

## Hypothyroidism- A Risk Factor for Menstrual Disorders among Nulliparous Females

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**Abstract: Background:** Menstrual disorders are very common among the young females and its incidence decreases as the age advances. Any abnormality in the hypothalamic or pituitary hormone leads to disturbance in menstrual cycle. Hypothyroidism is one of the major endocrine disorder prevalent amongst the females. The increased level of TSH influences the secretion of FSH and LH, leading to menstrual disorders.

The aim of the study was to estimate the TSH levels in the nulliparous females with menstrual cycle disorders and so as to establish hypothyroidism as a risk factor. **Method:** The study was conducted in Govt. Medical College, Kota and attached group of Hospitals, Kota, Rajasthan. Duration of study is from January 2015 to September 2015. A total of 102 nulliparous females of ages between 18-28 years presenting with menstrual cycle disorders were included in the study. These serum was analysed for TSH by chemiluminescence technique on Cobas e411 in Hormonal Assay Lab, Department of Biochemistry, Govt. Medical College, Kota, Rajasthan. Statistical Analysis was done on Microsoft Excel. Continuous parameters were expressed as Mean  $\pm$  SD. The results were obtained by students' Unpaired t-test. P value <0.05 was considered statistically significant. **Conclusion:** By this study we conclude that menstrual disorders are more common in hypothyroidism thus establishing that hypothyroidism is a risk factor for development of menstrual cycle disorders among nulliparous females and has to be ruled out at an early stage.

**Keywords:** Hypothyroidism, Menstrual disorders, Nullipara, Thyroid Stimulating Hormone (TSH)

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### I. Introduction

Menstruation is the periodic change occurring in primates, which results in the flow of blood and endometrium from the uterine cavity, and may be associated with various constitutional disturbances[1]. The normal menstrual functions depend upon the complex interaction between the hypothalamic-pituitary-ovarian axis and endogenous hormones[2]. The menstrual cycle is divided in two phases, the proliferative phase and the secretory phase, which are under the control of ovarian hormones oestrogen and progesterone respectively. Oestrogen and Progesterone are secreted by ovary under the influence of pituitary (FSH and LH), which is further under the control of hypothalamus[3]. The first menstruation usually begins between twelve and fifteen years of age, a point of time known as Menarche[4]. Menstrual cycle is usually of twenty eight days, measured by the time between the first day of one period and first day of next period. But the regular twenty eight days cycle is seen in only a small proportion of women. Bleeding usually occurs for 2 to 7 days[5]. Menstruation stops occurring between ages 45 to 55 years, which is termed as Menopause[6]. The most frequent menstrual cycle disorders are polymenorrhoea, oligomenorrhoea and dysmenorrhoea [7]. Polymenorrhoea is defined as a menstruation interval lasting less than 21 days, oligomenorrhoea is defined as menstruation interval of more than 35 days[8,9]; dysmenorrhoea as abdominal pain severe enough to interfere with normal activities, or require medication[10]. Menstrual abnormalities are more common in younger girls, becoming less frequent as they grow older[11,12]. Alterations in the hormones of hypothalamic-pituitary-ovarian origin affect menstrual cycle such as cycle length, regularity and bleeding patterns[13].

Thyroid hormones released by the thyroid gland under the influence of hypothalamus (Thyroid Releasing Hormone) modulate the carbohydrates, fats and proteins metabolism, gene expression and also the sexual and reproductive functions[14]. Hypothyroidism is caused by insufficient production of thyroid hormones by the thyroid gland. Hypothyroidism may be caused by immune or non-immune causes, Autoimmune thyroiditis being the most common cause. It has numerous effects on reproductive system development and functions[15]. In females hypothyroidism is associated with anovulatory cycles, amenorrhoea, polymenorrhoea, menstrual irregularities, menorrhagia, infertility and increased frequency of spontaneous abortions[16]. The

changes in menstrual cycle reflect that thyroid disorders are associated with ovarian hyperactivity like hyperoestrogenemia, hyperprolactinemia, impaired fertility. These effects are to a greater extent thought to be due to changes in TSH levels, whose secretion overlaps with FSH, LH and prolactin[17].

Nullipara/Para 0 is a woman who has never carried a pregnancy beyond 20 weeks[18].

Measurement of plasma TSH concentration provides the cornerstone of biochemical evaluation of hypothyroidism[19]. Normal level of TSH is 0.3-3.5 mU/L and in hypothyroidism, the level is found to be >10mU/L[20].

**AIM :** To estimate the TSH levels in the nulliparous females with menstrual cycle disorders and so as to establish hypothyroidism as a risk factor.

## II. Materials And Methods

**Study population :** The study was carried out in Govt. Medical College and attached group of hospitals, Kota, Rajasthan. The study period was from January 2015 to September 2015. A total of 102 nulliparous females of ages between 18-28 years presenting with menstrual cycle disorders were included in the study.

### Exclusion criterion included :

- Pregnancy
- Females using oral contraceptives and Intrauterine Contraceptive Devices(IUCD).
- Previous history of thyroid disorders and its treatment, known cases of hyperthyroidism and diabetes mellitus
- Chronic smokers and alcoholics.
- Patients suffering from any pituitary disorders. Females on treatment for infertility.
- Patients with drug history of corticosteroids, Lithium carbonate, etc. Any gynaecological disorder eg. Ovarian cyst, PCOD, etc.
- The patients who did not give the consent to participate.

Among the total of 102 females presenting with menstrual disorders, 78 were euthyroid, 3 were hyperthyroid and 21 were found to be hypothyroid. The hyperthyroid cases were excluded from the study.

**Sample Collection :** A sample of 5ml was collected following the consent of the patient. The sample was then left standing for an hour and serum was obtained by centrifugation at 3000 rpm for 10 minutes. There after the serum was analysed for TSH by chemiluminescence technique on Cobas e411 in Hormonal Assay Lab, Department of Biochemistry, Govt. Medical College, Kota.

**Statistical Analysis:** Statistical Analysis was done on Microsoft Excel. Continuous parameters were expressed as Mean  $\pm$  SD. The results were obtained by students' unpaired t-test. P value <0.05 was considered statistically significant.

## III. Results

During the 9 months study period from January 2015 to September 2015, a total of 102 females were studied of which 78 were euthyroid (TSH level between 0.3-3.5mU/L), 3 were hyperthyroid ( TSH level<0.3 mU/L) and 21 were found to be hypothyroid (TSH level >10mU/L).

**Table 1: Number and percentage of euthyroid, hypothyroid and hyperthyroid nulliparous females with menstrual disorders. The hyperthyroid females were excluded from the study.**

CATEGORY	NUMBER OF CASES	PERCENTAGE
EUTHYROID FEMALES (TSH level between 0.3-3.5mU/L)	78	76.5%
HYPERTHYROID FEMALES ( TSH level<0.3 mU/L)	3	2.9%
HYPOTHYROID FEMALES (TSH level >10mU/L)	21	20.6%
TOTAL NUMBER OF NULLIPAROUS FEMALES WITH MENSTRUAL DISORDERS	102	100%

The Mean  $\pm$  SD in case of euthyroid nulliparous females with menstrual disorders is 2.36  $\pm$  0.96 and in case of hypothyroid nulliparous females with menstrual disorders, it is 15.51  $\pm$  4.82. P value <0.05 was found to be

statistically significant.

PARAMETER	EUTHYROID NULLIPAROUS FEMALES WITH MENSTRUAL DISORDER	HYPOTHYROID NULLIPAROUS FEMALES WITH MENSTRUAL DISORDER	P VALUE
TSH LEVEL(mU/L)	2.36 ± 0.96	15.51± 4.82	<0.05* (significant)

**Table 2: Showing Mean± SD of TSH in cases of Euthyroid and Hypothyroid Nulliparous Females with Menstrual Disorders**

#### IV. Discussion And Conclusion

Thyroid disorders are one of the most common endocrine problem encountered all over the world since past two decades and India also carries its significant burden. In India, in a population based study done in Cochin, the prevalence of hypothyroidism was found to be 3.9% [21]. Its prevalence is also seen more in females as compared to males. Menstrual irregularities are common among nulliparous females. Abnormalities related to menstruation contribute to the major health problems that adversely affect the lives of not only women but also family, social and national economy as well. Medical management is required in majority of the cases.

The patients of hypothyroidism suffer from menstrual disorders frequently. Females with irregular menstrual cycle are at increased risk of development of anaemia, obesity, infertility, cardiovascular diseases, type 2 diabetes mellitus, osteoporosis, breast and endometrial cancers [22-25]. Hypothyroidism is also closely related to ovulatory problems, leading to reduction in number of ova produced each cycle. Anovulatory cycles are also present in hypothyroid patients which leads to issues related to infertility. It also leads to obesity which itself is associated with two-fold increase in the prevalence of heavy menstrual flow [26]. Excessive blood loss has been associated with ovulatory disorders, which are common among obese females [27]. Polymenorrhea (increased bleeding) is more common in hypothyroidism due to the defects in haemostasis. By this study we conclude that menstrual disorders are more common in hypothyroidism thus establishing that hypothyroidism is a risk factor for development of menstrual cycle disorders and has to be ruled out at an early stage. Our results go in favour of study done by Krassas GE et al in 1999, who reported that 23.4% of the hypothyroid females presented with irregular menstrual cycle [28]. It becomes an important issue of concern for the gynaecologists and physicians, so as decrease the burden of both the problems in the society.

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