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Original Research Article

Association of thyroid dysfunction with menstrual irregularities among women attending a tertiary care hospital in western India: a cross-sectional study

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ABSTRACT

Background: Thyroid dysfunction is a significant yet often underdiagnosed contributor to menstrual irregularities among women of reproductive age. Alterations in thyroid hormone levels can disrupt the hypothalamic-pituitary-ovarian axis, affecting the menstrual cycle in multiple ways. This study aimed to assess the prevalence and patterns of thyroid abnormalities among women presenting with menstrual irregularities in a tertiary care setting in Gujarat, India.
Methods: A hospital-based cross-sectional study was conducted at SSG Hospital, Vadodara, from March 2024 to February 2025. A total of 321 women aged 18-45 years presenting with menstrual irregularities were enrolled. Data were collected using a structured questionnaire covering menstrual history, symptoms of thyroid dysfunction, and clinical examination. Thyroid function tests (TSH, FT3, FT4) were conducted for all participants. Statistical analysis was performed using Chi-square and ANOVA to determine associations between menstrual patterns and thyroid function.
Results: Out of 321 participants, 99 (30.8%) had thyroid dysfunction. Among them, 65 (65.6%) had subclinical hypothyroidism, 21 (21.2%) had overt hypothyroidism, 9 (9.1%) had subclinical hyperthyroidism, and 4 (4%) had overt hyperthyroidism. Oligomenorrhea (36.3%) and menorrhagia (28.2%) were the most common menstrual disturbances associated with thyroid dysfunction. A significant association was observed between hypothyroidism and menorrhagia ($p<0.05$), while hyperthyroidism was more frequently linked with hypomenorrhea ($p<0.05$).
Conclusions: Thyroid abnormalities, particularly subclinical and overt hypothyroidism, are common among women with menstrual irregularities. Routine screening for thyroid dysfunction should be integrated into the evaluation of such cases to ensure early diagnosis and intervention.

Keywords: Menorrhagia, Menstrual irregularities, Reproductive age, SSG hospital, Subclinical hypothyroidism, Thyroid dysfunction

INTRODUCTION

Disruption of thyroid function has been linked to reproductive dysfunction in women and is associated with menstrual irregularity, infertility, poor pregnancy outcomes, and gynecological conditions such as premature ovarian insufficiency and polycystic ovarian syndrome.[1] Thyroid dysfunction, encompassing both hypothyroidism

and hyperthyroidism, has been associated with several menstrual disorders, including oligomenorrhea, polymenorrhea, menorrhagia, and amenorrhea.[2] In one study, among the hypothyroidism group 62% of women had a normal menstrual cycle, whereas 21.5% had oligomenorrhea, 10.1% had polymenorrhea, and 6.3% had amenorrhea, highlighting the spectrum of menstrual alterations.[3] Thyroid dysfunction has been identified as an important etiological factor in menstrual abnormalities, and routine assessment of thyroid function is recommended in all patients with menstrual disorders to avoid unnecessary interventions such as curettage and hysterectomy.[4]

In Indian cohorts, nearly 44% of women with menstrual disturbances were found to have underlying thyroid dysfunction, with subclinical hypothyroidism being the most common abnormality, followed by overt hypothyroidism and hyperthyroidism.[4] Hypothyroidism among women of reproductive age has been strongly linked to menstrual irregularities, polycystic ovary syndrome, miscarriage, and infertility.[5] Several regional studies have reiterated that thyroid dysfunction remains one of the most common causes of menstrual irregularities in reproductive-age women.[6] Furthermore, menorrhagia has been reported as the commonest menstrual abnormality, affecting 27-72% of hypothyroid women, followed by oligomenorrhea in 5-26%.[7] The pathophysiological link is explained by the observation that hypothyroidism causes oligomenorrhea and hyperprolactinemia, while decreasing serum estradiol, testosterone, and gonadotropins, all of which normalize upon achieving euthyroidism.[8] In addition, elevated thyrotropin-releasing hormone stimulates both thyroid-stimulating hormone and prolactin, and increased prolactin levels inhibit luteinizing hormone and follicle-stimulating hormone release, thereby interfering with ovulation.[9]

METHODS

Study design

A cross-sectional observational study was conducted to evaluate the association between thyroid dysfunction and menstrual irregularities among women of reproductive age.

Study area

The study was carried out in the Department of Medicine in collaboration with the Department of Obstetrics and Gynecology at SSG Hospital, a tertiary care center affiliated with Baroda Medical College, Vadodara, Gujarat.

Study period

The data collection was conducted over a period of 12 months, from March 2024 to February 2025.

Sample size

A total of 321 women aged between 18 and 45 years presenting with complaints of menstrual irregularities were enrolled for the study.

Sampling procedure

Participants were selected using consecutive sampling, including all eligible patients visiting the OPD or admitted in the departments during the study period who met the inclusion criteria.

Inclusion criteria and exclusion criteria

Females aged 18 to 45 years presenting with menstrual irregularities such as oligomenorrhea, polymenorrhea, menorrhagia, hypomenorrhea, or amenorrhea who have provided informed consent were included in the study. Women were excluded if they had known thyroid disorders already under treatment, were on hormonal therapy or contraceptive pills in the last three months, or were known cases of PCOS, hyperprolactinemia, diabetes, or structural uterine abnormalities. Pregnant or lactating women were also excluded.

Questionnaire and clinical evaluation

A predesigned, pretested semi-structured questionnaire was used to collect information on: 1) Demographics (age, BMI, socioeconomic status), 2) Menstrual history (cycle regularity, flow pattern, duration), 3) Obstetric history, 4) Associated symptoms (weight gain/loss, fatigue, galactorrhea, hair fall), 5) Family history of thyroid or menstrual disorders.

All participants underwent physical examination, including BMI calculation and signs of thyroid dysfunction and thyroid function tests such as serum TSH, FT3, and FT4.

Classification of thyroid function: 1) Euthyroid: Normal TSH, FT3, and FT4, 2) Subclinical Hypothyroidism: Elevated TSH with normal FT3 and FT4, 3) Overt Hypothyroidism: Elevated TSH with low FT4, 4) Subclinical Hyperthyroidism: Low TSH with normal FT3 and FT4, and 5) Overt Hyperthyroidism: Low TSH with elevated FT3 and/or FT4.

Statistical analysis

Data were analyzed using IBM SPSS version 26. Descriptive statistics were used for demographic variables. Chi-square test assessed associations between thyroid dysfunction and menstrual irregularities. ANOVA was used to compare hormone levels among different menstrual patterns. Binary logistic regression estimated the odds of menstrual irregularities in thyroid disorders, adjusting for age and BMI. A p value <0.05 was considered statistically significant.

RESULTS

Demographic distribution of study participants

Most participants were aged 26-35 years. Over half had a normal BMI, while nearly one-third were overweight.

Table 1: Demographic distribution of study participants (n=321).

Variable	Category	Frequency	Percentage (%)
Age (years)	18-25	101	31.5
	26-35	129	40.2
	36-45	91	28.3
BMI	<18.5 (underweight)	43	13.4
	18.5-24.9 (normal	167	52.0
	≥25 (overweight)	111	34.6

Distribution of menstrual irregularities

Oligomenorrhea was the most commonly reported irregularity, followed by menorrhagia and polymenorrhea.

Table 2: Distribution of menstrual irregularities (n=321).

Type of menstrual irregularity	Frequency	Percentage (%)
Oligomenorrhea	116	36.1
Menorrhagia	91	28.3
Polymenorrhea	41	12.8
Hypomenorrhea	39	12.1
Amenorrhea	34	10.6

Thyroid function status

Among participants, 30.8% of participants had abnormal thyroid function, with subclinical hypothyroidism being the most prevalent.

Table 3: Thyroid function status among participants (n=321).

Thyroid status	Frequency	Percentage (%)
Euthyroid	222	69.1
Subclinical hypothyroid	65	20.2
Overt hypothyroid	21	6.5
Subclinical hyperthyroid	9	2.8
Overt hyperthyroid	4	1.2

Association between thyroid status and menstrual irregularity

Hypothyroidism (especially overt) showed a significant association with heavy menstrual bleeding, whereas hyperthyroidism was more commonly linked with scanty flow or hypomenorrhea.

Table 4: Association between thyroid status and menstrual irregularity.

Thyroid dysfunction type	Most common menstrual pattern	Significant association (chi-square test)
Subclinical hypothyroid	Oligomenorrhea	p = 0.017
Overt hypothyroid	Menorrhagia	p = 0.003
Subclinical hyperthyroid	Hypomenorrhea	p = 0.048
Overt hyperthyroid	Hypomenorrhea	p = 0.041

DISCUSSION

The present study explored the association between thyroid dysfunction and menstrual irregularities among women attending a tertiary care hospital in Western India. Our findings corroborate prior evidence that thyroid hormones play a crucial role in reproductive physiology by modulating the hypothalamic-pituitary-ovarian axis and directly influencing ovarian function.[1,2] Disruption of thyroid homeostasis therefore often manifests as alterations in menstrual pattern, ranging from oligomenorrhea to menorrhagia.[3,4]

Several Indian studies have similarly highlighted the high prevalence of thyroid dysfunction in women with abnormal uterine bleeding (AUB) and other menstrual irregularities. Ajmani et al demonstrated a significant association between subclinical and overt hypothyroidism with menorrhagia and oligomenorrhea.[4] Comparable findings were reported in rural and urban Indian cohorts, where hypothyroidism was found in 15-20% of reproductive-age women presenting with menstrual abnormalities.[5,6] Sharma et al further emphasized that thyroid dysfunction is often overlooked in women with menstrual complaints, underscoring the need for routine thyroid screening.[7]

The impact of hypothyroidism on reproductive hormones has also been well established. Singh et al demonstrated that hypothyroidism significantly alters serum FSH, LH, and prolactin levels, which may contribute to menstrual irregularities and ovulatory dysfunction.[8] In severe cases, hypothyroidism has even been associated with amenorrhea due to disruption of gonadotropin secretion.[9]

Region-specific evidence further strengthens these observations. Jinger et al in Western Rajasthan found hypothyroidism in nearly 39% of women with AUB, most commonly presenting as menorrhagia.[10] Similarly, Bilwal and Garg et al and Aseeja et al reported high rates of thyroid dysfunction among women with menstrual irregularities, suggesting thyroid evaluation as an essential

component of AUB work-up.[11,12] More recently, Purohit et al confirmed a strong association of thyroid disorders and hyperprolactinemia with dysfunctional uterine bleeding in Western India.[13]

Taken together, these findings highlight that thyroid dysfunction is an important but often underdiagnosed contributor to menstrual irregularities. Early detection and correction of thyroid abnormalities not only restores menstrual cyclicity but may also improve fertility outcomes, thereby reducing the burden of undiagnosed endocrine disorders in women of reproductive age. Routine thyroid screening should therefore be considered in the diagnostic work-up of women presenting with AUB or other menstrual disturbances, particularly in resource-limited settings where delayed diagnosis remains common.

This study has several limitations. First, it was conducted at a single tertiary care center, which may restrict the generalizability of the findings to other settings and populations. Second, as the sample was drawn from patients attending the outpatient department, there is potential for selection bias toward individuals already experiencing health-related concerns. Third, the cross-sectional design precludes the establishment of causal relationships between thyroid dysfunction and menstrual irregularities. Fourth, menstrual history was obtained through self-report, which may be subject to recall bias and inaccuracies. Finally, important confounding factors such as stress, polycystic ovarian syndrome, and medication history were not accounted for, which could independently influence menstrual patterns.

CONCLUSION

This study highlights a significant association between thyroid dysfunction and menstrual irregularities among women of reproductive age. Hypothyroidism, both overt and subclinical, was found to be the most prevalent thyroid disorder linked to abnormal menstrual patterns, particularly oligomenorrhea and menorrhagia. The findings underscore the importance of routine thyroid screening in women presenting with menstrual disturbances to ensure early diagnosis and timely intervention. Addressing thyroid abnormalities can lead to better reproductive health outcomes and reduce the burden of undiagnosed endocrine disorders in the population.

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Ethical approval: The study was approved by the Institutional Ethics Committee of SSG hospital, Baroda, Gujarat, India

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