Chapter 1

Introduction
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According to the Population reference bureau (2000) India's population stands at 1,022.142 million i.e. India is the second most thickly populated country in the world and home 16% of the population of the world. The wealth of a country depends on the health of each family in it. The health and welfare of the family depends on the health of the woman and children. The woman is the foundation stone of a family with her diverse responsibilities. The different roles of her life as a child, adolescent girl, wife and mother are due to varying complex and scientific events underlying beneath these stages. The normal reproductive stage of the female is characterised by the monthly rhythmic changes occur as a result of the rate of secretion of the female sex hormones and the corresponding changes in the ovaries and sex organs as well. The development of cyclic, regular predictable ovulatory menstrual cycle results from regulated interactions of the hypothalamus, pituitary, ovaries and genital tract. The different phases of the menstrual cycle are the menstrual phase, the follicular phase or the proliferative phase, the midcycle or the ovulatory phase and the secretary phase or the luteal phase. The average duration of the cycle is about 28 days.

It is known for years now that the different hormonal levels during monthly cycle can affect functions in many organs of the body. The motto of the present work is to analyse the changes in the respiratory functions, serum cholesterol, triglycerides, lipoproteins, haemoglobin, total protein, albumin, globulin, fibrinogen, bicarbonate, blood cell count and the levels of estrogen, progesterone, LH and FSH during menstrual cycle in young adult females. The above said respiratory, biochemical, haematological and hormonal parameters were done
four times during the menstrual cycle in each subject. Even though considerable medical research is being carried out separately, it is for the first time such an extensive study concerning respiratory, biochemical, haematological and hormonal parameters was taken up together in the young adult females of Kerala.

The obvious goal of respiration is to provide $O_2$ to the tissues and remove $CO_2$ from the tissues. The mechanism of respiration is brought about by inflation and deflation of the lungs and the chest cavity, which in turn is brought about by the movement of respiratory muscles and ribs. The most important muscle of respiration is diaphragm whose movements account for about 70% of respiration. Other muscles responsible for respiration are intercostals, sternocleidomastoid anterior serrati, abdominal recti and scalene. The assessment of respiratory muscle function is done by the vital capacity manoeuvre which depends on maximum inspiratory and expiratory effort by the muscles (Nava, 1998).

Respiratory gases move along a pressure gradient. During normal breathing 3-5% of the total energy output is expended for breathing while during heavy exercise it goes even up to 50 fold. Respiration is mainly controlled by 2 ways, i.e. (1) neural regulation and (2) chemical regulation both being closely interrelated. The respiratory centre is composed of several widely scattered groups of neurones located bilaterally in the medulla and the pons.

The female sex hormone estrogen has a remarkable protective action against a major killer, cardiac failure (Stadel, 1981). It lowers the blood cholesterol level and there by affords a natural protection of women against atherosclerosis (Nabulsi et al., 1993). Synthetic compounds related to estrogens have been tried to lower cholesterol in hyper cholesterolemic men (Wahl et al., 1983). At the same time estrogens have been implicated in the causation of the cancer. However, not much progress has been made towards the elucidation of
its mechanism or site of action. Progesterone protects young pre-menopausal women from disordered breathing and apnoea during sleep (Lyons, 1968). In recent years large number of women are using synthetic progesterones and estrogens chronically for contraceptive purpose. Yet, the ventilatory effects of the progesterone have received little attention. Accordingly, the present investigation was designed to determine the effect of progesterone on ventilation. Previous researches had indicated that endogenous female sex steroids have significant effects on blood cholesterol concentration (Kushwaha, 1992). However, more work needs to be carried out to prove the significance of the observed changes. So in this study respiratory parameters and gonadal hormones are evaluated in normal menstruating women.

The fluctuations in plasma lipids that occur at the varying phases of female sexual cycle have important implications in the evaluation of factors for coronary heart disease in women of reproductive age (Naito, 1985). It is suggested that multiple point measurement may give a better estimate of plasma lipid changes in blood in females of reproductive age (Barclay et al., 1965). While evaluating the lipid risk profile in pre-menopausal women, the different phases of menstrual cycle must be taken into account. Fibrinogen, which is a clotting factor present in the plasma, has been found to have alterations during different phases of menstrual cycle (Poller et al., 1972). Patients with pulmonary hypertension are treated with anti-coagulants and it is reported that thrombogenesis of pulmonary vessels was the cause to some extent for pulmonary hypertension. In this study the fibrinogen concentration at different levels of gonadal hormones were compared. It is found that anaemia and polycythaemia is related to ventilation. Anaemia lowers the maximal exercise capacity with a higher cardiac output at a given level of \( O_2 \) uptake. During menstruation, anaemia occurs due to the loss of blood and this may affect the work capacity. Polycythaemia secondary to
hypoxemia is a well-established factor and has been shown to be closely related to the level of COHb (Solerte et al., 1991). Pulmonary function changes are closely associated with chronic eosinophilia and asthma. In acute leukaemia, where there is an increase in blood cell count, acute respiratory failure may be the first manifestation (Hanley, 1981). Haemoglobin is a critical factor in determining VO₂ max. Either abnormally high or low haemoglobin may be associated with decreased work capacity. Therefore, it is advisable to study the effect of Hb in the four phases of the menstrual cycle.

The work was designed in five stages.

- To find out and compare the changes in “lung volumes” and “flow rates” in different phases of menstrual cycle.

- To study the biochemical changes viz. the serum cholesterol, serum triglycerides, lipoproteins, haemoglobin, serum proteins, bicarbonates, etc. and their effects during different phases of menstrual cycle.

- To study the effects of haematological changes viz. bleeding time, clotting time, prothrombin time, blood cell counts etc. and their effects during different phases of menstrual cycle.

- To study the hormonal changes viz. Estrogen, Progesterone, LH and FSH during different phases of menstrual cycle.

- To examine any association and if so, the extent of association of the above said parameters with the respiratory functions in young adult women.

Above all the present study was undertaken with a view to enlighten the area of cardiopulmonary and reproductive diseases seen in young adult women.