, macrophages and complement.
2. The immunology response in infection, transplantation, immunosuppression and hypersensitivity.
3. The immunology of the conceptus as an allograft. Function of the trophoblast. Transplantation allo-antigens. The immune status of the neonate and graft-versus-host reaction.
4. Immunodiagnosis. Pregnancy testing, principles of immunoassay and tests of immunocompetence.
5. The immunological basis of fetomaternal iso-immunisation.
6. Autoimmune disease. Placental transmission of immunoglobulins.
7. Immunology of tumours. Oncofetal antigens (tumour markers).

#### **j) Microbiology**

1. The principles of microbiology including broad outlines of bacteriology and virology.
2. Knowledge of the behavior and characteristics of bacteria, viruses, fungi, protozoa and parasites causing disease of the female reproductive tract and fetus.
3. Principles of control of infection. Antisepsis, asepsis, sterilization, isolation and epidemic control.
4. The principles underlying the use of antibiotics and allied chemotherapeutic agents.

#### **k) Pathology**

1. The response of tissues to trauma, inflammation, neoplasia, allograft, degeneration and ionizing radiation.
2. Features affecting pathology of wound healing and wound infection.
3. Characteristics of neoplasia.
4. Morbid anatomy and histopathology related to reproduction.

## **l) Pharmacology**

The principles underlying the mode of action and side effects of the following groups of drugs:

1. Anaesthetics, analgesics, sedatives and hypotensive agents.
2. Chemotherapeutic agents and antibodies.
3. Cytotoxic drugs.
4. Drugs acting upon the sympathetic and parasympathetic nervous systems.
5. The teratogenic dangers of drugs and other drug hazards to the fetus.
6. The pharmacology of drugs acting upon the female reproductive system including oxytocic and tocolytic drugs and sex hormones.

## **m) Physiology**

A limited knowledge of all aspects of human physiology will be expected with a more detailed understanding of the following points:

1. Reproduction. Much of this is covered under other headings within this syllabus. A detailed knowledge of all aspects of male and female reproductive physiology including coitus.
2. Electrolyte and water metabolism.
3. Normal renal function and micturition.
4. The cardiovascular system including knowledge of the control of blood pressure, heart rate and regional blood flow.
5. Respiration, oxygen and carbon dioxide transport mechanisms.
6. The working and arrangement of somatic and autonomic nervous systems including the chemical transmission of nerve impulses.
7. Uterus and tube. Myometrial and tubal function.
8. Alimentary tract including absorption of food substances and defecation. Functions of the liver.
9. Nutrition. The general principles of dietetics. The constitution of a normal diet and the particular requirements of pregnancy.
10. Coagulation and haemostasis. Fibrinolysis. Haemolysis.
11. Breast development and lactation.
12. The physiological of pregnancy. Special emphasis should be placed on the physiological changes of normal pregnancy, weight gain, the duration of pregnancy, renal, cardiovascular, respiratory, alimentary and haemopoetic changes, parturition and the puerperium.

## **n) Medical biophysics**

The physical principles of the following:

1. Ultrasound
2. Nuclear medicine
3. X-rays
4. Therapeutic ionizing irradiation
5. Electronic cardiac monitoring

## **Suggested References**

### **Main references**

1. Basic Science in Obstetrics and gynaecology - A Textbook for MRCOG Part 1 by Phillip Bennett and Catherine Williamson
2. Basic Science in Obstetrics and Gynaecology by Tim Chart and Richard Lilford

### **Other references**

1. Ganong, Lange-Maruzen Medical Physiology Series
2. Harper, Lange-Maruzen Physiological Chemistry Series
3. Langman's Medical Embryology
4. Last R.J. ELBS&J A Anatomy- Regional and Applied, Churchill, London
5. MacDonald R.R., Churchill-Livingston, London & Edinburgh. Scientific Basis of Obstetrics and Gynaecology
6. Phillip E.E, J. Barnes & M. Newton, William Heinemam Medical Books Ltd, London Scientific Foundation of Obstetrics and Gynaecology
7. Robbins Basic Pathology
8. Katzung's. Basic and Clinical Pharmacology
9. Jawetz, Melnick & Adelberg's Medical Microbiology
10. Betty Kirkwood, Jonathan Sterne. Essential Medical Statistic