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Corresponding Author
Pranadeep Reddy Inukollu, Department of Obstetrics and Gynaecology, Sree Mookambika Institute of Medical Sciences Kanyakumari, India
Tel: 9843624468
bhuvanamuthu82@gmail.com

Author Designation
[1]Postgraduate
[2]Associate Professor

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Prevalence of Subclinical Thyroid Dysfunction in Reproductive-Age Women Presenting with Abnormal Uterine Bleeding: A Cross-Sectional Study

[1]L. Bhuvaneswari and [2]Pranadeep Reddy Inukollu
[1,2]Department of Obstetrics and Gynaecology, Sree Mookambika Institute of Medical Sciences Kanyakumari, India

ABSTRACT
Abnormal Uterine Bleeding (AUB) is a frequent gynecological complaint among reproductive-age women, with multifactorial etiology. While structural and hormonal causes are well recognized, thyroid dysfunction-particularly in its subclinical form is increasingly being acknowledged as a contributing factor. Subclinical thyroid dysfunction may present without overt symptoms yet cause significant menstrual irregularities, including menorrhagia and oligomenorrhea. To determine the prevalence of subclinical thyroid dysfunction in reproductive-age women presenting with AUB and to correlate bleeding patterns with thyroid status. This cross-sectional study was conducted in the Department of Obstetrics and Gynecology at a tertiary care center, involving 170 women aged 18-45 years presenting with AUB. Detailed clinical evaluation and thyroid function tests (FT3, FT4 and TSH) were performed. Based on TSH levels with normal FT3 and FT4, patients were categorized as having subclinical hypothyroidism or subclinical hyperthyroidism. Out of 170 women, 23 (13.5%) had subclinical hypothyroidism, while 12 (7.1%) had subclinical hyperthyroidism. Menorrhagia was the most common bleeding pattern among those with subclinical hypothyroidism (43.6%), whereas oligomenorrhea was predominant in subclinical hyperthyroidism (75%). A significant number of women with AUB were found to have underlying thyroid dysfunction, emphasizing the importance of early screening. Subclinical thyroid dysfunction is a common, often overlooked cause of abnormal uterine bleeding in reproductive-age women. Routine thyroid function screening in AUB cases can facilitate early diagnosis, appropriate treatment and potentially prevent unnecessary surgical interventions.

INTRODUCTION

Abnormal Uterine Bleeding (AUB) is a common and distressing gynecological complaint characterized by bleeding that deviates from the normal menstrual cycle in terms of volume, frequency, regularity, or duration. It is responsible for a significant proportion nearly 30% of outpatient visits to gynecology clinics worldwide, particularly among women of reproductive age[1]. AUB not only causes physical discomfort but also significantly impacts the emotional, social and professional lives of affected women, often resulting in fatigue, decreased work productivity and impaired quality of life[2].

While structural causes such as fibroids, polyps and adenomyosis are often implicated in AUB, endocrine imbalances also contribute significantly. Among these, thyroid dysfunction stands out as an important yet frequently underrecognized cause. The thyroid gland, through its hormones triiodothyronine (T3) and thyroxine (T4), regulates metabolic processes and has wide-ranging effects on reproductive physiology. Both hypothyroidism and hyperthyroidism can disrupt menstrual regularity, leading to conditions such as oligomenorrhea, polymenorrhea, menorrhagia, or even amenorrhea[3].

Subclinical thyroid dysfunction refers to an asymptomatic or mildly symptomatic state in which serum levels of T3 and T4 remain within the normal range while the thyroid-stimulating hormone (TSH) is either elevated (in subclinical hypothyroidism) or suppressed (in subclinical hyperthyroidism). It is considered a transitional phase that may evolve into overt thyroid disease, especially in the presence of autoimmune thyroiditis[4].

Subclinical hypothyroidism, the more common form in women, has been associated with subtle menstrual irregularities, ovulatory dysfunction, infertility and increased risk of miscarriage. Furthermore, it has systemic implications, including dyslipidemia, cardiovascular morbidity and neurocognitive effects if left untreated[5]. The prevalence of subclinical hypothyroidism among women in the general population ranges from 4 to 10% but it may be significantly higher among those with menstrual abnormalities[6].

Several studies have evaluated the association between thyroid disorders and AUB. A study by Krassas et al. demonstrated that menstrual disturbances occurred in up to 68% of women with thyroid dysfunction, with hypothyroid women more commonly presenting with menorrhagia[7]. Research by Kirar et al. and Prentice et al. further corroborated these findings, showing a significant correlation between elevated TSH and prolonged or heavy menstrual bleeding[8,9].

Notably, studies conducted in South Asia have reported a prevalence of thyroid dysfunction in 20-30% of women presenting with AUB, highlighting a regional health concern possibly exacerbated by nutritional deficiencies, late diagnosis and limited access to endocrine screening[10]. However, many of these studies focus on overt thyroid disease, leaving a significant gap in the literature regarding the prevalence and clinical spectrum of subclinical thyroid dysfunction in this population.

Given the often silent nature of subclinical thyroid disease and its potential progression to overt disease, early detection is essential. Reproductive-age women with AUB represent an important demographic where subtle hormonal imbalances may be the first indication of underlying thyroid pathology. Timely diagnosis and management can help avoid unnecessary invasive investigations and surgeries, reduce healthcare costs and improve reproductive and overall health outcomes.

This study seeks to address this clinical gap by evaluating the prevalence of subclinical thyroid dysfunction among reproductive-aged women presenting with AUB. By identifying the proportion of women affected and correlating bleeding patterns with thyroid profiles, this study aims to provide evidence for the routine incorporation of thyroid function testing into the diagnostic algorithm for AUB.

Aim: To evaluate the prevalence of subclinical thyroid dysfunction among reproductive-aged women presenting with abnormal uterine bleeding (AUB).

Objectives:

- To determine the proportion of women with subclinical hypothyroidism and subclinical hyperthyroidism among those presenting with AUB
- To assess the distribution of various bleeding patterns in relation to thyroid dysfunction
- To evaluate the association between thyroid status and demographic factors such as age and parity in women with AUB

MATERIALS AND METHODS

This hospital-based cross-sectional study was conducted in the Department of Obstetrics and Gynaecology at SMIMS. A total of 170 women, aged between 18 to 45 years, presenting to the gynecology outpatient department with complaints of abnormal uterine bleeding (AUB) were enrolled during the study period.

Inclusion criteria:

- Women aged 18-45 years presenting with abnormal uterine bleeding
- No evidence of obvious genital lesions
- Not currently on hormonal therapy
- No history or evidence of hematological disorders

Exclusion criteria:

- Patients unwilling to participate
- Presence of pelvic infection
- Current use of oral contraceptive pills or Intrauterine Contraceptive Devices (IUCDs)
- Known or suspected malignant lesions of the cervix
- Women already on treatment for thyroid disorders

Data collection: After obtaining informed consent, a detailed history was recorded, including age, parity, type and duration of bleeding and symptoms suggestive of thyroid dysfunction (hypothyroid or hyperthyroid symptoms). A thorough clinical examination was also performed.

Laboratory evaluation: A 5 mL fasting venous blood sample was collected in a plain glass tube (without anticoagulant). Serum was separated and analyzed for:

- Free triiodothyronine (FT3)
- Free thyroxine (FT4)
- Thyroid stimulating hormone (TSH)

Reference ranges:

- FT3: 75-220 ng/dL
- FT4: 4-11 µg/dL
- TSH: 0.5-5 mIU/L

Classification of thyroid function:

- **Euthyroid:** Normal FT3, FT4 and TSH
- **Hypothyroidism:** Decreased FT3 and FT4 with elevated TSH
- **Hyperthyroidism:** Increased FT3 and FT4 with suppressed TSH
- **Subclinical hypothyroidism:** Normal FT3 and FT4 with elevated TSH
- **Subclinical hyperthyroidism:** Normal FT3 and FT4 with suppressed TSH

Data analysis: All data were entered into Microsoft Excel and analyzed using SPSS version 21.0. Descriptive statistics were used to express results as percentages. Associations between thyroid dysfunction and bleeding patterns were assessed using appropriate statistical tests.

RESULTS AND DISCUSSION

Figure 1 illustrates the age distribution of participants. The majority of patients belonged to the 31-40 years age group.

Most of the women presenting with AUB were of parity two (45.9%), followed by parity one (34.8%). Nulliparous women accounted for only 10.5% of the study group (Table 1).

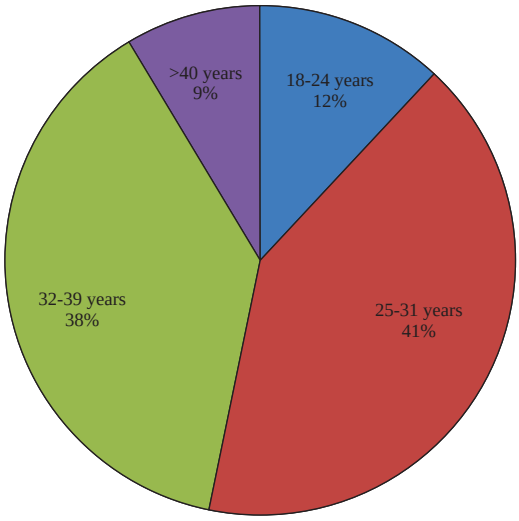

Fig. 1: Age wise distribution of the study participants

Table 1: Distribution of study participants according to parity

Parity	No.	Percentage
Nullipara	18	10.5
P1L1	59	34.8
P2L2	78	45.9
Multipara	15	8.8

Table 2: Distribution of patients according to bleeding pattern

Type of bleeding pattern	No.	Percentage
Acyclical	3	1.8
Hypomenorrhoea	3	1.8
Menorrhagia	29	17.1
Oligomenorrhoea	21	12.4
Polymenorrhagia	12	7.1
Polymenorrhoea	8	4.7

Table 3: Distribution of study participants according to thyroid function

Thyroid dysfunction	N	Percentage
Euthyroid	94	55.3
Hypothyroid	41	24.1
Subclinical hypothyroid	23	13.5
Hyperthyroid	12	7.1

The majority of patients (55.3%) were euthyroid. Overt hypothyroidism was observed in 24.1%, while 13.5% had subclinical hypothyroidism. A smaller proportion (7.1%) had hyperthyroidism (Table 2).

Menorrhagia was the most common bleeding pattern among women with AUB (17.1%), followed by oligomenorrhoea (12.4%). Acyclical and hypomenorrhoea were least common, accounting for 1.8% each (Table 3).

Among women with hypothyroidism, menorrhagia was the most frequent bleeding pattern (46.3%), followed by oligomenorrhoea (19.5%). Subclinical hypothyroidism also commonly presented with menorrhagia (43.6%) and polymenorrhagia (21.7%). In contrast, hyperthyroid patients predominantly exhibited oligomenorrhoea (75%) and hypomenorrhoea (25%) (Table 4).

The present cross-sectional study evaluated the prevalence of subclinical thyroid dysfunction among reproductive-age women presenting with Abnormal

Table 4: Bleeding patterns in thyroid dysfunction

Bleeding pattern	Hypothyroid (n = 41)	Subclinical hypothyroid (n = 23)	Hyperthyroid (n = 12)
Acyclical	2 (4.9%)	1 (4.3%)	0
Hypomenorrhoea	0	0	3 (25%)
Menorrhagia	19 (46.3%)	10 (43.6%)	0
Oligomenorrhoea	8 (19.5%)	4 (17.4%)	9 (75%)
Polymenorrhagia	7 (17.1%)	5 (21.7%)	0
Polymenorrhoea	5 (12.2%)	3 (13%)	0

Uterine Bleeding (AUB). The results showed that 13.5% of the women had subclinical hypothyroidism, while 7.1% had subclinical hyperthyroidism. In addition, a significant number of women with thyroid dysfunction (both overt and subclinical) exhibited specific patterns of menstrual irregularities, particularly menorrhagia and oligomenorrhea. These findings reinforce the growing evidence on the role of thyroid function in regulating menstrual health.

Prevalence of thyroid dysfunction: Our study observed that 13.5% of women with AUB had subclinical hypothyroidism, while 24.1% had overt hypothyroidism. These findings are in concordance with the results reported by Thakur *et al*.[11] who found that 17% of women with AUB had subclinical hypothyroidism in a South Indian hospital-based study. Similarly, a study by Priyanka *et al*.[12] also documented that around 15.5% of women with menstrual disturbances exhibited subclinical hypothyroidism.

The high prevalence of hypothyroidism-including the subclinical variant among women with AUB in our study underscores the importance of routine thyroid screening in this population. Notably, the prevalence in our cohort is higher than that observed in the general population (4-10%) as reported by Hollowell et al. in the NHANES III survey, which indicates a potential association between thyroid dysfunction and AUB[6].

Distribution of bleeding patterns in thyroid dysfunction: The most common bleeding abnormality among women with hypothyroidism and subclinical hypothyroidism in our study was menorrhagia, followed by oligomenorrhea and polymenorrhagia. This is consistent with the findings from Krassas *et al*.[3] who reported that up to 60% of hypothyroid women presented with menorrhagia due to estrogen breakthrough bleeding and unopposed estrogen stimulation of the endometrium. Similarly, research by Bedi *et al*.[13] documented that nearly 44% of hypothyroid patients with AUB reported menorrhagia, reinforcing the link between thyroid hormone deficiency and prolonged or heavy menstrual bleeding. In our study, oligomenorrhea was more frequently observed in patients with hyperthyroidism, a finding consistent with that of Krassas and Pontikides, who noted that hyperthyroid women often experience shortened or irregular cycles due to accelerated metabolism and increased Sex Hormone-binding Globulin (SHBG), which reduces bioavailable estrogen. Moreover, hypomenorrhea was exclusively noted among hyperthyroid women in our cohort, further supporting the association[3].

Subclinical hypothyroidism and menstrual patterns: Interestingly, our study found that subclinical hypothyroidism most frequently presented with menorrhagia (43.6%) and polymenorrhagia (21.7%), mirroring the bleeding profile of overt hypothyroidism. This aligns with the findings of Dhanwal *et al*.[14] who emphasized that subclinical hypothyroidism, though often asymptomatic, may manifest with mild but clinically significant reproductive disturbances such as irregular bleeding, anovulation and infertility.

In addition, Biondi and Cooper noted that subclinical hypothyroidism may impair endometrial receptivity and ovulatory function through subtle disruptions of the hypothalamic-pituitary-ovarian axis, leading to menstrual abnormalities comparable to those seen in overt disease[5].

Age and parity distribution: The majority of our study population fell within the 31-40 years age group, with the highest prevalence of thyroid dysfunction noted in this range. This is consistent with previous reports suggesting that women in their third and fourth decades of life are at an increased risk of developing autoimmune thyroid disease, especially Hashimoto's thyroiditis, the most common cause of subclinical hypothyroidism[15]. Our findings are comparable to the results by Thakur *et al*.[11] who reported a similar age distribution in women diagnosed with subclinical thyroid dysfunction in a gynecologic context.

Clinical implications and recommendations: The findings of this study emphasize the clinical utility of thyroid function screening in women with AUB, even in the absence of classic symptoms of thyroid disease. As subclinical thyroid dysfunction may precede overt disease and is reversible with early treatment, incorporating thyroid testing into the initial evaluation of AUB can aid in diagnosis, guide targeted management and reduce the risk of unnecessary hormonal or surgical interventions.

Given the high prevalence of thyroid dysfunction in our study cohort and its significant association with

specific menstrual patterns, routine evaluation of TSH levels-especially in women aged over 30 and those with a history of irregular or heavy menstrual cycles-appears justified.

CONCLUSION

This study highlights a significant association between thyroid dysfunction and abnormal uterine bleeding in women of reproductive age. A substantial proportion of participants were found to have underlying thyroid abnormalities, with subclinical hypothyroidism emerging as a common yet frequently overlooked contributor. Menorrhagia was the most prevalent bleeding pattern among hypothyroid and subclinical hypothyroid women, while hyperthyroidism was more often linked with oligomenorrhoea.

Early identification and appropriate management of thyroid dysfunction-especially subclinical forms can play a vital role in addressing abnormal uterine bleeding, reducing the need for invasive procedures and improving patient outcomes. Routine screening for thyroid function in women presenting with AUB should therefore be considered a crucial step in clinical evaluation, especially in resource-limited settings where timely intervention can substantially improve quality of life.

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