

## ORIGINAL ARTICLE

# Association Between Abnormal Uterine Bleeding and Thyroid Dysfunction: A Cross-Sectional Analytical Study

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**ABSTRACT**

**Background:** Abnormal menstrual patterns are many times associated with thyroid dysfunction which is yet an under evaluated cause.

**Objective:** This study aims to determine the association between abnormal uterine bleeding (AUB) and thyroid dysfunction.

**Materials and methods:** This prospective, single-center, cross sectional analytical study was conducted with all women who were attended with AUB at investigation site. In total, 256 women were enrolled in study. Those with diagnosed thyroid dysfunction were excluded from the study. After assessment of the menstrual pattern, all women were subjected for Abdomino-pelvic ultrasonography and blood tests hemogram and thyroid profile. The women were divided into these categories based on thyroid values: Euthyroid, hyperthyroid, subclinical hypothyroidism and hypothyroid.

**Results:** In this study, the average age of women was 41.48 years. Out of a total of 256 individuals, the majority (62.1%) were found to be euthyroid, indicating normal thyroid function. Hypothyroidism was observed in 29.3% of the women, while hyperthyroidism accounted for 6.3%. A smaller proportion (2.3%) exhibited subclinical hypothyroidism. The most frequent complaint was heavy menstrual bleeding (HMB), reported by 160 individuals, predominantly among those with euthyroidism (61.3%) and hypothyroidism (33.1%). Metrorrhagia occurred in

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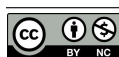
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only three cases, two of which were in individuals with hypothyroidism (66.7%). Isolated thyroid dysfunction was present in 15.6% of the study population, which is significant.

**Conclusions:** Hypothyroidism was significantly associated to HMB. Most women were euthyroid, but altered thyroid function, especially hypothyroidism, influenced menstrual irregularities in a substantial subset. There is need to shed light on isolated thyroid dysfunction.

#### KEYWORDS

• Abnormal uterine bleeding • Thyroid dysfunction • Hypothyroidism

#### Abbreviation:

**AUB:** Abnormal uterine bleeding, **HMB:** Heavy menstrual bleeding, **HRQL:** Health-related quality of life, **HPO:** Hypothalamic-pituitary-ovarian

## INTRODUCTION

Any kind of bleeding that deviates from the typical range in terms of quantity, frequency, duration, and cyclicity is referred to as abnormal uterine bleeding (AUB).<sup>1</sup> The impact of irregular uterine bleeding on a woman's Health-related quality of life (HRQL) stems from the challenges of controlling monthly bleeding as well as the negative effects of excessive blood loss, like exhaustion and iron deficiency anaemia.<sup>2</sup>

In gynecological OPD, AUB is one of the most common presentations. Approximately, 9–14% of women experience this common but complex clinical presentation between menarche and menopause, and it has a major negative impact on the health of the women.<sup>3</sup>

AUB's aetiology includes endocrinological disorders as a major group. Thyroid hormone synthesis and activity are among the endocrinological factors that significantly impact irregular menstruation. Menstrual irregularities are caused by both hypothyroidism and hyperthyroidism, two thyroid hormone disorders.<sup>4</sup> Globally, thyroid diseases are very common. Thyroid diseases have rapidly increased in India in recent years for several reasons, such as an increase in autoimmunity, rapid iodination, and obesity.<sup>5</sup>

According to estimates, 4–5% of people in affluent nations have overt hypothyroidism, while 4–15% have subclinical hypothyroidism.<sup>6</sup> Infertility, polycystic ovaries, irregular menstruation,

and miscarriages are all consequences of hypothyroidism in women.

Thyroid hormone levels affect the hypothalamus-pituitary-thyroid axis's physiology. Menstrual abnormalities or AUB appear prior to the beginning of overt hypothyroidism or hyperthyroidism.<sup>7</sup> In the general population, women are 10 times more likely than men to have thyroid dysfunction.<sup>8</sup> Hyperthyroidism has been associated with oligomenorrhea and amenorrhea, while hypothyroidism has been associated with menorrhagia.<sup>9</sup> Numerous studies have demonstrated that treating thyroid dysfunction can alleviate irregular menstruation.<sup>10</sup>

Currently, surgery and protracted hormonal therapy are part of the treatment procedures for AUB. Debilitating symptoms and an inability to identify the cause typically led to needless surgical procedures, which raise morbidity and mortality<sup>4</sup>. Many women must undergo these hormonal treatments, which subsequently result in surgery after causing further adverse effects like weight gain, headaches, nausea, breast discomfort, raised blood pressure, and changes in sex drive.

The primary aim of this study was to analyse the aetiology of AUB in a cohort of 256 women. This study also sought to analyse the distribution of various causes of AUB, with a particular focus on structural uterine lesions such as endometrial pathology, adenomyosis, and leiomyomas, which are known to be prevalent in women with AUB.

## METHODS

A prospective, single-center, cross-sectional analytical study was conducted for 24 months, from June 2023 to June 2025 at a tertiary care center in Pune. After informed consent and screening of women, the subjects were enrolled in a study. The demographic parameters of women were recorded. In total, 256 women were enrolled in study. All women with AUB were included in the study. Women who had AUB for minimum 3 cycles and were willing to participate in the study were enrolled, whereas those who were already diagnosed with thyroid dysfunction were excluded. Following a detailed history and clinical examination, the patient underwent evaluation - complete haemoglobin count, fT3, fT4, and TSH estimations and ultrasound.

Following that, the women was divided into these categories based on thyroid values: Euthyroid, hyperthyroid, subclinical hypothyroidism and hypothyroid. Age, Pattern of menstrual irregularity, duration of symptoms, CBC, Serum fT3, Serum fT4, serum TSH, USG (abdomen + pelvis) were variables used in study.

Statistical analysis for this study was done using the Mann Whitney U test and *Chi-square* test.

## RESULTS

Out of 256 women, the age range was 19 years to 65 years, with an average of 41.48 years.

**Table 1:** Thyroid status in correlation with Age of women

Thyroid status	Age and TSH level	Mean	SD
Euthyroidism	Age (years)	40.61	9.32
	TSH (uIU/ml)	2.37	1.22
Hyperthyroidism	Age (years)	38.19	11.07
	TSH (uIU/ml)	1.82	2.51
Hypothyroidism	Age (years)	43.59	9.02
	TSH (uIU/ml)	5.73	4.64
Subclinical hypothyroidism	Age (years)	47.17	6.46
	TSH (uIU/ml)	2.70	1.44

Subclinical hypothyroidism was more common in the elderly population with a mean age of 47.17 years; hyperthyroidism was more prevalent in the younger ages with a mean of 38.19.

**Table 2.** Distribution of Menstrual Symptoms

Menstrual Symptoms	Frequency	Percentage
Heavy menstrual bleeding (HMB)	160	62.5
Hypomenorrhea	23	9.0
Metrorrhagia	3	1.2
Oligomenorrhoea	41	16.0
Polymenorrhoea	22	8.6
Postmenopausal bleeding	7	2.7
Total	256	100

HMB was the most frequent symptom, reported in 62.5% of cases, followed by oligomenorrhoea (16%) and hypomenorrhea (9%). Less frequent symptoms included polymenorrhoea (8.6%), postmenopausal bleeding (2.7%), and metrorrhagia (1.2%)

**Table 3:** Association of Menstrual abnormalities with Thyroid Dysfunction

Abnormality	Thyroid Status				Total	Percentage
	Euthyroidism	Hyperthyroidism	Hypothyroidism	Subclinical hypothyroidism		
HMB	98	6	53	3	160	62.5
Hypomenorrhea	14	3	6	0	23	9.0
Metrorrhagia	1	0	2	0	3	1.2
Oligomenorrhoea	27	4	8	2	41	16.0
Polymenorrhoea	16	2	4	0	22	8.6
Postmenopausal bleeding	3	1	2	1	7	2.7
Total	159	16	75	6	256	100
Percentage	62.1	6.3	29.3	2.3	100	

HMB was the most common complaint amongst hypothyroid women, there were

almost equal number of women with oligomenorrhoea and HMB in case of

hyperthyroidism. Women presenting with subclinical hypothyroidism also showed heavy menstrual bleeding more than other menstrual abnormalities as shown in *table 3*.

**Table 4:** Distribution of women as per PALM-COEIN

Variable	Total	Percentage
Polyp	20	7.8
Adenomyosis	45	17.6
Leiomyoma	40	15.6
Malignancy	5	1.9
Coagulopathy	0	0
Ovarian	11	4.3
Endometrial	47	18.5
Iatrogenic	0	0
Not Yet Classified	88	34.3
Total	256	100%

Regarding structural pathologies, endometrial causes were the most common amounting to 18.5%. Adenomyosis and leiomyoma were present in 17.5% and 15.6% of cases, respectively, followed by Polyps in 7.8%. Malignancy was identified in 1.9% of cases and ovarian pathologies were noted in 4.3% of women. Coagulopathies and iatrogenic causes were absent in all women. In total, 34.3% were categorized 'N' as per PALM-COEIN classification.

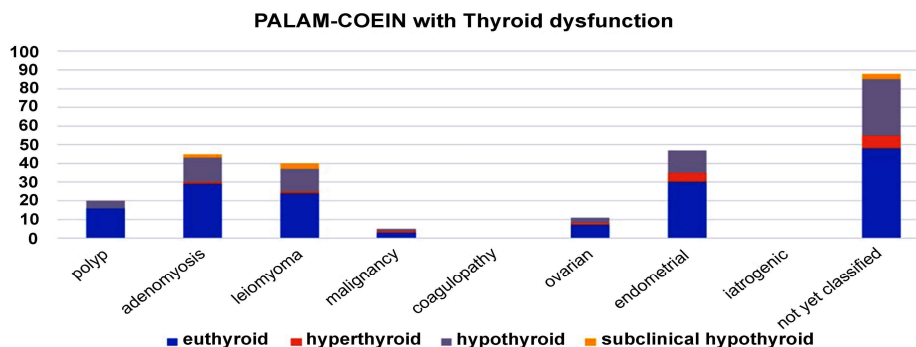
The above table evaluates the association between the FIGO AUB classification with thyroid dysfunction. It shows that there is no association of thyroid dysfunction with organic causes of AUB ( $p > 0.05$ ) as shown in *table 5*. *Figure 1* shows correlation of PALM-COEIN and thyroid disorders.

**Table 5:** PALM-COEIN and thyroid Status

	Thyroid status				Total	Percentage
	Euthyroidism	Hyperthyroidism	Hypothyroidism	Subclinical hypothyroidism		
Polyp	16	0	4	0	20	7.8
Adenomyosis	29	1	13	2	45	17.6
Leiomyoma	24	1	12	3	40	15.6
Malignancy	3	1	1	0	5	1.9
Coagulopathy	0	0	0	0	0	4.3
Ovarian	7	1	3	0	11	18.5
Endometrial	30	5	12	0	47	34.3
Iatrogenic	0	0	0	0	0	17.6
Not yet classified	48	7	30	3	88	15.6
Total	159	16	75	6	256	100

As depicted in the table 6, 4.54% women had euthyroid state, 45.46% of women who had no organic cause were found to have thyroid dysfunction. Out of 256 women, 40 had isolated

thyroid dysfunction, which is approximately 15.6% of the study population, which is significant.



**Figure 1:** PALM-COEIN and thyroid disorders

**Table 6:** Isolated Thyroid dysfunction in AUB

Thyroid dysfunction	Frequency in category 'n'	Percentage
Euthyroidism	48	54.54
Hyperthyroidism	7	7.96
Hypothyroidism	30	34.1
Subclinical hypothyroidism	3	3.4
Total	88	100

## DISCUSSION

Thyroid hormones regulate metabolism and influence the hypothalamic-pituitary-ovarian (HPO) axis, which is crucial for normal menstrual cycles and can thus, alter menstrual patterns.<sup>11</sup> Several previous studies have established a strong link between thyroid dysfunction and AUB.

The presence of thyroid dysfunction in all the AUB women (irrespective of confounding factors) in our study was 37.9% which is along the same lines as Nekkanti D *et al.* (32.36%).<sup>6</sup>

The association between thyroid status and these symptoms was not statistically significant ( $p$ -value>0.26). PALM COEIN classification N shows that isolated thyroid dysfunction was found to be in 15.6% of study population.

HMB was the most frequent symptom in this study, reported in 62.5% of cases, followed by oligomenorrhea (16%) and hypomenorrhea (9%). However, no statistically significant correlation was observed between specific thyroid dysfunctions and menstrual irregularities ( $p$ >0.05). These findings are consistent with Shawl AS *et al.*, who also identified HMB as the predominant menstrual irregularity in thyroid dysfunction.<sup>12</sup> Similarly, Verma K *et al.* reported a strong association between hypothyroidism and AUB, with heavy menstrual bleeding being the most prevalent pattern.<sup>13</sup> However, Sebain A *et al.* found that oligomenorrhea was more common in subclinical hypothyroidism ( $p$ =0.05), suggesting that variations in thyroid dysfunction severity may influence different menstrual disturbances.<sup>14</sup>

In this study, among menorrhagia, 6 (33.1%) had hypothyroid, which was in higher than those studied by Patil *et al* (9.6%) and Nekkanti D *et al* (8.51%), but lesser than Singh *et al* (93.75%).<sup>6,15</sup> In this study, 98 (61.3%) of had euthyroid, similar to Nekkanti D *et al* (65.96%)

but lesser than Patil *et al* (79.1%), and higher than Singh *et al* (28%).<sup>16</sup> Out of the 4 cases with subclinical hypothyroidism, 3 (1.9% of all menorrhagia) had heavy menstrual bleeding as their chief complaint whilst 1 had post-menopausal bleeding. This is lesser than what was reported by Nekkanti D *et al* (23.40%) and Patil *et al* (12.9%). In this study, among menorrhagia, 6 women (3.8%) were found to have hyperthyroidism, which is almost comparable to Nekkanti D *et al* (2.13%).<sup>6,17</sup>

Hypothyroid women had prolonged bleeding durations and heavier menstrual flow compared to other groups, supporting the hypothesis that thyroid dysfunction contributes to dysregulation of hemostasis, further exacerbating menstrual abnormalities.<sup>11,17</sup>

In terms of underlying gynecological conditions, The study found that the association is not statistically significant between thyroid dysfunction and specific gynecological pathologies ( $p$ >0.05), indicating that while thyroid disorders impact menstrual function, they do not necessarily correlate with organic reproductive tract abnormalities.

Regarding other symptoms, 53.5% of women reported abdominal pain, 48% had dysmenorrhea, and 18% experienced dyspareunia, but no strong significant association was found between thyroid disorder and these symptoms ( $p$  > 0.05). This finding aligns with Joshi BR *et al.*, who also observed no direct correlation between thyroid dysfunction and dysmenorrhea.<sup>18</sup> Here, we observe multiple confounding factors for abnormal bleeding that can be categorized into PALM COEIN. There is no association between organic causes of AUB and thyroid dysfunction ( $p$  value > 0.05).

The analysis of the aetiology in this study highlights a diverse range of underlying causes, with significant findings on structural lesions as major contributors. Among the 256 women, the most frequently observed causes were endometrial pathology (18.5%), adenomyosis (17.6%), and leiomyoma (15.6%). These findings align with existing literature, which consistently identifies structural issues as leading causes of AUB, particularly in reproductive-aged women.<sup>19</sup>

The 34.3% of cases categorized as “not yet classified” is a noteworthy finding. This highlights potential gaps in diagnostic

evaluation, where incomplete imaging, lack of histopathological confirmation, or missed diagnoses may leave many cases without a definitive cause. The PALM-COEIN classification system, which separates structural and non-structural causes, could be an effective tool to standardize diagnostic approaches and reduce the percentage of unclassified cases. Including thyroid function tests as a part of standard evaluation for AUB could identify thyroid dysfunction early before complications set in. Since thyroid disorders are a readily treatable cause of AUB, prompt identification and treatment of thyroid abnormalities in women who present with AUB can help to avoid needless surgery, lessen financial strain, and enhance quality of life. While the findings are consistent with existing knowledge regarding the leading causes of AUB, they also highlight areas for improvement in diagnostic practices. The relatively high number of unclassified cases suggests a need for more rigorous diagnostic protocols, such as routine use of advanced imaging and histopathological evaluations. Additionally, greater awareness of conditions like adenomyosis and the inclusion of the PALM-COEIN classification may further refine AUB diagnosis and management in clinical practice.

Further research is recommended to explore long-term impacts and treatment strategies for isolated thyroid-related menstrual disorders.

#### Additional Information/Disclosures

**Human Ethics:** Consent was obtained by all women in this study. Ethics Committee approval was taken from Bharati Vidyapeeth (DTU) College and Hospital, Pune, India with approval file BVDUMC/IEC/63.

**Animal Ethics:** All authors have confirmed that this study did not involve animal subjects or tissue.

**Conflict of Interest:** The authors declare no conflict of interest.

**Conclusion:** Hypothyroidism was significantly associated to HMB. Most women were euthyroid, but altered thyroid function, especially hypothyroidism, influenced menstrual irregularities in a substantial subset. Further research is recommended to explore long-term impacts and treatment strategies for isolated thyroid-related menstrual disorders.

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