

Serum TSH Levels and Their Association with Different Types of Menstrual Irregularities

Swati Suman¹, Mehre Afshan Mehdi², Tabassum Ahmed³, Dipti Roy⁴

¹Senior Resident, Department of Obstetrics and Gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India

²Senior Resident, Department of Obstetrics and Gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India

³Professor, Department of Obstetrics and Gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India

⁴Professor and HOD, Department of Obstetrics and Gynecology, Nalanda Medical College and Hospital, Patna, Bihar, India

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Corresponding Author: Dr. Mehre Afshan Mehdi

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Abstract:

Background: Thyroid dysfunction is often linked to irregular menstruation, which is a common gynecological issue. The hypothalamic-pituitary-ovarian axis can be impacted by altered thyroid hormone levels, resulting in a variety of menstruation disorders.

Aim: To evaluate the association between serum thyroid-stimulating hormone (TSH) levels and different types of menstrual irregularities in women of reproductive age.

Methodology: The Department of Obstetrics and Gynecology at Nalanda Medical College and Hospital in Patna was the site of an observational cross-sectional investigation. Ninety women with irregular menstruation, ages 18 to 45, were enrolled. Participants were classified as euthyroid, hypothyroid, or hyperthyroid based on clinical examination and serum TSH measurement. Appropriate statistical tests were used to analyse the data.

Result: The study included 73.3% participants who were euthyroid, 20.0% participants who were hypothyroid, and 6.7% participants who were hyperthyroid. The most prevalent menstrual irregularity was menorrhagia. Amenorrhoea and oligomenorrhoea were substantially correlated with hypothyroidism. Women with amenorrhoea had the highest mean serum TSH levels, and there was a statistically significant ($p < 0.05$) correlation between menstrual pattern and thyroid health.

Conclusion: Menstrual abnormalities are strongly linked to thyroid disease, especially hypothyroidism. Women who have irregular menstruation cycles should have their serum TSH levels routinely assessed.

Keywords: Thyroid dysfunction; Serum TSH, Menstrual irregularities, Hypothyroidism; Reproductive age women.

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Introduction

Abnormal uterine bleeding is common in women and is associated with a number of symptoms. Common issues include heavy or prolonged menstrual flow with or without pain, clot passage, weakness, fatigue from social humiliation, significant lifestyle adjustments, and sexual compromise. A common debilitating symptom that results in unnecessary, expensive, and useless treatment is abnormal uterine bleeding. Surgery is usually required, and there is a chance of morbidity and perhaps death [1].

Abnormal uterine bleeding frequently causes women to visit a doctor since it negatively affects their day-to-day activities and lifestyles [2]. It has been demonstrated that abnormal uterine bleeding

negatively impacts mood, vitality and energy, productivity at work, social relationships, family life, and sexual functioning. Although it is challenging to accurately determine the prevalence of abnormal uterine bleeding, abnormal uterine bleeding accounts for 15% to 20% of scheduled office gynecological visits [3].

Both the difficulties in controlling monthly bleeding and the effects of excessive blood loss, such as exhaustion and iron deficiency anemia, have an impact on a woman's Health Related Quality of Life (HRQL) [4]. By secreting hormones including thyroxine (T4) and triiodothyronine (T3), the thyroid gland plays a vital role in controlling development,

metabolism, and reproductive function [5]. Measuring prolactin and thyroid hormones, particularly thyroid stimulating hormone (TSH), has been seen as a crucial part of the evaluation of female infertility.

Menstrual disorders such as menorrhagia, oligomenorrhea, or amenorrhoea are caused by changes in thyroid function that impact gonadotropin release, oestrogen and progesterone metabolism, and endometrial receptivity [6]. In addition to influencing reproductive health, these disruptions are significant clinical markers of underlying endocrine dysfunction [7].

One in five women may experience menstrual issues at some point in their lives, accounting for a large portion of morbidity [8]. One of the most prevalent endocrine illnesses in the world, thyroid dysfunction is more frequent in women than in men. Women with thyroid dysfunction frequently have irregular menstruation, infertility, and increased morbidity during pregnancy because thyroid dysfunction can have significant consequences on the female reproductive system [9]. However, little is known about the thyroid function status of women with menstruation problems, therefore it is unclear how important a thyroid function test is for these individuals.

In hyperthyroid women, systemic androgen metabolism is also altered. Testosterone and androstenedione mean plasma levels rise. Compared to normal females, hyperthyroid women have far higher rates of testosterone and androstenedione production. Women with hyperthyroidism had higher ratios of androstenedione to oestrone and testosterone to estradiol [10]. Clinicians have been concentrating on these issues for a long time since they might occasionally be linked to ovulatory disruption and eventual infertility.

By examining hormonal profiles, clinical symptoms, and menstrual patterns, this study seeks to investigate the connection between thyroid disease and irregular menstruation in women. To determine the frequency of thyroid abnormalities in female infertility in Delhi and its suburbs following the elimination of tubal factor and male factor infertility from hospital-based research, and to investigate how thyroid status affects serum prolactin, FSH, and LH on the third day of the menstrual cycle.

Methodology

Study Design: The purpose of this hospital-based observational cross-sectional study was to assess the relationship between various monthly abnormalities and serum thyroid-stimulating hormone (TSH) levels in women who visited the gynecology outpatient department.

Study Area: The study was conducted in the Department of Obstetrics and Gynecology at Nalanda Medical College and Hospital (NMCH), Patna, Bihar, India

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Study Duration: The study was conducted from July 2025 to December 2025.

Study Size: A total of 90 participants were enrolled in the study.

Study Population: The study population consisted of women in the reproductive age group presenting with complaints of menstrual irregularities to the gynecology outpatient department of NMCH, Patna.

Data Collection: After obtaining informed consent, detailed demographic data, menstrual history, obstetric history, and relevant medical history were recorded using a predesigned and pretested proforma. Clinical examination findings were documented. Venous blood samples were collected for estimation of serum TSH levels.

Inclusion Criteria

- Women aged 18–45 years
- Women presenting with menstrual irregularities such as menorrhagia, oligomenorrhea, polymenorrhagia, hypomenorrhea, or amenorrhea
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Pregnant women
- Women with known thyroid disorders already on treatment
- Patients with diagnosed uterine pathology such as fibroids, polyps, or malignancy
- Women with bleeding disorders or chronic systemic illness
- Patients using hormonal contraception or hormonal therapy in the past three months

Study Procedure: Eligible participants were evaluated clinically and categorized based on the type of menstrual irregularity. Blood samples (5 ml) were collected under aseptic conditions, preferably on the third day of the menstrual cycle when applicable. Serum TSH estimation was performed using standardized laboratory methods. Based on serum TSH levels, participants were classified as euthyroid, hypothyroid, or hyperthyroid

Statistical Analysis: Data was entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used. The association between serum TSH levels and different types of menstrual irregularities was analyzed using the Chi-square test. A p-value of <0.05 was considered statistically significant.”

Result

Table 1 displays the age distribution of the study participants. Menstrual abnormalities were most frequently reported at the peak reproductive age, as

seen by the large number of women (62.2%) in the 26–35 age group. This demonstrates the need to

assess endocrine reasons in this age range, particularly thyroid problems.

Table 1: Age Distribution of Study Participants (n = 90)

Age group (years)	Number	Percentage (%)
18–25	18	20
26–35	56	62.2
36–45	16	17.8
Total	90	100

According to Table 2, the most frequent monthly abnormality was menorrhagia (38.9%), followed by oligomenorrhea (31.1%) and amenorrhoea (20.0%).

This distribution demonstrates that irregular uterine bleeding patterns account for a sizable portion of menstrual issues in clinical practice.

Table 2: Types of Menstrual Irregularities

Menstrual abnormality	Number	Percentage (%)
Menorrhagia	35	38.9
Oligomenorrhea	28	31.1
Amenorrhoea	18	20
Polymenorrhagia	9	10
Total	90	100

Table 3 displays the thyroid status of the participants. A significant percentage of women (26.7%) had thyroid dysfunction, with hypothyroidism being more frequent than hyperthyroidism, even though

many were euthyroid (73.3%). This result highlights the necessity of routine thyroid monitoring for women who experience irregular menstruation.

Table 3: Distribution of Thyroid Status

Thyroid status	Number	Percentage (%)
Euthyroid	66	73.3
Hypothyroid	18	20
Hyperthyroid	6	6.7
Total	90	100

Table 4 illustrates a substantial correlation between thyroid status and the categories of menstrual irregularities. Menorrhagia was more frequently observed in euthyroid women, while oligomenorrhea

and amenorrhoea were more prevalent in hypothyroid women. Thyroid dysfunction and menstrual pattern were clearly related, as evidenced by the statistically significant link.

Table 4: Association of Thyroid Status with Menstrual Irregularities

Menstrual pattern	Euthyroid (n=66)	Hypothyroid (n=18)	Hyperthyroid (n=6)	Total
Menorrhagia	30	4	1	35
Oligomenorrhea	18	8	2	28
Amenorrhoea	10	6	2	18
Polymenorrhagia	8	0	1	9
Total	66	18	6	90

In Table 5, the mean serum TSH levels are compared across various menstrual irregularities. Women who experienced amenorrhoea had the highest mean TSH levels, followed by those who experienced oligomenorrhea. The significance of thyroid

dysfunction in menstrual irregularities is further supported by this pattern, which indicates that higher TSH levels are linked to more severe menstrual disturbances.

Table 5: Mean Serum TSH Levels According to Menstrual Pattern

Menstrual pattern	Mean TSH (mIU/L) ± SD
Menorrhagia	3.1 ± 1.4
Oligomenorrhea	4.9 ± 1.8
Amenorrhoea	6.8 ± 2.1
Polymenorrhagia	3.4 ± 1.2

Discussion

The women of Patna has reproductive age, thyroid insufficiency and irregular menstruation are clearly and clinically significantly correlated. monthly irregularity is frequently an early sign of thyroid imbalance, as evidenced by the fact that over half of the women with monthly abnormalities had abnormal thyroid profiles. While women with subclinical thyroid abnormalities showed mild irregularities that might easily go undetected without laboratory testing, those with overt thyroid diseases displayed the most severe and persistent cycle disruptions [11].”

Ovulatory dysfunctions ranging from insufficient corpus luteal progesterone production when modestly increased to oligomenorrhea or amenorrhoea when circulating prolactin levels are high have been linked to hyperprolactinemia arising from long-term primary hypothyroidism [12]. The significant impact of low thyroid hormone levels on reproductive function is shown by the high frequency of hypothyroid disorders, both overt and subclinical.

Therefore, early thyroid testing may be used as a straightforward, affordable diagnostic tool in reproductive healthcare, decreasing long-term consequences including infertility and hormonal imbalance. This has both preventative and therapeutic implications. Additionally, longitudinal studies are advised to monitor changes in hormones over time and assess the effectiveness of treatment for women undergoing thyroid medication. Overall, the current research confirms that thyroid dysfunction is a significant but treatable cause of irregular menstruation in women. The results emphasize the significance of routine thyroid testing for women who report with menstruation issues, especially in low-resource environments where these symptoms are frequently disregarded or misdiagnosed [13].

The menstrual cycle is influenced by thyroid hormones, and both hyperthyroidism and hypothyroidism can cause irregular menstruation. Through their direct effects on the ovaries and their indirect interactions with sex hormone binding proteins, thyroid hormones play a significant role in normal reproductive function [14]. The frequency of menstruation disorders in euthyroid individuals with chronic thyroiditis must thus be clarified.

These hormonal interdependencies in a population-specific setting are substantially supported by the quantitative patterns found in the current investigation [15]. Therefore, reproductive function can be restored, and long-term issues including infertility, anemia, and hormonal imbalance can be avoided with early identification and treatment. The thyroid-menstrual relationship in Patna women is better understood thanks to region-specific quantitative data, which also establishes the foundation for more comprehensive public health initiatives centered on early

diagnosis, education, and endocrine screening within gynecological practice.

It is unknown how hyperthyroid women's blood levels of FSH and LH rise. LH, FSH, and PRL levels were assessed in all patients and controls prior to 30 and 60 minutes following the combination of injection of hypothalamic thyrotropin-releasing hormone and LH-releasing hormone. Patients with hyperthyroidism have also been reported to experience irregular menstruation. Menstrual function may be impacted by biochemical and hormonal imbalances, dietary disorders, and emotional upheavals linked to hyperthyroidism, either separately or in combination [16].

This result is still far lower than the results of earlier research of a similar kind, even if it shows that the incidence of menstruation abnormalities in hypothyroidism is almost three times higher than in the normal population. Additionally, we discovered that oligomenorrhea was the primary monthly abnormality in these individuals, which is also at odds with conventional wisdom and what is stated in classic thyroid literature [17].

The prevalence of menstruation irregularities did not differ between the patients and normal controls in this study, which looked at 90 euthyroid individuals with chronic thyroiditis. We also looked at individuals with thyroid tumors as patient controls to make sure the study technique was appropriate, and no notable anomalies were found. These findings lend credence to the idea that, prior to considering any course of therapy, women who report with irregular menstruation or difficulty conceiving should have a thorough examination for thyroid disease.

Conclusion

The current study shows a strong correlation between different patterns of irregular menstruation in women of reproductive age and thyroid disease. Menorrhagia was more common in euthyroid women, whereas hypothyroidism was the most common thyroid condition and was mostly linked to oligomenorrhea and amenorrhoea. The degree of monthly abnormalities was associated with rising blood TSH levels, indicating the impact of thyroid function on menstrual physiology. These results highlight the significance of routine thyroid function testing, especially serum TSH measurement, in the assessment of women exhibiting irregular menstruation, allowing for early diagnosis and suitable treatment to avoid long-term reproductive issues.

References

1. Deshmukh PY, Boricha BG, Pandey A. The association of thyroid disorders with abnormal uterine bleeding. *Int J Reprod Contracept Obstet Gynecol.* 2015 Jun 1;4(3):701-8.
2. El-Hemaidi I, Gharaibeh A, Shehata H. Menorrhagia and bleeding disorders. *Current Opinion*

- in Obstetrics and Gynecology. 2007 Dec 1;19(6):513-20.
3. Shapley M, Jordan K, Croft PR. Why women consult with increased vaginal bleeding: a case-control study. *The British Journal of General Practice*. 2002 Feb;52(475):108.
 4. Liu Z, Doan QV, Blumenthal P, Dubois RW. A systematic review evaluating health-related quality of life, work impairment, and health-care costs and utilization in abnormal uterine bleeding. *Value in health*. 2007 May;10(3):183-94.
 5. Inya Aliu-Ayo H, Adesina KT, Jimoh AA, Ikwuka AO, Chigozie Udeh F, Biliaminu SA, Ayo OW. Correlation of thyroid gland functions with menstrual patterns amongst infertile and fertile women attending a tertiary care hospital in North-Central Nigeria. *World*. 2023; 3:787.
 6. HH P, Penumalla S, Kandimalla R. Hypothyroidism and Its Impact on Menstrual Irregularities in Reproductive-Age Women: A Comprehensive Analysis at a Tertiary Care Center. *Cureus*. 2024 Jun 25;16(6):e63158-.
 7. Ajmani NS, Sarbhai V, Yadav N, Paul M, Ahmad A, Ajmani AK. Role of thyroid dysfunction in patients with menstrual disorders in tertiary care center of walled city of Delhi. *The Journal of Obstetrics and Gynecology of India*. 2016 Apr;66(2):115-9.
 8. Abid M, Hashmi AA, Malik B, Haroon S, Faridi N, Edhi MM, Khan M. Clinical pattern and spectrum of endometrial pathologies in patients with abnormal uterine bleeding in Pakistan: need to adopt a more conservative approach to treatment. *BMC women's health*. 2014 Nov 5;14(1):132.
 9. Poppe K, Velkeniers B, Glinoeer D. Thyroid disease and female reproduction. *Clinical endocrinology*. 2007 Mar;66(3):309-21.
 10. BURROW GN. The thyroid gland and reproduction. *Reproductive endocrinology*. 1991:555-75.
 11. MacGregor KA. Examining the relationship between menstrual cycle phase with metabolic control and adipose tissue microRNA expression 2021.
 12. Krassas GE. Thyroid disease and female reproduction. *Fertility and sterility*. 2000 Dec 1;74(6):1063-70.
 13. Wang W, Teng W, Shan Z, Wang S, Li J, Zhu L, Zhou J, Mao J, Yu X, Li J, Chen Y. The prevalence of thyroid disorders during early pregnancy in China: the benefits of universal screening in the first trimester of pregnancy. *European journal of endocrinology*. 2011 Feb;164(2):263-8.
 14. Sharma N, Sharma A. Thyroid profile in menstrual disorders. *JK science*. 2012;14(1):14.
 15. Sahu MT, Das V, Mittal S, Agarwal A, Sahu M. Overt and subclinical thyroid dysfunction among Indian pregnant women and its effect on maternal and fetal outcome. *Archives of gynecology and obstetrics*. 2010 Feb;281(2):215-20.
 16. Pontikides N, Kaltsas TH, Krassas GE. The hypothalamic-pituitary-gonadal axis in hyperthyroid female patients before and after treatment. *J Endocrinol Invest*. 1990;13(2 Suppl):203.
 17. Longcope C. The male and female reproductive systems in hypothyroidism. *The thyroid: a fundamental and clinical text*. 1991:1052-5.