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Current factors affecting the menstrual cycle

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ABSTRACT

A regular menstrual cycle is an important indicator of a healthy reproductive system. Menstrual problems affect not only women, but also families, social & national economy as well. The menstrual cycle is divided into two 14-day phases. In normal healthy women, menarche occurs between the ages 10 and 16 years, with an average rhythm of 28 days, inclusive of 4–6 days of bleeding, with some common minor variations like Amenorrhoea, Oligomenorrhoea, Polymenorrhoea, Menorrhagia, Hypomenorrhoea etc., these menstrual disorders frequently affect the quality of life of young adults women, some of the lifestyle factors like obesity, intake of junk food, stress, lack of physical activity, skipping breakfast are associated with irregular menstruation. The purpose of this study is to identify menstrual irregularities and assess the impact of lifestyle factors and on menstrual pattern in reproductive age females.

Keywords: bleeding, junk food, life style factors, menarche, obesity, menstrual irregularities.

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INTRODUCTION

Menstrual Cycle

The menstrual cycle is categorised into two 14-day phases, the follicular phase and the luteal phase, which describes changes in the ovary along the length of the cycle, and also the proliferative and secretory phases, this describes repeated changes in the endometrium throughout the same period of time. over the follicular phase, the secretion of FSH from the pituitary gland results in development of a primary ovarian follicle. The ovarian follicle secretes estrogen,

this causes the uterine lining to proliferate. . At midcycle interval approximately day 14 there is LH spike in response to a preceding estrogen surge and this stimulates ovulation, and also the release of the ovum from the follicle. After ovulation the luteal phase starts. The remnants of the follicle in the ovary develop into the corpus luteum. This corpus luteum is responsible for the release of progesterone, which maintains the endometrial lining in preparation to receive a fertilized ovum. If in case of failure of fertilization, the corpus luteum degenerates and progesterone levels fall. Without progesterone, the endometrial lining is sloughed off, this is known as menstruation. The hypothalamus, pituitary, ovaries, and uterus are all involved in regulating the menstrual cycle.

Follicular Phase

The decrease in estrogen and progesterone during the luteal phase of the prior cycle causes a gradual increase in FSH. In turn, FSH stimulates the growth of approximately 5 to 15 primordial ovarian follicles, initiating the follicular phase again. in these primordial follicles, one becomes the dominant follicle and develops, matures until ovulation. The developing dominant follicle, destined to ovulate, produces estrogen that enhances follicular maturation and increases the production of FSH and LH receptors in an autocrine fashion. The estrogens are produced in a two-cell process with the theca interna cells producing androstenedione in response to LH stimulation and the granulosa cells converting this androstenedione to

estradiol when stimulated by FSH. LH increases and stimulates the synthesis of androgens, which are converted to estrogen. As rising estrogen levels negatively feed back on pituitary FSH secretion, the dominant follicle is protected from the decrease in FSH by its increased number of FSH receptors.

Figure 1: Changes occurring during the menstrual cycle (Adapted from Hanretty, 2003).

Ovulation

At the end of the follicular phase, estrogen levels eventually surge to reach a critical level that triggers the anterior pituitary to release an LH. The LH surge triggers the resumption of meiosis in oocyte, induces production of progesterone and prostaglandins inside the follicle. The progesterone, prostaglandins are responsible for the rupture of the follicular wall with release of the mature ovum. The ovum passes into the fallopian tube and is swept into the uterus by the cilia lining of the fallopian tube. This process takes 3 to 4 days. Fertilization of the ovum should occur within 24 hours of ovulation if not it degenerates.

Luteal Phase

After ovulation, the luteal phase emanate. The LH stimulate granulosa and theca interna cells lining the wall of the follicle forming the corpus luteum. The corpus luteum synthesizes estrogen and progesterone, leading endometrium to become more glandular and secretory in preparation for implantation of a fertilized ovum. If fertilization occurs, the mature trophoblast synthesizes human chorionic gonadotropin (hCG) which support the corpus luteum so, it can continue production of estrogen and progesterone to sustain the endometrium. This continues until the placenta develops its own synthetic function at 8 to 10 weeks' gestation. If fertilization, with the rise in hCG, does not occur, the corpus luteum degenerates, progesterone levels decreases, the endometrium is not maintained, and menstruation occurs.

Menstruation

The endometrium in the uterus undergoes cyclical changes during the menstrual cycle. throughout the follicular phase, the endometrium is in proliferative phase and grows in accordance with estrogen. over

the luteal phase, the endometrium get into the secretory phase as it matures and is prepared to maintain implantation. If ovum is not fertilized, the corpus luteum deteriorates after approximately 14 days, leading to a fall in estrogen, progesterone levels. The decrease in progesterone leads the endometrium to slough, initiating the menstrual phase. At the same time, FSH levels begin to slowly increases with absence of negative feedback and the follicular phase begins again. A menstrual cycle less than 24 days or longer than 35 days or a cycle that lasts greater than 7 days standard further evaluation.^[1]

Menstrual cycle changes throught out all the phases.

Menstrual Irregularities

In normal healthy women, menarche occurs in between the age of 10 and 16 years, Cyclic menstruation persists along the reproductive era of life with an average rhythm of 28 days, inclusive of 4-6 days of bleeding (excluding pregnancy, lactation).

Amenorrhea is the absence of menstruation and is a symptom and not a disease.

Oligomenorrhoea indicates infrequent, irregularly episodes of bleeding generally occurring at intervals of more than 35 days.

- Polymenorrhoea refers to frequent cycles of menses, usually occurring at intervals of 21 days or less than that.
- Menorrhagia indicates regularly time episodes of bleeding that are greater in amount (80 mL) and/or duration of flow (5 days).
- Metrorrhagia denotes irregularly time episodes of bleeding superimposed on normal menstrual cbleeding.
- Menometrorrhagia refers to excessive, prolonged bleeding that occurs at irregularly timed and frequent gaps of intervals.
- Hypomenorrhoea means regularly timed but scanty episodes of menstrual bleeding.
- Intermenstrual bleeding denotes bleeding that occurs in between the menses otherwise normal menstrual cycles.
- Precocious menstruation refers to occurrence of menstruation or menstrual cycle before the age of 10 years. ^[2]

Factors affecting the menstrual cycle

Stress: One mechanism which links stress with menstrual function occurs along dysregulation of the

body's stress responses, mainly along the hypothalamic-pituitary-adrenal axis. Hypothalamus regulates menstrual cycle by releasing the gonadotropin-releasing hormone, which stimulates the periodic secretion of follicle stimulating hormone (FSH) and luteinizing hormone (LH) from the pituitary gland. FSH is very important for follicular maturation, while LH, which regulates estradiol secretion by the maturing follicle which is essential for ovulation and after ovulation helps in maintaining the corpus luteum. Once this cycle is disrupted, maintenance of regular menstrual function stops for some time; the nature and length of stop of menses depends on the continuation of the initiating stressful event.^[3]

Intake of junk food: Most of Indian foods are prepared by deep frying in fats especially transfat and saturated fat. Fast food intake leading to greater proportion of calories being derived from total and saturated fats. Moreover, the micronutrient content of the fast food is also low.^[4] Junk foods which are rich in saturated fatty acids should be interfering with the metabolism of progesterone in the luteal phase of regular menstrual cycle and leads in premenstrual symptoms. Junk foods being deficient in micronutrients like vitamin B6, calcium, magnesium and potassium, might also be responsible for triggering premenstrual symptoms.^[5]

Obesity: There are various known mechanisms linking adipose tissue on ovulation and menstrual cycle: (1) adipose tissue or fat tissue converts androgens to estrogen by aromatization in breast, abdomen, omentum, and fatty marrow of long bones; (2) body weight influences the direction of estrogen metabolism, with very thin women producing a less potent inactivated form of estrogen (2-hydroxylated form) and obese women releasing more potent forms of estrogen because of activated estrogenic activity (16-hydroxylated form); (3) obese women have decreased capacity for estrogen binding with the SHBG, which in turn inactivates estrogen and results in increasing percentage of free serum estradiol; and (4) adipose tissue stores steroid hormones in obese women, and also central effects on hypothalamic pituitary axis in addition potentially regulate ovarian function.^[6]

Lack of physical activity: Daily physical activity helps in maintaining ideal body weight, with rise in insulin sensitivity, increases BMR and stimulate endorphins, which in turn helps in regularisation of menstrual cycle, improvement in PCOD and hypothyroidism, reduction in PMS and overall feeling of well-being.^[7] Low levels of physical activity has the strongest association with irregular periods. Women who are both obese and sedentary have a higher prevalence of irregular periods compared with normal-weight women who exercise moderately. Excess adipose tissue may affect levels of androgens and estrogens through several pathways: it may provide a reservoir

for lipid-soluble steroids and it may affect the relations between hormones and sex-hormone-binding globulin.^[8]

Skiping breakfast: Breakfast habits are associated with physiological, psychological and social health. Several researches reported associations between breakfast skipping and fatigue at noon, worsens memory and increase in BMI as well as higher prevalence of obesity along with chronic illnesses, deficiency in total energy, vitamins and minerals, rise in risk of central adiposity and risk of insulin resistance and cardio-metabolic disorders. The reasons behind skipping breakfast were reported as lack of time, inability to cook, lack of appetite, eating late at night, to control weight, as a habit etc.,. Skipping breakfast has a greater influence on both waist circumference and BMI. A positive association between skipping breakfast to over weight and obesity is globally seen. In adults, skipping meals may be linked to increase in body weight, insulin resistance, and rise in fasting lipid concentrations. Breakfast has a direct influence on blood glucose levels and also, blood glucose levels have a direct effect on cognitive function.^[9]

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