Section: Obstetrics and Gynaecology

Original Research Article

A CLINICAL STUDY THYROID DISORDERS IN ABNORMAL UTERINE BLEEDING

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Abstract

Background: The aim is to determine the association between Abnormal uterine bleeding and thyroid disorders in various age groups attending out patient. **Materials and Methods:** This cross-sectional study was conducted over 18 months at the Modern Government Maternity Hospital in Hyderabad, focusing on women aged 11-60 years presenting with various menstrual disturbances. Inclusion criteria encompassed women experiencing heavy menstrual bleeding, intermenstrual bleeding, frequent or infrequent cycles, and acyclical bleeding. Sample size was 256, rounded to 250, and patients attending the gynecological outpatient department with abnormal uterine bleeding (AUB) were included after obtaining informed consent and institutional ethics approval. Detailed patient histories and clinical examinations were performed, along with routine investigations and specific thyroid function tests (T3, T4, TSH) using ELISA. **Result:** The age distribution reveals that the majority of participants are over 30 years old, comprising 44.40% of the sample, with the rest spread across younger age categories. Marital status shows a slight majority of 52.00% being married, and education status indicates that 52.40% are educated. In terms of residence, 53.20% of the participants live in rural areas, while the remaining 46.80% reside in urban areas. Social class distribution highlights that 56.80% of the participants belong to the high social class. Clinical data on parity status shows that 49.20% of the participants have no children, while the rest have one or more children. Menstrual complaints are diverse, with infrequent cycles being the most common, reported by 19.60% of participants, followed by intermenstrual bleeding and heavy menstrual bleeding. Thyroid status indicates that a significant majority of 73.60% are euthyroid, while the rest have various forms of hypothyroidism or hyperthyroidism. The mean and standard deviation values for thyroid hormones T3, T4, and TSH are provided, with T3 averaging 1.52, T4 at 8.75, and TSH at 3.06. **Conclusion:** When examining thyroid hormone levels by menstrual complaints, there is a slight variation in the mean levels of T3, T4, and TSH across different complaints, but overall, the values remain within similar ranges. The distribution of thyroid status by menstrual complaints shows varied patterns, with a notable number of euthyroid participants across all categories.

INTRODUCTION

Abnormal uterine bleeding (AUB) is a term that encompasses any deviation from the normal menstrual cycle, including changes in the regularity and frequency of menstruation, the duration of menstrual flow, or the amount of blood loss. AUB is a significant health issue affecting women of reproductive age and beyond. Globally, it is estimated that 10-30% of women of reproductive age and up to 50% of perimenopausal women experience AUB at some point in their lives. This condition not only impacts the quality of life but also poses substantial challenges to healthcare systems due to the need for diagnosis, treatment, and ongoing management. AUB is a prevalent condition worldwide, affecting millions of women across different age groups. The global prevalence of AUB among reproductive-aged women is reported to be between 10-30%, with higher rates observed in perimenopausal women . In India, AUB is a common complaint among women visiting gynecological

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clinics, with an estimated 20-30% of outpatient department (OPD) visits attributed to this condition . This high prevalence underscores the significant burden of AUB on women's health and the healthcare system.[1-3]

It has been long recognized that thyroid dysfunction may have profound effects on the female reproductive system. A relationship between the thyroid gland and the gonads is suggested by far more frequent occurrence of thyroid disorders in women than in men by clinical appearance of goiter during pregnancy, puberty, and menopause. Thyroid disorders are 10 times more common in women than in men currently subclinical thyroid dysfunction is on the rising side than overt dysfunction. The effect of thyroid hormones is due to the direct metabolic effects on the gonads as well as indirectly through alterations in anterior pituitary hormones that control the sexual functions. Regular menstruation is a feature of contemporary society. Large family size, prolonged breastfeeding and reduced life expectancy limited the number of cycles experienced by women in the past. One of the common causes of women attending gynecology OPD is abnormal uterine bleeding constituting around 30 percentages. The majority of women who present with bleeding problems, no underlying abnormality could be made out. It is quite often this situation tackled with fractional curettage and finally the hysterectomy. AUB encompasses a wide spectrum of disorders such as reproductive tract diseases, systemic diseases, and iatrogenic causes. Thyroid dysfunction accounts for 30%-40% of cases in systemic disorders causing AUB.[4-6] The goal of evaluation of AUB is to arrive at an accurate and clinically useful diagnosis most efficiently and cost-effectively possible. The thyroid function test is helpful in women presenting with AUB to detect subclinical conditions and provide an opportunity to treat the cause. This will avoid unnecessary hormonal treatment, surgery, and reduce patient morbidity.

MATERIALS AND METHODS

A cross-sectional study was carried out at the Modern Government Maternity Hospital, Petlaburj, Hyderabad. The study was conducted over a period of 18 months from 2022 September to 2024 July

The study population included women aged 11-60 years presenting with menstrual disturbances such as heavy menstrual bleeding, intermenstrual bleeding, frequent cycles, infrequent cycles, or acyclical bleeding.

Inclusion Criteria

Women aged 11-60 years with the following menstrual disturbances as heavy menstrual bleeding, intermenstrual bleeding, frequent cycle or infrequent cycles and acyclical bleeding

Exclusion Criteria

Precocious puberty, known cases of coagulopathy, on anticoagulation therapy, pregnancy, on thyroid medication or with a history of thyroid surgeries, on medications like Metformin or corticosteroids, women with an intrauterine contraceptive device (IUCD) in situ, Hyperprolactinemia

Sample Size: The sample size was calculated to be 200 using the formula n=4pq/L2 where:

- p = 10% (proportion or prevalence from previous studies)
- q= 100 - PP = 80%
- LL= allowable error or precision = 5% (0.05)

Thus,

n=4×0.20×0.80(0.05)2=200

n=(0.05) 24×0.20×0.80=256.

This was rounded to 250.

Patients with AUB attending the gynecological outpatient department at MGMH were included in the study after giving informed consent and obtaining Institutional Ethics Committee approval.

Study Procedure: A total of 250 patients with AUB were included. Detailed histories were taken, including age, parity status, and menstrual history (onset, duration, amount of bleeding, and associated complaints). Any complaints regarding thyroid dysfunction were recorded. Clinical examinations included general, systemic, gynecological, and thyroid gland examinations.

Routine investigations were conducted, including complete blood count, blood group typing, fasting and postprandial blood sugars, liver function tests, renal function tests, urine examination (albumin, sugar, microscopy), bleeding time, and clotting time. Pap smears, pelvic ultrasounds, and endometrial biopsies were performed as needed.

All patients underwent serum T3, T4, and TSH estimation using enzyme-linked immunosorbent assay (ELISA). These tests were conducted on random blood samples, as the circadian rhythm variation in TSH secretion is minimal and does not affect the time of blood sampling.

Data Collection: Data were collected on patient demographics, clinical history, examination findings, and laboratory results, including thyroid function tests.

Independent variables included patient demographics, clinical history, and examination findings. Outcome variables were thyroid function test results and the categorization of thyroid status. The study was approved by the Institutional Ethics Committee. Informed consent was obtained from all participants. Patient confidentiality was maintained throughout the study.

Statistical Analysis: Quantitative data were entered into MS Excel and analyzed using SPSS version 20. Descriptive statistics, including mean, median, and frequencies, were used to summarize the data. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The highest proportion of participants are over 30 years old, comprising 44.4% of the sample.

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Participants under 20 years old make up 22.4% of the sample, while those aged 21-25 and 26-30 account for 16.8% and 16.4%, respectively. A slight majority of 52.0% are married, while the remaining 48.0% are not married.

The majority, 47.6%, have no formal education, highlighting a significant portion of the sample with limited educational background. Participants with education ranging from Class 1 to Class 10 constitute 40.0% of the sample, indicating a substantial group with basic educational attainment. A smaller proportion, 12.4%, have achieved education levels beyond Class 10. The majority, 53.2%, reside in rural areas, while 46.8% live in urban areas. The majority, 56.8%, belong to the high social class, while 43.2% are in the low social class. The majority of participants, 49.2%, have no children. Those with one child make up 18.8%, while participants with two and three children constitute 17.2% and 14.8% of the sample, respectively.

Table 1: Demographic Distribution in present study.

Age Category	**Frequency**	**Percent**
<20	56	22.4
21-25	42	16.8
26-30	41	16.4
>30	111	44.4
Total	250	100.0
Marital Status		
No	120	48.0
Yes	130	52.0
Education		
> Class 10	31	12.4
Class 1-10	100	40.0
No formal Education	119	47.6
Area of Residence		
Rural	133	53.2
Urban	117	46.8
Social Class		
High	142	56.8
Low	108	43.2
Parity Status		
0	123	49.2
1	47	18.8
2	43	17.2
3	37	14.8

Table 2: Menstrual Complaints Distribution

Menstrual Complaints	**Frequency**	**Percent**
Hypomenorrhoea	31	12.4
Acyclical Bleeding	40	16.0
Heavy Menstrual Bleeding	42	16.8
Intermenstrual Bleeding	43	17.2
Infrequent Cycles	49	19.6
Frequent Cycles	45	18.0

The most frequently reported complaint was infrequent cycles, accounting for 19.6% of the total cases. This was followed by frequent cycles at 18.0% and intermenstrual bleeding at 17.2%. Heavy menstrual bleeding and acyclical bleeding were reported by 16.8% and 16.0% of the individuals, respectively. Hypomenorrhoea was the least common complaint, observed in 12.4% of the cases.

Table 3: Thyroid Status Distribution

Thyroid Status	**Frequency**	**Percent**
Euthyroid	184	73.6
Overt Hypothyroid	30	12.0
Subclinical Hyperthyroid	6	2.4
Subclinical Hypothyroid	30	12.0
Thyroid level		
T3	1.52	0.39
T4	8.75	1.9
TSH	3.06	1.5

The majority of participants, 184 (73.6%), are euthyroid, indicating normal thyroid function. Both overt hypothyroid and subclinical hypothyroid statuses are observed in 30 individuals each, making up 12.0% of the population for each condition. Subclinical hyperthyroid status is the least common, found in only 6 participants, accounting for 2.4%. there are no patients in study with overt hyperthyroidism. The mean T3 level is 1.52 with an SD of 0.39, indicating a relatively small variability in

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T3 levels among the participants. The mean T4 level is 8.75 with an SD of 1.9, showing a moderate degree of variability. The mean TSH level is 3.06 with an SD of 1.5, suggesting some variation in TSH levels within the population.

Table 4: Thyroid levels by Menstrual Complaints

T3 Levels	Mean	SD
Hypomenorrhoea	1.51	0.43
Acyclical Bleeding	1.49	0.44
Heavy Menstrual Bleeding	1.56	0.4
Intermenstrual Bleeding	1.53	0.34
Infrequent Cycles	1.52	0.36
Frequent Cycles	1.5	0.4
T4 Levels		
Hypomenorrhoea	8.83	1.9
Acyclical Bleeding	8.75	2.01
Heavy Menstrual Bleeding	9.02	1.98
Intermenstrual Bleeding	8.38	1.95
Infrequent Cycles	8.94	1.76
Frequent Cycles	8.58	1.87
TSH Levels		
Hypomenorrhoea	3.35	1.62
Acyclical Bleeding	3.13	1.43
Heavy Menstrual Bleeding	3.04	1.4
Intermenstrual Bleeding	3.16	1.46
Infrequent Cycles	3.14	1.56
Frequent Cycles	2.61	1.51

The mean T3 levels range from 1.49 to 1.56, with heavy menstrual bleeding having the highest mean T3 level (1.56 ± 0.40) and acyclical bleeding the lowest (1.49 ± 0.44). Other complaints such as hypomenorrhoea, intermenstrual bleeding, infrequent cycles, and frequent cycles show mean T3 levels of 1.51 ± 0.43, 1.53 ± 0.34, 1.52 ± 0.36, and 1.50 ± 0.40, respectively, indicating relatively consistent T3 levels among the different complaints. Heavy menstrual bleeding is associated with the highest mean T4 level at 9.02 ± 1.98, while intermenstrual bleeding has the lowest mean T4 level at 8.38 ± 1.95. Hypomenorrhoea, acyclical bleeding, infrequent cycles, and frequent cycles have mean T4 levels of 8.83 ± 1.90, 8.75 ± 2.01, 8.94 ± 1.76, and 8.58 ± 1.87, respectively, indicating some variation in T4 levels among these conditions.

Hypomenorrhoea has the highest mean TSH level at 3.35 ± 1.62, while frequent cycles have the lowest at 2.61 ± 1.51. Acyclical bleeding, heavy menstrual bleeding, intermenstrual bleeding, and infrequent cycles show mean TSH levels of 3.13 ± 1.43, 3.04 ± 1.40, 3.16 ± 1.46, and 3.14 ± 1.56, respectively.

Table 5: Distribution of Thyroid Status by Menstrual Complaints

Menstrual Complaints	Euthyroid (N/%)	Overt Hypothyroid (N/%)	Subclinical Hyperthyroid (N/%)	Subclinical Hypothyroid (N/%)
Hypomenorrhoea	18 (9.78)	8 (26.67)	0 (0.00)	5 (16.67)
Acyclical Bleeding	32 (17.39)	5 (16.67)	0 (0.00)	3 (10.00)
Heavy Menstrual Bleeding	33 (17.93)	2 (6.67)	1 (16.67)	6 (20.00)
Intermenstrual Bleeding	32 (17.39)	5 (16.67)	1 (16.67)	5 (16.67)
Infrequent Cycles	32 (17.39)	7 (23.33)	1 (16.67)	9 (30.00)
Frequent Cycles	37 (20.11)	3 (10.00)	3 (50.00)	2 (6.67)

Frequent cycles have the highest percentage of euthyroid individuals (20.11%), while subclinical hyperthyroid status is most common in frequent cycles (50.00%). Overt hypothyroid is highest in hypomenorrhoea (26.67%), and subclinical hypothyroid is most prevalent in infrequent cycles (30.00%).

DISCUSSION

Nearly half of the participants (49.20%) were nulliparous, while the rest had one or more children, offering a diverse perspective on abnormal uterine bleeding (AUB) across different parity statuses. The most common menstrual complaint was infrequent cycles (19.60%), followed by intermenstrual and heavy menstrual bleeding. Thyroid function analysis showed that 73.60% of participants were euthyroid, while the rest had hypothyroidism or hyperthyroidism. The mean T3, T4, and TSH values were 1.52, 8.75, and 3.06, respectively, with variations reflecting differences in thyroid function among participants.[7]

Heavy menstrual bleeding is a common and distressing gynecological symptom that often necessitates repeated curettage or hysterectomy, both of which carry considerable risks of morbidity and mortality. On average, menstrual blood loss is around 35 ml per cycle, with excessive bleeding classified as more than 80 ml per cycle.[8] The causes of heavy menstrual bleeding vary and may include systemic conditions like hormonal imbalances (particularly

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hypothyroidism and hyperthyroidism), local genital tract abnormalities such as endometrial hyperplasia, pelvic inflammatory disease, endometriosis, benign tumors (leiomyomas, polyps), and malignant tumors (endometrial carcinoma). However, in over half of the cases, the underlying cause remains unidentified. Thyroid dysfunction is a significant contributor to excessive menstrual bleeding and menstrual irregularities. Research shows that heavy menstrual bleeding affects 32% of individuals with myxedema and 32.4% of those with hypothyroidism. Hypothyroidism can also lead to anovulation, infertility, and recurrent miscarriages. The condition often develops gradually, with classic symptoms taking months or even years to manifest. In some cases, heavy menstrual bleeding may be the only noticeable symptom in women with hypothyroidism. With modern hormonal assay techniques, thyroid hormone levels can now be accurately and quickly measured. Treatment for hypothyroidism is highly effective, often resolving all associated symptoms, highlighting the importance of thyroid function evaluation in patients experiencing heavy menstrual bleeding and menstrual irregularities. Early detection and treatment can help prevent unnecessary procedures such as repeated curettage and hysterectomy.[9,10]

In patients with abnormal thyroid function, hypothyroidism was significantly linked to heavy menstrual bleeding as a predominant menstrual irregularity, with a highly significant statistical association ($P \leq 0.001$). Similar observations have been made by various researchers. Doifode et al,[11] reported that 63.3% of hypothyroid patients in their study experienced heavy menstrual bleeding, while Singh et al,[12] found an incidence of 44.4%. Wilansky and Bernard recorded a 100% incidence in their study.[13]

However, the current study reported a 32.5% incidence of heavy menstrual bleeding among hypothyroid patients, which may be due to the exclusion of individuals with clinically evident thyroid symptoms from the outset. These findings reinforce the well-recognized association between hypothyroidism and menstrual disturbances. When examining thyroid hormone levels by menstrual complaints, there is a slight variation in the mean levels of T3, T4, and TSH across different complaints, but overall, the values remain within similar ranges. The distribution of thyroid status by menstrual complaints shows varied patterns, with a notable number of euthyroid participants across all categories. This highlights the complexity of diagnosing and managing AUB in patients with thyroid dysfunction, as thyroid hormones can influence menstrual patterns without always presenting clear deviations from the norm. These findings suggest that while thyroid dysfunction is a contributing factor, it is not the sole determinant of menstrual irregularities.[14]

The presence of thyroid dysfunction, particularly hypothyroidism, has significant implications for reproductive health. Hypothyroidism can lead to various menstrual abnormalities, including heavy menstrual bleeding, infrequent cycles, and frequent cycles. This study confirms previous research that hypothyroidism is prevalent among women with AUB. For instance, Doifode et al,[11] found that 28.17% of their patients with AUB had hypothyroidism, while our study reports 12% with overt hypothyroidism and another 12% with subclinical hypothyroidism. These findings underscore the importance of thyroid function testing in the diagnostic workup of women presenting with AUB, as early detection and treatment of thyroid disorders can significantly improve menstrual symptoms and overall quality of life.

While less common than hypothyroidism, hyperthyroidism also contributes to menstrual irregularities. The study found that 2.4% of participants had subclinical hyperthyroidism, which was notably linked to both infrequent and frequent menstrual cycles. These findings are consistent with existing research, which indicates that hyperthyroidism can disrupt normal menstrual patterns, often leading to lighter and less frequent periods. The hormonal imbalance associated with hyperthyroidism affects the hypothalamic-pituitary-ovarian axis, resulting in significant changes in menstrual function.

Furthermore, the study's demographic analysis highlights the impact of factors such as social class, marital status, education level, and area of residence on the prevalence and nature of thyroid dysfunction and menstrual disorders. Higher rates of thyroid dysfunction were observed among individuals from rural areas and lower socioeconomic backgrounds, likely due to limited healthcare access, nutritional deficiencies, and a lack of awareness about thyroid health. The increased prevalence of hypothyroidism in these groups underscores the need for targeted public health initiatives to improve thyroid health awareness and access to diagnostic services.[15]

In conclusion, this study highlights the intricate relationship between thyroid dysfunction and menstrual irregularities among women with AUB. The findings reinforce the need for comprehensive thyroid function testing in women presenting with menstrual complaints. Understanding the demographic factors that influence thyroid health can aid in designing more effective public health strategies and ensuring better healthcare access for at-risk populations. Future research should focus on longitudinal studies to explore the causal relationships between thyroid dysfunction and menstrual abnormalities further, as well as the impact of timely thyroid treatment on reproductive health outcomes.

The detailed analysis of data and the correlation between thyroid dysfunction and menstrual irregularities emphasize the complex nature of AUB. Our study also underscores the strong link between specific thyroid disorders and particular menstrual issues, highlighting the need for individualized

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patient evaluation. For instance, hypothyroidism was significantly associated with heavy menstrual bleeding, whereas hyperthyroidism was commonly linked to infrequent cycles.[16] These findings are essential for developing targeted treatment approaches and improving patient outcomes. Early diagnosis and proper management of thyroid dysfunction can reduce the severity of menstrual disturbances and enhance the quality of life for affected women. Future research should focus on examining the long-term impact of thyroid hormone normalization on menstrual health and fertility, offering deeper insights into optimal treatment strategies for women with AUB.

CONCLUSION

The study sheds light on the various menstrual irregularities experienced by women aged 11 to 60, emphasizing the significant influence of thyroid function on these conditions. A thorough analysis of the relationship between menstrual disorders and thyroid status revealed that many women with menstrual complaints exhibited fluctuations in thyroid hormone levels. However, the high prevalence of euthyroid status among participants suggests that while thyroid dysfunction plays a key role, it is not the sole factor contributing to menstrual disturbances. This highlights the need for a holistic approach to evaluating and managing abnormal uterine bleeding (AUB), considering multiple physiological and pathological factors.

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