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**Original Research Article**

# Thyroid dysfunction association with abnormal uterine bleeding

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## ABSTRACT

**Background:** Abnormal uterine bleeding (AUB) is one of the most frequent gynaecological complaints among women of reproductive age. Thyroid hormones play a crucial role in regulating menstrual physiology and their imbalance may lead to a spectrum of menstrual disorders ranging from Infrequent menses to Prolonged bleeding. To detect and evaluate thyroid functional abnormalities in women with AUB and to analyse different patterns of menstrual abnormalities associated with thyroid dysfunction across different age groups.
**Methods:** This was a cross-sectional observational study conducted in the Department of Obstetrics and Gynaecology, SSG hospital, Vadodara. A total of 370 women aged 15–49 years presenting with AUB were included fulfilling the inclusion and exclusion criteria. Detailed history, clinical examination and relevant investigations including thyroid function tests were performed. Patients were classified based on the bleeding patterns, PALM-COEIN system and thyroid status.
**Results:** Out of the total patients studied, 25.39% were found to have thyroid dysfunction, with hypothyroidism being the most common type. Thyroid abnormalities were more frequently seen in women aged 31–40 years. Multiparity was more common in hypothyroid AUB cases. Structural causes like fibroids and adenomyosis were more prevalent among euthyroid women, while functional bleeding patterns were common in thyroid dysfunction.
**Conclusions:** Thyroid dysfunction, especially hypothyroidism, is significantly associated with AUB, particularly in the 31–40 age group. Routine screening of thyroid function in AUB patients is recommended to enable early diagnosis and reduce the need for invasive procedures.

**Keywords:** AUB, Hypothyroidism, Hyperthyroidism, Menstrual irregularities

## INTRODUCTION

AUB is one of the most common gynecological complaints encountered in clinical practice, contributing significantly to morbidity and affecting the quality of life of women in their reproductive, perimenopausal and postmenopausal years.[1] AUB encompasses any deviation from the normal menstrual cycle in terms of frequency, regularity, duration or volume of bleeding. Abnormality of menstruation is primarily a disorder of hypothalamic-pituitary-ovarian axis either through direct effect or indirectly by their effect on target organs. Endocrinological disturbances other than the reproductive hormones form a small but significant sub group in the etiopathogenesis of abnormal uterine bleeding. Amongst the endocrinological causes, after pituitary, thyroid is probably the most important endocrine organ which exerts a broad range of effects on the development, growth, metabolism and function of virtually every organ system in human body.[2,6] Alteration in production and activity of the thyroid hormones thyroxine (T4) and triiodothyronine (T3) may result in menstrual abnormality. Both hypothyroid and hyperthyroidism may result in menstrual disturbances.[3,4] Hyperthyroidism is often associated with oligomenorrhea or amenorrhea, particularly in autoimmune conditions like Graves' disease.[5] Thyroid disorders are 10 times more common in women than men. Although the reason is not clearly understood the high prevalence in women is

possibly due to autoimmune nature of many thyroid disorders.[6,7] Acute AUB refers to an episode of heavy bleeding that, in the opinion of the clinician, is of sufficient quantity to require immediate intervention to prevent further blood loss. Chronic AUB was defined as 'bleeding from the uterine corpus that is abnormal in volume, regularity and/or timing that has been present for the majority of the last 6 months'.

Once bleeding is defined as being abnormal, the acronym PALM-COEIN is now being increasingly used for categorizing causes: polyp (AUB-P), adenomyosis (AUB-A), leiomyoma (AUB-L), malignancy (AUB-M) (and hyperplasia)-coagulopathy (AUB-C), Ovulatory disorders (AUB-O), endometrial (AUB-E), iatrogenic (AUB-I) and not otherwise classified (AUB-N) (Table 2). The 'PALM' components are assessed visually (imaging and histopathology) and the 'COEIN' are non-structural component. Altered thyroid hormone levels affect the pulsatile release of GnRH, leading to anovulation and luteal phase defects.[8]

### *Correlation of thyroid disorders with atypical uterine bleeding*

Thyroid dysfunction significantly influences the female reproductive system, particularly menstrual function, through direct and indirect effects on the hypothalamic-pituitary-ovarian (HPO) axis, metabolism of sex steroids and uterine endometrial response.[9,10] Both hypothyroidism and hyperthyroidism are associated with various patterns of AUB. Hypothyroidism, especially in its clinical form, is commonly associated with menorrhagia, oligomenorrhea and in some cases, amenorrhea.[11]

Mechanisms include disruption of GnRH pulsatility: Altered thyroid hormone levels affect the pulsatile release of GnRH, leading to anovulation. Elevated TRH can increase prolactin secretion, causing hyperprolactinemia, which suppresses ovulation and contributes to menstrual irregularity.[12] Lastly hypothyroidism increases peripheral conversion of androgens to estrone, leading to unopposed estrogen stimulation of the endometrium, which contributes to heavy or irregular bleeding.[13]

Some hypothyroid patients exhibit altered platelet function and decreased clotting factor synthesis, exacerbating menorrhagia.[14] Women with subclinical hypothyroidism may also experience subtle menstrual disturbances, including oligomenorrhea, spotting or anovulatory cycles, especially if TSH is markedly elevated or TPO antibodies are present.[15] Hyperthyroidism is often associated with oligomenorrhea or amenorrhea, particularly in autoimmune conditions like Graves' disease. Mechanisms include increased sex hormone-binding globulin (SHBG): Reduces free estradiol levels, disrupting the menstrual cycle. Direct suppression of gonadotropin release: Excess thyroid hormone can also blunt FSH/LH secretion. Altered metabolism of estrogens and androgens, leads to insufficient endometrial development or inadequate luteal function.[16]

Anovulatory Bleeding also called dysfunctional uterine bleeding, is a type of AUB that occurs without ovulation. It is most common during times of hormonal instability, such as adolescence and perimenopause.[1] In anovulatory cycles ovulation does not occur, so the corpus luteum and progesterone are absent. Oestrogen levels remain unopposed, causing continuous proliferation of the endometrium. Overgrowth, instability and fragility of the endometrial lining and irregular and unpredictable shedding of the endometrium occur. This results in irregular, prolonged and sometimes heavy bleeding. Bleeding can occur after several weeks or months of amenorrhea.

## METHODS

### *Study type*

This was an observational cross-sectional study.

### *Study place*

The study will be carried out in Department of Obstetrics and Gynaecology at SSG Hospital, Baroda.

### *Study duration*

The study duration was of 1 year (July 2024 to June 2025).

### *Study population*

Women between the age of 15 to 49 years, visiting OPD at the Obstetrics and Gynaecology Department of SSG Hospital with AUB.

### *Inclusion criteria*

Females with age above 15 years and under 49 years with AUB giving consent for study were included in the study.

### *Exclusion criteria*

Women were excluded if they had known thyroid disorders already under treatment and also women with history of PID. Women who were pregnant, post-menopausal or who used IUCD were also excluded.

The patients will be enrolled in the present study and will be explained about the nature and purpose of study. 370 consenting patients fulfilling the inclusion and exclusion criteria will be considered for my study.

After taking informed consent, detailed history of patient will be taken as per Proforma. All routine recommended investigations will be done including details.

Thyroid function tests (TSH, free T3, free T4) were performed at the Central Biochemistry laboratory of SSG Hospital using chemiluminescent immunoassay. Reference ranges were TSH: 0.35–4.94 µIU/ml, FT3: 1.53–3.91 pg/ml, FT4: 0.7–1.48 ng/dl

***Statistical analysis***

A standard template was created using Microsoft Excel 2017 to enter the data collected in the present study. Categorical variables were reported as numbers and percentages.

## RESULTS

The maximum proportion of the women are in the age group of >40 years (40.27%), 35.4% in the age group 31-40 years, 15.13% in age group 21-30 years and 9.18% in the age group <=20 years. Among 370 cases of AUB Majority 113 (30.54%) patients were second para, followed by 95 (25.67%) patients were primipara, 73 (19.72%) were third para.

Among 370 patients who came with complain of different bleeding pattern commonest was irregular bleeding (25.67%). Among others 21.89% cases presented with heavy menstrual bleeding, 19.81% cases with prolonged bleeding and 12.97% cases with frequent menses.11.35% patients had infrequent menses, 4.59% patients had amenorrhoea and 1.08% patients had shortened bleeding.

Most common type of AUB is AUB-O (Ovulatory dysfunction) with 146 cases (39.45%). Other frequent types are AUB-L (Leiomyoma/fibroids) with 109 cases (29.45%) and AUB-A (Adenomyosis)–60 cases (16.21%). Structural causes (PALM) account for 49.44% cases and Non-structural causes (COEIN) account for 50.54%. Normal thyroid function (Euthyroid) was observed in the majority of cases (74.59%). Thyroid dysfunction was present in 25.41% of cases, indicating a significant proportion of AUB patients had some form of thyroid disorder. Subclinical hypothyroidism (11.35%) was more common than overt hypothyroidism (8.91%). Hyperthyroidism was the least frequent abnormality (5.13%).

The table describes the various distribution of patients according to their thyroid dysfunction in relation to their abnormal bleeding pattern. Most common across all bleeding patterns is irregular bleeding. Hypothyroidism is most common in prolonged bleeding (8 cases) followed by Heavy bleeding (7 cases) and irregular bleeding (7 cases). Hyperthyroidism is associated more with infrequent menses (6 cases) – consistent with known link to oligomenorrhea/amenorrhea and also observed in amenorrhea (3 cases) and irregular bleeding (7 cases). Euthyroid status is most prevalent across all AUB types. Among 33 hypothyroid cases 16 cases belonged to AUB-O and there were 7 cases of AUB-A and 6 of AUB-L. Among 19 cases of hyperthyroidism majority of cases belong to AUB-O (15).

**Table 1: Distribution of patients according to age, parity.**

| Age (in years) | No. of women | % |
|---|---|---|
| <=20 | 34 | 9.18 |
| 21-30 | 56 | 15.13 |
| 31-40 | 131 | 35.40 |
| >40 | 149 | 40.27 |
| **Parity** | | |
| 0 | 59 | 15.94 |
| 1 | 95 | 25.67 |
| 2 | 113 | 30.54 |
| 3 | 73 | 19.72 |
| 4 or more | 30 | 8.10 |

**Table 2: Distribution of patients according to bleeding pattern, AUB types, thyroid function.**

| Bleeding pattern | No. of women | % |
|---|---|---|
| **Amenorrhea** | 17 | 4.59 |
| **Frequent menses** | 48 | 12.97 |
| **Infrequent menses** | 42 | 11.35 |
| **Prolonged bleeding** | 71 | 19.18 |
| **Shortened bleeding** | 4 | 1.08 |
| **Heavy menstrual bleeding** | 81 | 21.89 |
| **Light bleeding** | 12 | 3.24 |
| **Irregular bleeding** | 95 | 25.67 |
| **AUB types** | | |
| AUB-P | 10 | 2.70 |

Continued.

| Bleeding pattern | No. of women | % |
|---|---|---|
| AUB-A | 60 | 16.21 |
| AUB-L | 109 | 29.45 |
| AUB-M | 4 | 1.08 |
| AUB-C | 2 | 0.54 |
| AUB-O | 146 | 39.45 |
| AUB-E | 31 | 8.37 |
| AUB-I | 4 | 1.08 |
| AUB-N | 4 | 1.08 |
| **Thyroid function** | | |
| Euthyroid | 276 | 74.59 |
| Clinical Hypothyroidism | 33 | 8.91 |
| Subclinical hypothyroidism | 42 | 11.35 |
| Hyperthyroidism | 19 | 5.13 |

**Table 3: Prevalence of thyroid dysfunction according to bleeding pattern.**

| Bleeding pattern | Thyroid dysfunction | | | | Total |
|---|---|---|---|---|---|
| | Euthyroid | Clinical hypothyroidism | Subclinical hypothyroidism | Hyperthyroidism | |
| **Amenorrhea** | 11 | 0 | 3 | 3 | 17 |
| **Frequent menses** | 35 | 4 | 8 | 1 | 48 |
| **Infrequent menses** | 25 | 4 | 7 | 6 | 42 |
| **Prolonged bleeding** | 55 | 8 | 8 | 0 | 71 |
| **Shortened bleeding** | 3 | 0 | 0 | 1 | 4 |
| **Heavy menstrual bleeding** | 69 | 7 | 4 | 1 | 81 |
| **Light bleeding** | 8 | 3 | 1 | 0 | 12 |
| **Irregular bleeding** | 70 | 7 | 11 | 7 | 95 |
| **Total** | 276 | 33 | 42 | 19 | 370 |

**Table 4: Prevalence of thyroid dysfunction according to types of AUB.**

| Types of AUB | Thyroid dysfunction | | | | Total |
|---|---|---|---|---|---|
| | Euthyroid | Hypothyroidism | Subclinical hypothyroidism | Hyperthyroidism | |
| **AUB-P** | 7 | 0 | 3 | 0 | 10 |
| **AUB-A** | 50 | 7 | 2 | 1 | 60 |
| **AUB-L** | 92 | 6 | 10 | 1 | 109 |
| **AUB-M** | 3 | 0 | 1 | 0 | 4 |
| **AUB-C** | 2 | 0 | 0 | 0 | 2 |
| **AUB-O** | 93 | 16 | 22 | 15 | 146 |
| **AUB-E** | 21 | 4 | 4 | 2 | 31 |
| **AUB-I** | 4 | 0 | 0 | 0 | 4 |
| **AUB-N** | 4 | 0 | 0 | 0 | 4 |
| **Total** | 276 | 33 | 42 | 19 | 370 |

## DISCUSSION

In the present study, thyroid dysfunction was detected in 25.41% of women with AUB, indicating that approximately one in four patients had an underlying thyroid abnormality. This finding supports the well-established role of thyroid hormones in regulating the hypothalamic-pituitary-ovarian axis and endometrial function. Among the thyroid disorders identified, subclinical hypothyroidism (11.35%) was the most common, followed by overt hypothyroidism (8.91%), whereas hyperthyroidism (5.13%) was the least frequent abnormality. The predominance of subclinical hypothyroidism is clinically important because these women may have menstrual disturbances despite the absence of overt symptoms of thyroid disease and may therefore remain undiagnosed unless thyroid function tests are performed routinely. A similar prevalence was reported by Sinha et al who observed thyroid dysfunction in 29% of women with AUB, while Sharma et al reported

a prevalence of 35%.[17,18] The slightly lower prevalence in the present study may be attributed to differences in sample size, demographic characteristics, iodine status and diagnostic criteria for thyroid dysfunction. Irregular bleeding was the most common menstrual complaint in the present study. This may be explained by the high proportion of women with ovulatory dysfunction, as anovulatory cycles commonly produce irregular and unpredictable endometrial shedding. Similar observations have been reported by Sinha et al and Padmaleela et al both of whom identified irregular menstrual cycles as one of the predominant clinical presentations in women with thyroid dysfunction and AUB.[19]

Comparable observations have been reported by Ramaneeswari et al who found that most women with heavy menstrual bleeding were euthyroid, whereas hyperthyroidism was rarely associated with menorrhagia.[20] Similarly, in the present study, the majority of women with heavy menstrual bleeding were euthyroid, while hyperthyroidism was predominantly associated with irregular and infrequent menstrual cycles.

The prevalence of thyroid dysfunction observed in the present study (25.41%) is comparable with findings from previous studies. Sharma et al, in an observational study conducted at RNT Medical College, Udaipur, reported thyroid dysfunction in 35% of women with AUB, including 17% with subclinical hypothyroidism, 15% with overt hypothyroidism and 3% with hyperthyroidism. Although the overall prevalence was slightly higher than that observed in the present study, both studies consistently identified subclinical hypothyroidism as the most common thyroid abnormality and hyperthyroidism as the least frequent disorder.

Similarly, Joshi et al conducted a descriptive cross-sectional study at a tertiary care hospital in Eastern Nepal involving 95 women with AUB and reported thyroid dysfunction in 15.79% of cases, with hypothyroidism accounting for 60% of thyroid disorders, followed by subclinical hypothyroidism (26.66%) and hyperthyroidism (13.33%).[21] The mean age of the study population was 33±8 years, with thyroid dysfunction occurring predominantly among women aged 31–40 years. Although the prevalence of thyroid dysfunction in the Nepalese study was lower than that observed in the present study, both studies demonstrated hypothyroidism as the predominant thyroid abnormality among women with AUB.

The present study was conducted at a single tertiary care centre and therefore the findings may not be generalizable to the entire population. The cross-sectional design precluded assessment of the temporal relationship between thyroid dysfunction and abnormal uterine bleeding. Thyroid autoantibodies and long-term treatment outcomes were not evaluated. Larger multicentric prospective studies are required to further establish the association between thyroid dysfunction and different FIGO PALM-COEIN subtypes of AUB.

## CONCLUSION

This study demonstrates that thyroid dysfunction is present in 25.41% of women presenting with abnormal uterine bleeding (AUB), with subclinical hypothyroidism being the most common abnormality and AUB-O the predominant FIGO subtype, highlighting the important role of thyroid dysfunction in ovulatory menstrual disorders. The findings also show that subclinical hypothyroidism is frequently associated with prolonged and irregular bleeding, while hyperthyroidism, although less common, is associated with infrequent menstruation and amenorrhea.

These observations strengthen the evidence for a significant association between thyroid dysfunction and specific patterns of AUB and support the inclusion of thyroid function testing as a routine component of the evaluation of women with AUB, particularly when structural causes have been excluded. By demonstrating the distribution of thyroid abnormalities and their relationship with AUB subtypes in our study population, this study advances current understanding of the clinical spectrum of thyroid-related menstrual disorders and underscores the potential for early diagnosis and appropriate hormonal management to improve patient outcomes while reducing unnecessary invasive interventions.

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