Original Research Article

# Evaluating Patterns Of Abnormal Uterine Bleeding (AUB) In Thyroid Dysfunction At A Tertiary Care Centre In North Kerala , India

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## Abstract

**Background**: Menstrual cycle function is determined by a complex endocrine axis that controls the ovaries and endometrium and it represents the underlying hormonal milieu of the female reproductive system . It is closely related to hypothalamic-pituitary-thyroid axis which controls the thyroid function and is determined by TSH levels. Both hypothyroidism and hyperthyroidism can be associated with abnormal uterine bleeding. Hence, we evaluated the association of Abnormal uterine bleeding(AUB) and thyroid disorders in women of reproductive age group.**Methods**: This research conducted in a tertiary care hospital in North Kerala included 236 women of reproductive age group with abnormal uterine bleeding who attended Department of Obstetrics and Gynaecology, KMCT Medical College, Kozhikode, over a period of 10 months ( December 2018 to October 2019). Detailed clinical history with specific relevance to parity and bleeding pattern was taken and after thorough clinical examination including general, gynaecological and systemic examination , clinical diagnosis of abnormal uterine bleeding was made. FT3 FT4 TSH results were then evaluated and grouped into Euthyroid Hypothyroidism, Subclinical hypothyroidism and Hyper-thyroidism.**Results:** Maximum patients in AUB belonged to the age group of 31-40 years. Maximum patients in the study belonged to para 2 (38.6%).The most common bleeding patterns were HMB (69%) and least common bleeding pattern (1.3%) was amenorrhea. 89% of patients had euthyroid status.11% of patients had thyroid dysfunction out of which subclinical hypothyroidism(6.8%) was more common followed by hypo-thyroidism (2.5%).Least common was hyperthyroidism(1.7%).Subclinical hypothyroidism was the most predominant thyroid dysfunction.**Conclusion**: Hence TSH appears to be the most sensitive test to evaluate thyroid function and is advocated to screen for thyroid abnormality in women who present with AUB especially with non-structural causes of AUB as correction of thyroid abnormalities also relieves AUB.

**Keywords:** Euthyroid , thyroid dysfunction ,hypothyroid, Abnormal uterine bleeding TSH



## Introduction

Thyroid dysfunction is a common cause of Abnormal uterine bleeding (AUB) and accounts for 30-40% of cases[1].Thyroid disorders are 10 times more common in women than men. Approximately 1% of the female population will develop overt hypothyroidism. Abnormal menstrual cycles are occasionally the first sign of hypothyroidism or hyperthyroidism[2].Thyroid disorders are the most common endocrine disorders in India[3]. Incidence of thyroid disorders increases with age and its prevalence is around 26% in women[4].Both hypothyroidism and hyperthyr-oidism can result in menstrual irregularities. AUB is common problem among reproductive women with reported prevalence of 17.9% in India[5]. 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[6].One of the common causes of women attending gynaecology outpatient department is abnormal uterine bleeding (30%). AUB encompasses a wide spectrum of disorders such as reproductive tract diseases, systemic diseases and iatrogenic causes.

**Abnormal Uterine Bleeding (AUB)** is flow outside of normal volume, duration, regularity or frequency. One-third of patient visits to the gynaecologist are for AUB and it accounts for more than 70% of all gynaecological consults in the perimenopausal and postmenopausal years[7] Abnormal uterine bleeding that occurs from adolescence through perimenopause can be broadly divided into two categories: anovulatory and ovulatory. Anovulatory bleeding is characterized by irregular or infrequent periods, with flow ranging from light to excessively heavy[8].Terms commonly associated with anovulatory bleeding include heavy menstrual bleeding(HMB- periodical bleeding which has either increased blood loss or prolonged duration of bleeding days), heavy & prolonged menstrual bleeding(HPMB- AUB in which there is increased amount of blood loss & also increased bleeding days), inter menstrual bleeding(IMB- regular cycles with normal bleeding & bleeding in between cycles) amenorrhea (absence of periods for more than three cycles),oligomenorrhea (menses occurring at intervals of more than 35 days).In contrast to anovulatory patterns, ovulatory abnormal uterine bleeding occurs at regular intervals (every 24 to 35 days), but with excessive volume or duration of more than seven days[9].Excessive menstrual bleeding is defined as the need to change menstrual products every one to two hours, passage of clots greater than 1 inch (2.54cm) and/or ―very heavy periods as reported by the patient[10,11]. It is commonly associated with low ferritin levels[12].The International Federation of Gynaecology and Obstetrics (FIGO) in 2011 published a pair of systems and a set of clinical recommendations to guide clinicians in evidence based management of abnormal uterine bleeding (AUB). This publication included two systems-Terminology and Definitions (FIGOAUB System 1) and the PALM-COEIN system of classification of causes of AUB in reproductive years (FIGO-

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AUB System 2). This classification system proposed by FIGO Menstrual Disorders Group (MDG) is an attempt to standardize the terminology, investigation, diagnosis and management of AUB in non-gravid women of reproductive age[13].In 2018 FIGO has updated the recommendations for both the systems and slightly modified the PALM COEIN system[14]. Thyroid dysfunction accounts for 30% - 40% of cases in systemic disorders causing AUB. Thyroid function should be especially evaluated in cases of HMB. Hypothyroidism and hyperthyroidism can both depress ovarian and menstrual function.

With hyperthyroidism, hypomenorrhea and amenorrhea are more frequent complaints, and HMB is noted in approximately 5 percent. With hypothyroidism, women commonly present with HMB (30%), HPMB, and AUB-O.The goal of evaluation of AUB is to arrive at an accurate and clinically useful diagnosis in the most efficient and cost effective manner possible. 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 and improve the quality of life.Hence clinical objective is to detect and treat thyroid disease before the symptoms and signs are significant .The key to early diagnosis is to maintain a high index of suspicion and to readily screen for the presence of abnormal thyroid function. Moreover, thyroid dysfunction is an easily correctable cause of AUB. Appropriate treatment is rewarded by prompt return of normal menstrual cycles.

**Aims and objectives**

**Aims:** To identify the association between thyroid dysfunction in patient with abnormal uterine bleeding

**Objectives:**

1.To estimate the prevalence of thyroid dysfunction among women with abnormal uterine bleeding

2.To determine the association and analyse the pattern of menstrual irregularities and thyroid dysfunction

**Materials and methods**

**Study Design :** Prospective cross -sectional study

**Study Area:** The study was conducted in both out-patient and in-patient department Department of Obstetrics & Gynaecology, KMCT Medical College, Kozhikode, Kerala.

**Study Duration**: The study was conducted over a period of 10 months from December 2018 to October 2019.

**Selection Criteria**

**Inclusion Criteria**

- Patients attending Gynaecology outpatient with complaints of abnormal uterine bleeding in the age group 15 to 45.
- Ultrasound showing normal uterus and adnexa.

**Exclusion criteria.**

- Diagnosed case of ovarian cyst, palpable uterine fibroid, polyp adenomyosis,endometriosis and malignant tumors (endometrial and cervical).
- Patients with goitre, carcinoma thyroid.
- Patients who are on drugs or hormones, IUCD users , history of bleeding disorders (haemophilia , von Willebrand's disease)
- Pelvic infections including endometritis

**Sample Size** :236

$n = 4pq/L^2$

P = **Proportion or prevalence(from previous studies) =18%**

q=100-p

L= allowable error or precision or variability

p=18% q= 100-p = 0.82 L=5%(0.05)

$n=4x0.18xo.82/(0.05)^2$

n= 236

**Methodology:** This is a prospective cross sectional study conducted after obtaining approval from hospital ethics committee & scientific committee. Total 236 patients were recruited into our study after satisfying all inclusion and exclusion criteria. Complete history was taken from all recruited patients with regards to age, parity, menstrual history, onset and duration of complaints, amount of blood flow and any other specific complaints. Following this, a thorough examination was carried out which includes general physical examination, systemic examination, gynaecological and pelvic examination . All the findings were noted in a pre-designed proforma. Basic routine investigations like Hb, PCV, urine routine, BT, CT, Pap smear and ultrasound of abdomen and pelvis were performed. Then FT3, FT4, TSH was done in all patients. Patients with TSH<0.4 were considered as hyperthyroid and TSH >5 were considered as hypothyroid.

**Based on these values, patients were categorized into 4 groups.**

- Euthyroid
- Hypothyroidism
- Subclinical hypothyroidism
- Hyperthyroidism.

**Normal value**

| | |
|---|---|
| TSH | 0.4-5.0 m IU |
| FT3 | 2.3-4.2pg/ml |
| FT4 | 0.8-2 ng/dl |

All the relevant data was entered in a structured proforma and descriptive analysis was done using SPSS software. Analysis was done in the form of percentages and proportions and represented as tables and figures where necessary.

**Statistical methods** :All statistical procedures were performed using Statistical Package for Social Sciences (SPSS) 20.0. Calculations for power (80%) of study will be performed before commencement of the study. Qualitative variables will be expressed in percentages. Shapiro-Wilk test was used for testing the normality assumption of the data. Chi- square and student t test will be used for association between variables. Probability value (P <0.05) will be considered statistically significant.

**Data collection methods:** Detailed clinical history was obtained from the patient with specific relevance to parity and bleeding pattern, thorough clinical examination including general, gynaecological and systemic examination was carried out. A clinical diagnosis of abnormal uterine bleeding was made. Patient underwent routine blood test and FT3 FT4 TSH results were evaluated and grouped into Euthyroid ,Hypothyroidism ,Subclinical hypothyroidism and Hyperthyroidism

**Results**

Among the 236 patients, 94 belonged to 31-40 years of age which constitutes 39.8% and 88 belong to above 40 years which constitutes 37.3%.

Table 1: Distribution of AUB based on age

Figure 1:Distribution according to parity

The following table shows the relationship of parity and various menstrual symptoms. Among the 236 cases. Para-2 (38.6.0%), followed by Para-3 (22.0).Abnormal uterine bleeding was more in parous women.

Table 2:Distribution AUB based on dysmenorrhea

In our study dysmenorrhoea is present in 40.3%

Table 3:Distribution of patient with AUB Based On Body Mass Index

In our study majority of patient are belonging to the BMI of 18-24.

Table 4:Association between BMI AND pattern OF AUB

Figure 2 :Histogram showing association of BMI and AUB

Table 5:Distribution of patient based on bleeding pattern--This table shows bleeding pattern showing HMB (69.1%) is common followed by IMB(19.9%) and HPMB(9.3%), acyclic (1.3%) and amenorrhoea(0.4%).

Figure 3: Pie chart showing distribution of patients according to thyroid function status.There were 236 cases of AUB. 26 patients had thyroid dysfunction which includes Hypothyroidism, hyperthyroidism and subclinical types. Prevalence of thyroid disorder in our study is 11% ,of which subclinical hypothyroid-

ism(6.8%) was more common followed by hypothyro-idism(2.5%) and then hyperthyroidism(1.7%).

Figure 4:Figure showing distribution of patients according to type of thyroid dysfunction

Table 6:distribution of patients according to age and bleeding pattern

Patients with age less than and equal to 20 years, most common bleeding pattern was hmb (60%) followed with hpmb (20.0%). Imb was present in 20.0% of the cases.Similarly in age groups- 21-30 years, 31 -40 years and >40years the commonest bleeding pattern was hmb.

Figure 5: figure showing patients according to age groups and bleeding pattern

Table 7:distribution of patients according to age and thyroid disorder

This table shows the relation of age of patient to thyroid disorder. All 4 patients have subclinical hypothyroid were younger than 20 years.21-30 years were two and were having hypothyroidism. 31-40 were 4 (40%) and were hypothyroid and 6(60%) ,subclinical hypothyroidism and age >40 years are 10 patient of which 6(60%) are subclinical hypothyroidism and 4(40%) had hyperthyroidism.

Table 8 distribution of thyroid dysfunction in relation with parity

In this table hypothyroidism and hyperthyroidism is more common in para 1 to para 3 and subclinical hypothyroidism is common in para 1 .

Table :9 pattern of bleeding in thyroid dysfunction

Most common menstrual irregularity found in our study is hmb followed by imb in subclinical hypothyroidism (86.7%) and acyclic bleeding is common in hyperthyroidism.

Figure 6 :figure showing pattern of bleeding pattern in thyroid dysfunction

Table 10 :distribution of aub patient in relation with hemoglobin

in our study patent with aub are having haemoglobin in range 8-10 g/dl

**Table 1: Distribution of AUB based on age**

| AGE | Number of patient (n) | Percentage (%) |
|---|---|---|
| <18 | 2 | 0.8 |
| 18-24 | 175 | 74.2 |
| 24-29 | 45 | 19.1 |
| >30 | 14 | 5.9 |

**Table 2: Distribution AUB based on dysmenorrhea**

| Dysmenorrhea | Number of patient | Percentage % |
|---|---|---|
| **Absent** | 141 | 59.7 |
| **Present** | 95 | 40.3 |

**Table 3: Distribution Aub Based On Body Mass Index**

| BMI | Number of patient N | Percentage% |
|---|---|---|
| <18(underweight) | 2 | 0.8 |
| 18-24(normal weight) | 175 | 74.2 |
| 24-29(overweight) | 45 | 19.1 |
| >30(obese) | 14 | 5.9 |

**Table 4:Association between BMI and pattern of AUB**

| BMI | Acyclic | AMENORRHOEA | HMB | HPMB | IMB | Chi square value | P value |
|---|---|---|---|---|---|---|---|
| <18 | 0 | 0 | 2(1.2) | 0 | 0 | 12.07 | 0.44 |
| 18-24 | 2(66.7) | 1(100) | 128(78.5) | 17(77.3) | 27(57.4) | | |
| 24-29 | 1(33.3) | 0 | 26(16) | 3(13.6) | 15(31.9) | | |
| >30 | 0 | 0 | 7(4.3) | 2(9.1) | 5(10.6) | | |
| Total | 3 | 1 | 163 | 22 | 47 | | |

**Table:5 Pattern Of Uterine Bleeding In AUB**

| Bleeding pattern in AUB | Number of patient N | Percentage % |
|---|---|---|
| Acyclic | 3 | 1.3 |
| AMENORRHOEA | 1 | 0.4 |
| HMB | 163 | 69.1 |
| HPMB | 22 | 9.3 |
| IMB | 47 | 19.9 |
| Total | 236 | 100.0 |

**Table :6 Distribution of bleeding pattern with age**

| Age group In years | Acyclic | Amenorrhea | Heavy menstrual bleed (HMB) | Heavy prolonged menstrual bleed (HPMB) | Inter-menstrual Bleed IMB | Chi square value | P value |
|---|---|---|---|---|---|---|---|
| <20 | 0(0.0%) | 0(0.0%) | 18(60.0%) | 6(20.0%) | 6(20.0%) | 28.4 | **0.019*** |
| 21-30 | 0(0.0%) | 0(0.0%) | 12(50.0%) | 0(0.0%) | 12(50.0%) | | |
| 31-40 | 0(0.0%) | 1(1.1%) | 72(76.6%) | 6(6.4%) | 15(16.0%) | | |
| >40 | 2(2.3%) | 0(0.0%) | 61(69.3%) | 10(11.4%) | 14(15.9%) | | |

**p value <0.05 is statistically significant; ** <0.001 is statistically highly significant**

**Table 7:Distribution of patients according to age and thyroid disorder**

| Age group | Hypothyroid | Subclinical hypothyroid | Hyperthyroid | Chi square value | P value |
|---|---|---|---|---|---|
| <20 | 0 | 4(100) | 0 | 18.20 | 0.006* |
| 21-30 | 2(100) | 0 | 0 | | |
| 31-40 | 4(40) | 6(60) | 0 | | |
| >40 | 0 | 6(60) | 4(40) | | |
| Total | 6(23.1) | 16(61.5) | 4(15.4) | | |

**p value <0.05 is statistically significant; ** <0.001 is statistically highly significant**

**Table:8 Distribution of thyroid dysfunction in relation with parity**

| Age group | Para 3 | Para>3 | Para 1-2 | Unmarried | Chi square value | P value |
|---|---|---|---|---|---|---|
| Hypothyroid | 0 | 0 | 6(100) | 0 | 34.12 | 0.000* |
| Subclinical hypothyroid | 0 | 6(37.5) | 6(37.5) | 4(25) | | |
| Hyperthyroid | 4(100) | 0 | 0 | 0 | | |

**p value <0.05 is statistically significant; ** <0.001 is statistically highly significant**

**Table :9 Pattern of bleeding in thyroid dysfunction**

| AUB | Hypothyroid | Subclinical hypothyroid | Hyperthyroid | P value |
|---|---|---|---|---|
| Acyclic | 0(0.0%) | 0(0.0%) | 2(100.0%) | **<0.001**** |
| HMB | 1(6.7%) | 13(86.7%) | 1(6.7%) | |
| HPMB | 0(0.0%) | 0(0.0%) | 1(100.0%) | |
| IMB | 5(62.5% ) | 3(37.5%) | 0(0.0%) | |

**p value <0.05 is statistically significant; ** <0.001 is statistically highly significant**

**Table: 10 Distribution of AUB patient in relation with hemoglobin**

| Haemoglobin (g/dl) | Number of patient(n) | Percentage(%) |
|---|---|---|
| 10-8 | 195 | 82.6 |
| 8-6 | 39 | 16.5 |
| 4-6 | 2 | 0.8 |
| < 4 | 0 | 0 |

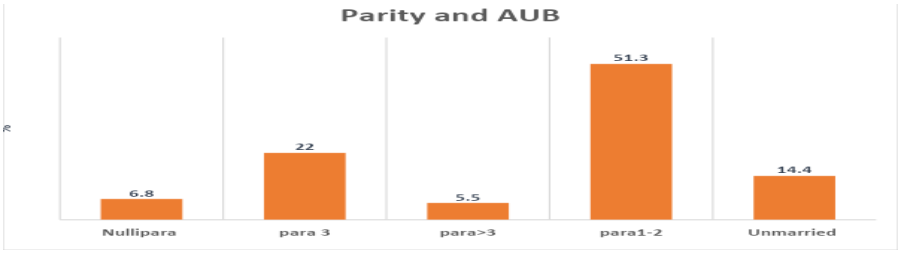


**Fig 1: Distribution of parity with AUB**

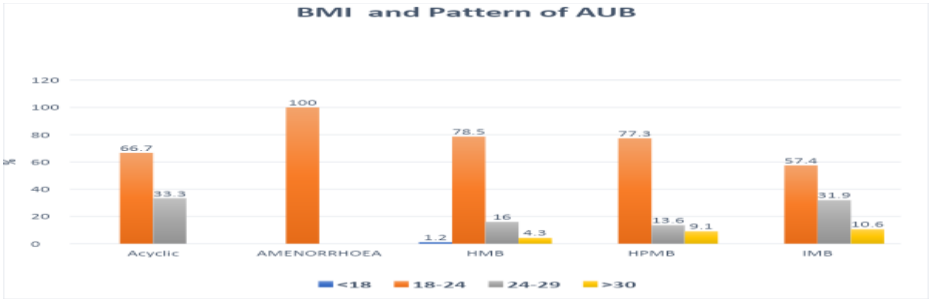


**Fig 2 :Histogram showing association of BMI and AUB**

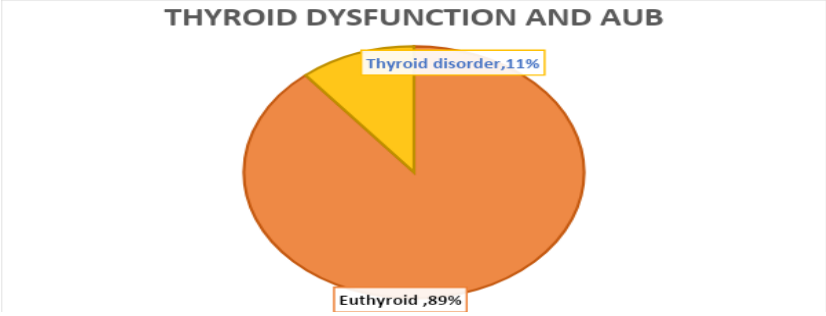


**Fig 3: Pie chart showing distribution of patients according to thyroid function status**

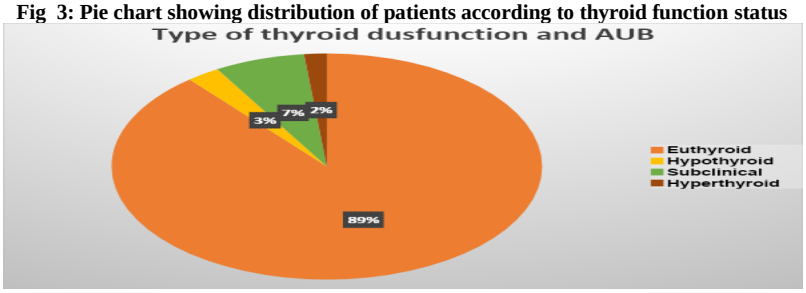


**Fig 4 :Pie -Diagram Showing Distribution Of Patients According To Type Of Thyroid Dysfunction**

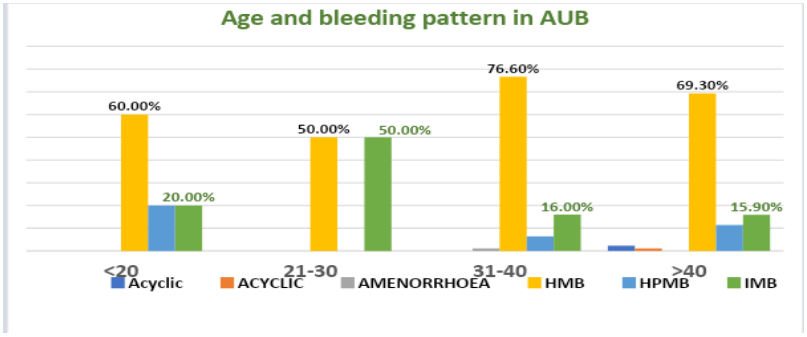


**Fig 5:Histogram showing patients according to age groups and bleeding**

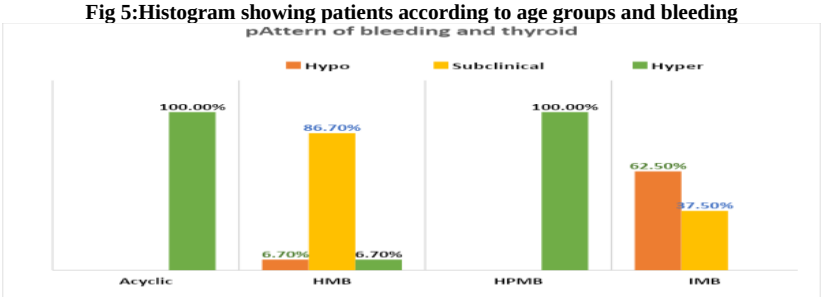


**Fig 6 :Histogram showing pattern of bleeding pattern in thyroid dysfunction**

**Discussion**

In this study 236 women with AUB after excluding local pathology and systemic disease like diabetes mellitus, hypertension and known case of thyroid disorder on medication .Thyroid dysfunction is marked by large number of menstrual irregularities. Maximum number of patients belonged to the age group of 31-40 years followed by more than 40 years and is similar to study by Narula et al[15] and Sangeets Pahwa et al[16], where 32.8% and 42% patients were there in the age group of 31-45 years respectively.Das and Chugh et al[17] reported that highest incidence of AUB was seen in the 41-50yrs (32.5yrs) of age group and then 31-40yrs( 28.2%) .In the present study, majority of patients were multiparous.Para 2 (38.6) was followed by nulliparous (21.2) and was similar to the report by Pilli et al[18], where in 87% of the patients were multiparous women and nulliparous women were only 7%[19].This contradicts to the study done by Ashok Kumar H, S, Saravanan S[20] where nulliparous (43%) were followed by women with two live children(40%). Even

though nulliparous women presents earlier to gynecology OPD for infertility evaluation, nulliparous predominated in that done by Ashok Kumar (43%)Patients were categorized on the basis of WHO criteria for body mass index. BMI of range 18-24 (74.2%) were followed by BMI of 24-29 who were overweight (19.1%) and BMI >30 obese were only 5.9%. Least were underweight BMI <18 (0.8) Obesity is the main cause of hyper-estrogenism. Thyroid hormone deficiency slows metabolism, resulting in a decrease of resting energy expenditure, oxygen consumption, and utilization of substrate.The effect of thyroid hormone deficiency on appetite and energy intake is not precisely known but energy expenditure certainly decreases, leading to a slight net gain in energy stores. Body weight increases on average by 10% due to an increase if body fat and retention of water and salt. An increase of adipose tissue mass results in an increase of serum leptin, which mediates a decrease in energy intake while energy disposal increases, eventually leading to a reduction in adipose tissue mass. Interactions between leptin and thyroid hormone have thus attracted much interest[18]Knudsen et al[21] studied a group of 4082 patients about the association between thyroid function and body mass index. It showed a positive association between BMI and TSH level, negative association between BMI and serum T4 and no association between BMI and serum T3 levels but in Knudsen et al ,BMI is categorized based on Asian specific classification where many subjects were in group of 23 to 24.9kg/$m^2$ In study conducted by Haberette[22] , they showed positive correlation with overweight and thyroid dysfunction In our study prevalence of thyroid dysfunction was 11% of which subclinical hypothyroidism (6.8%) was more common followed by hypothyro-idism(2.5%) and then hyperthyroidism(1.7%) which was comparable to that seen in Padmaleela et al(18.1%[23], Kaur et al [26] (14%) . Doifode CD et al [24] have stated that any menstrual irregularity in non-pregnant women justifies screening for thyroid disorders.The most common type of AUB presentation was HMB, (69.1%). In thyroid dysfunction, HMB constitutes the highest abnormality (69.1%) and least is amenorrhoea(0.4%) Next to HMB was IMB(19.9%). HPMB constituted 9.3% while acyclic was 1.3% . Thyroid dysfunction has significant association and is similar to study done by Prentice[25] Kaur[26] Puspha Bikha[27] Rom et al Wilkansky [28]. This study was against the study of Koutras[1] which revealed frequent cycles prevalent high in hypothyroidism. In our study common age group for thyroid dysfunction was 31-40 and >40 years and is similar to study done by Sangeetha Pahwa[16] et al where 42% were in the age group of 31-40 years. This is in contrast to the findings by K. Padmaleela et al[23] .Das and Chugh[17] reported the highest incidence of thyroid dysfunction of 32.5% was in 41-50 years of age and 32.8% in the age group of 31-40 years of age in the study done by Narula et al[15].Most common menstrual irregularity found in our study was HMB followed by IMB in subclinical hypothyroidism(86.7%). Acyclic bleeding frequently presented in hyperthyroidism. HMB and IMB alone or combined, constituted the abnormal menstrual pattern in 75% of the patients in a study conducted by Scott and Mussey [29] as in the present research. Ingbar et al[30] and Pearce et al[31] in their study opined menstrual irregularity was significantly more common in hypothyroidism or hyperthyroidism as compared to control cases According to Redmond, any type of menstrual irregularity can occur with either thyroid dysfunction [32].Acyclic irregular bleeding was common in hyperthyroidism followed by HMB and HPMB and is similar to that done by Kaur[26].(40%) of the hyperthyroid patients had oligomenorrhea, (40%) had HMB and 1 (10%) patient with irregular bleeding pattern. Least common menstrual irregularity is amenorrhoea. Haemoglobin levels in AUB patient showed normal range of 10gm /dl in 82.6% cases and there was no significant association between AUB and haemoglobin levels.

**Conclusion**

It can be concluded that there is significant association between thyroid dysfunction and menstrual disorders .Hence timely and with prompt evaluation of patient with non-structural cause of AUB in reproductive age women with TSH and as prevalence of subclinical hypothyroidism is high, evaluation with FT3, FT4, TSH should be part of investigation. so as to prevent unnecessary surgery and improve the mental, physical and better quality of life in reproductive women.

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