

Study of Correlation between Thyroid Disorders and Menstrual Disorders

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Abstract

Background: The relation between menstrual irregularities and thyroid disorders are attributed to multiple mechanisms. Menstrual disturbances may accompany and even may precede thyroid dysfunction. In the present study thyroid status of patients presenting with abnormal uterine bleeding was assessed by TSH, T3, and T4 assay.

Materials and methods: The present study was a hospital based prospective study, conducted in the Department of Obstetrics and Gynecology department of Tertiary care center during 1st June 2016 to 31st June 2018. The study group was comprised of women attending Obstetrics and Gynecology department, presenting with menstrual disorder.

Results: Patients with age less than or equal to 20 years, most common bleeding pattern was oligomenorrhoea (50%). Followed by Hypomenorrhoea (25%) and menorrhagia (9%) Oligomenorrhoea was present in 40 (32%) of the cases in age group 21- ≤ 30 years.

Conclusion: Abnormal uterine bleeding is frequently seen to be associated with thyroid dysfunction and in majority of the patients, menstrual abnormality may even precede the occurrence of other clinical signs and symptoms of thyroid dysfunction.

Keywords: Menstrual cycle; Menstrual disturbances; Thyroid function; Abnormal uterine bleeding.

Introduction

Normal reproductive behavior and physiology is dependent on having essentially normal levels of thyroid hormone [1]. Thyroid hormones play an important role in normal reproductive function both through direct effects on the ovaries and indirectly by interacting with sex hormone binding proteins. Thyroid dysfunction can lead to menstrual irregularities and infertility [2]. Diseases of the thyroid gland are among the most abundant disorders worldwide second only to diabetes [3]. Abnormal uterine bleeding is a common clinical problem among women of reproductive age group and with the reported prevalence of about 17.9% in India [4]. By definition abnormal uterine bleeding is menstrual flow outside of normal volume, duration, regularity or frequency. Adolescent and perimenopause women are affected most often. Thyroid hormones play a key role in the menstrual and reproductive function of women and thyroid disorders are 10 times more common in women than men [5]. Women with thyroid dysfunction often have menstrual irregularities, infertility and increased morbidity during pregnancy. Although the reason is not clearly understood the high prevalence of thyroid disorders in women

is possibly due to autoimmune nature of thyroid disorders. The objective of present study is to find the correlation between thyroid disorders and AUB in women attending gynecology OPD.

Thyroid responsiveness by the ovaries could be explained by presence of thyroid hormone receptors in human oocytes. While activity of the thyroid is closely linked with the process of ovarian maturation, the thyroid gland is itself dependent on direct and indirect stimuli from the ovary to discharge its own function [6]. Menstrual disturbances may accompany and even may precede thyroid dysfunction. In the present study thyroid status of patients presenting with abnormal uterine bleeding was assessed by TSH, T3, and T4 assay. Hypothyroidism is usually associated with heavy menstrual bleeding [7]. Hyperthyroidism in contrast is associated with oligomenorrhoea and the decrease in flow. Subclinical hypothyroidism is defined as a serum thyroid stimulating hormone (TSH) above the defined upper limit of the reference range, with a serum free thyroxin (T4) within the reference range. Recently "occult" menorrhagia has been found to be an early manifestation of subclinical hypothyroidism with disease becoming symptomatic later.

The relation between menstrual irregularities and thyroid disorders are attributed to multiple mechanisms [8]. They are altered TSH response, TRH induced increased prolactin levels, altered LH response, peripheral conversion of androgens to estrogens, altered sex hormone binding globulin (SHBG) and effect on the coagulation factors. In hypothyroidism, TRH induced hyperprolactinemia alter the GnRH pulsatile secretion and it leads to defective or delay in LH response leading to luteal phase defect and anovulation. For proper production of progesterone, the synergistic effect of FSH mediated LH receptor are important and they are directly influenced by thyroid hormones. Hypothyroidism also alters peripheral metabolism of estrogens by decreasing SHBG production leading to abnormal feedback at pituitary level. Apart from effect on ovulation, hypothyroidism also causes menorrhagia by altering coagulation factors i.e., decrease in factors VII, VIII, IX, XI. SHBG production increases in hyperthyroidism. The metabolism of estrogen is altered and peripheral conversion of androgens to estrogens is increased. Hyperthyroxinemia increases the gonadotropin response to GnRH and baseline gonadotropin concentrations are also frequently elevated. The decrease in menstrual flow may also relate to effects on hemostatic factors, including the synthesis of factor VII [9].

The present study was conducted to evaluate and detect the thyroid dysfunction and its correlation in patients with menstrual disorder in reproductive age group.

Material and Methods

The present study was a hospital based prospective study, conducted in the Department of Obstetrics and Gynecology department of Tertiary care center during 1st June 2016 to 31st June 2018. The study group was comprised of women attending Obstetrics and Gynecology department, presenting with menstrual disorder.

Sample size: This study consists of 520 patients. By N Bhavani *et al.* [10]

Among 200 cases 38 had thyroid dysfunction

$$n = pq \div 5^2$$

p - Prevalence

$$q = 1-p$$

As per this formula minimum 62 cases of abnormal uterine bleeding should be studied.

Ethical committee gave sample size about 520

Inclusion Criteria

1. All women with AUB in reproductive age group (menarche to 40 yr).

Exclusion Criteria

1. Contraceptives users: IUCD users, oc pills, inj.DMPA
2. Bleeding disorders.

Methodology

All women visiting the department for first time with complaint of abnormal uterine bleeding selected for the study after taking consent according to inclusion criteria.

A detailed history was taken regarding the symptoms and signs of thyroid disorders, menstrual history, obstetrics history, past history, medical history, family history, and personal was taken. A thorough history was taken regarding age, bleeding pattern, onset, duration, quantity of bleeding.

A thorough clinical examination including general physical examination was done with reference to pulse, BP, temperature, respiratory

rate was noted followed by CVS, CNS, RS, Local examination of thyroid, per abdomen and gynecological examination were carried out.

All recruited patients were subjected to routine investigations like hemoglobin, RBSL, routine urine examination, bleeding and clotting time, ultrasound of abdomen and pelvis.

Then all patients were subjected to TSH. If TSH deranged was observed then T3, T4 levels were checked and patients were diagnosed according to test results and further medical management was done. TFT was carried out by using TOSOH AIA 360 analyzer machine. lab values were.

T3-52-185 ng/ml, T4-4.6-10.7 ug/dl, TSH-0.28-6.82 uIU/ml).

Statistical Analysis

The collected data was compiled in Microsoft excel 2010. Data describing quantitative measures was expressed as mean, median, standard deviation. Qualitative type of data was expressed as

percentage or proportion. Data was analyzed using SPSS (statistical programme for social sciences) software 21 versions, open Epi software version 2.3. For quantitative type of data test of significance applied was student t test and for qualitative data Chi square test was applied. 'p' value less than 0.05 is taken as significant. Results were graphically represented where deemed necessary.

Results

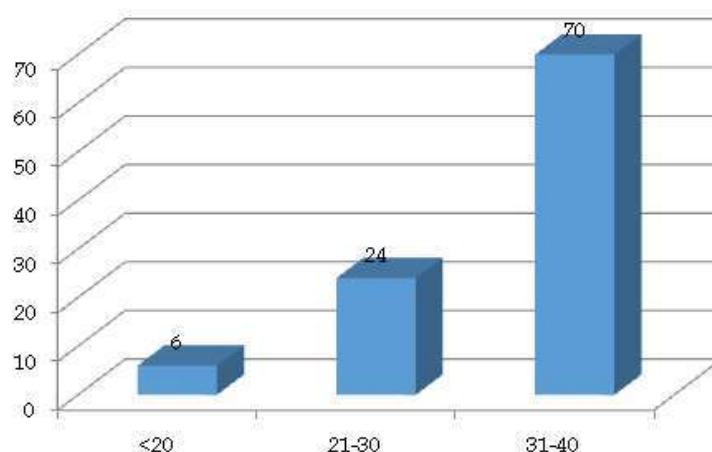
A prospective analytical study was conducted with 520 patients to assess the prevalence of thyroid disorder in abnormal uterine bleeding. Among 520 women majority patients belong to the age group between 31 to 40 years (70%) followed by 21 to 30 years and 6% were in age group < 20 years. (Table 1) (Fig. 1).

Age wise distribution of Hypothyroidism and Hyperthyroidism cases among abnormal uterine bleeding patients showed that though thyroid

Table 1: Distribution of patients according to age groups and bleeding pattern

age	No of cases	Menorrhagia	Metrorrhagia	Polymenorrhoea	Oligomenorrhoea	Hypomenorrhoea	Poly-Menorrhagia
<20	32	3 (9%)	1 (3%)	3 (9%)	16 (50%)	8 (25%)	1 (3%)
21-30	124	27 (22%)	11 (9%)	17 (14%)	40 (32%)	18 (14%)	11 (9%)
31-40	364	181 (50%)	76 (21%)	62 (17%)	9 (2%)	14 (4%)	22 (6%)

Distribution of age



Graph 1: Distribution of cases according to their age

dysfunction was seen in all age groups, it was most common in 21–40 years (38%). And in age group less or equal to 20 it is 23%. For this table p value was 0.08 which not significant. (Table 2).

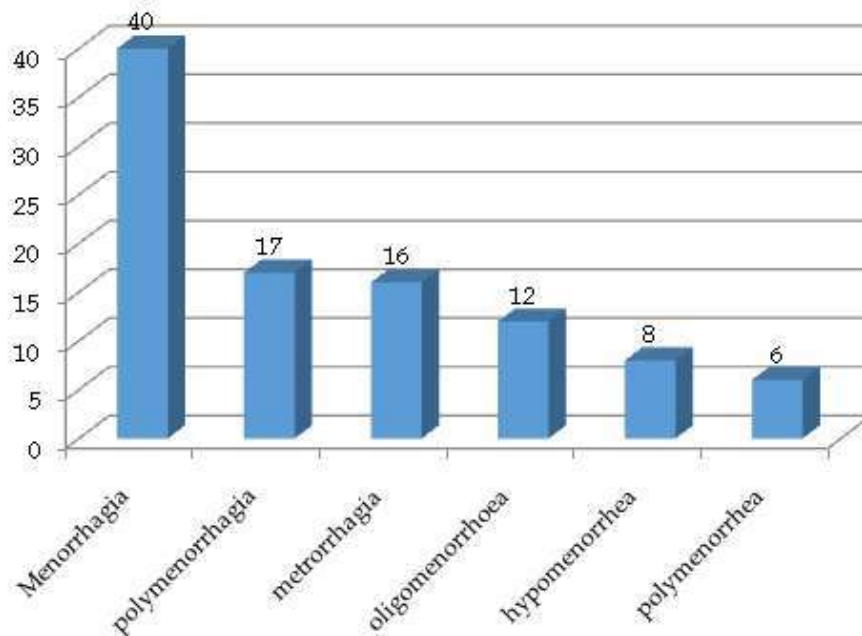
Patients with age less than or equal to 20 years, most common bleeding pattern was oligomenorrhoea (50%). Followed by Hypomenorrhoea (25%) and menorrhagia (9%) Oligomenorrhoea was present in 40 (32%) of the cases in age group 21–≤30 years. Second most common bleeding pattern is menorrhagia and 31–≤40 years the commonest bleeding pattern was menorrhagia (50%). Followed by Polymenorrhoea and Metrorrhagia. p value is highly significant <0.000001. Commonest bleeding

pattern in among 520 cases found menorrhagia 40% followed by Metrorrhagia 17%. Among others 16% of presented with Polymenorrhoea, 12% of them had Oligomenorrhoea, 8% with Hypomenorrhoea, 6% with Polymenorrhagia. (Table 3) (Fig. 2).

Among 520 cases maximum number of patients with abnormal uterine bleeding are euthyroid 82% and 16% belongs to hypothyroid. About 13% normal patients with abnormal uterine bleeding belong to category of subclinical hypothyroid. Profound hypothyroid present in 3%. Only 2% of cases had hyperthyroidism though they were clinically normal. (Fig. 3).

Table 2: Thyroid dysfunction in different age group

age	No. of cases	Euthyroid	Overt hypothyroidism	Sub hypothyroidism	hyperthyroidism	Total thyroid dysfunction
<20	32	25 (78%)	3 (9%)	4 (12%)	0	7 (22%)
21-30	124	95 (77%)	4 (3%)	21 (17%)	4 (3%)	29 (23%)
31-40	364	309 (85%)	7 (2%)	42 (11%)	6 (2%)	55 (15%)



Graph 2: Pattern of bleeding

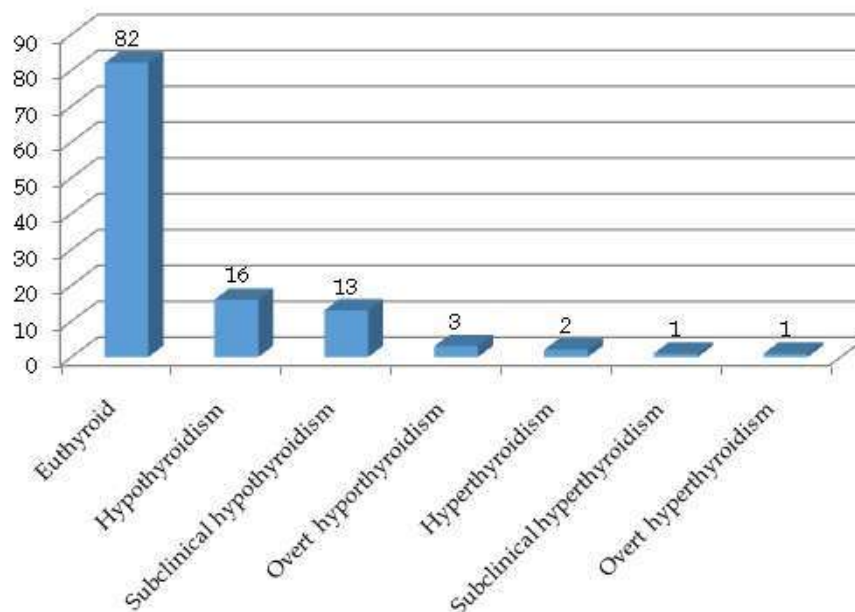
Other causes of bleeding

According to FIGO PALM COEIN classification causes of AUB included both structural and nonstructural causes. Structural causes were Polyps, Adenomyosis, Leiomyoma, Malignancy and Hyperplasia and nonstructural causes were

including Coagulopathy, Iatrogenic and not classified. In this study 18% (91 cases out of 520) had thyroid dysfunction, 8% (42 out of 520) were non classified causes of AUB and 76% had abnormal uterine bleeding because structural causes. Thyroid dysfunction was commonest in patients with Polymenorrhoea (26%) and menorrhagia

Table 3: Correlation between pattern of bleeding and thyroid dysfunction

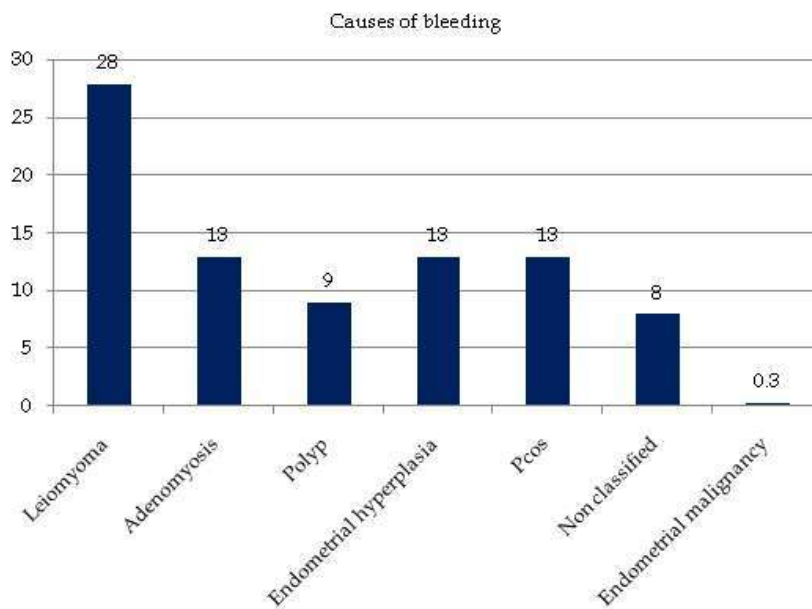
Pattern of bleeding	No of cases	Euthyroid	Overt hypothyroidism	Subclinical hypothyroidism	Overt Hyperthyroidism	Subclinical hyperthyroidism	Total thyroid dysfunction
Menorrhagia	211	166(79%)	5(2%)	39(18%)	1(1%)	0	45(21%)
Hypo menorrhoea	40	36(90%)	0	2(5%)	0	2(5%)	4(10%)
Polymenorrhagia	34	29(85%)	2(5%)	3(9%)	0	0	5(15%)
Oligo menorrhoea	65	56(86%)	1(1%)	1(1%)	4(6%)	3(5%)	9(14%)
Metrorrhagia	88	82(93%)	3(3%)	3(3%)	0	0	6(7%)
Polymenorrhoea	82	60(73%)	3(4%)	19(23%)	0	0	21(26%)
Total	520	429(82%)	14(3%)	67(13%)	5(1%)	5(1%)	91(17%)



Graph 3: Thyroid dysfunction

Table 4: Correlation between other causes of bleeding and thyroid dysfunction

Causes of bleeding	No of cases	Euthyroid	Overt hypothyroidism	Subclinical hypothyroidism	Overt hyperthyroidism	Subclinical hyperthyroidism	Total thyroid dysfunction
Leiomyoma	147	140 (95%)	0	7 (5%)	0	0	7 (5%)
Adenomyosis	69	68 (99%)	0	1 (1%)	0	0	1 (1%)
Polyp	48	48 (100%)	0	0	0	0	0
Endometrial Hyperplasia	66	62 (94%)	0	4 (6%)	0	0	4 (6%)
PCOS	67	67	0	0	0	0	0
Non classified	42	42	0	0	0	0	0
Endometrial malignancy	2	2	0	0	0	0	0
Total	441	429 (97%)	0	12 (3%)	0	0	12 (3%)



Graph 4: Percentage of other causes of bleeding

(21%) followed by Polymenorrhagia (15%) and oligomenorrhoea (14%). Thyroid dysfunction was least common in Hypomenorrhoea and Metrorrhagia. p value is 0.009 which was highly significant. Among structural causes, leiomyoma and endometrial hyperplasia is associated with thyroid dysfunction and almost all patients have subclinical hypothyroidism. (Table 4) (Fig. 4).

Discussion

Thyroid disorders in general and Hypothyroidism in particular is extremely common especially in women. Menarche, Pubertal growth and development, menstrual cycles, fertility and fetal development, post-partum period, reproductive years and menopausal years are profoundly influenced by the thyroid status of the women. Both hyper and hypothyroidism may result in menstrual

disturbances.

Menorrhagia is a frequent debilitating symptom in gynecological practice resulting in need for repeated curettage and hysterectomy with its attendant morbidity and mortality. Objective measurements have shown that mean menstrual blood loss in each menstrual cycle is 35 ml and menstrual blood loss is considered to be excessive when it is more than 80 ml per cycle (90th percentile). The etiology of menorrhagia is very diverse. It may be due to systemic conditions like hormonal imbalance (usually hypothyroidism and hyperthyroidism), or local lesions of genital tract like endometrial hyperplasia, pelvic inflammatory disease, endometriosis, benign tumors (leiomyoma, polyps) and malignant tumors (endometrial carcinoma). Thyroid dysfunction is one of the common causes of excessive menstrual blood loss and menstrual irregularities. Menorrhagia has been reported in 32% of subjects with myxedema [60] and in 32.4% [11]. It may also lead to anovulation, infertility and recurrent abortion. The onset of hypothyroidism is so insidious that classic clinical manifestation may take months and years to appear [12]. Furthermore menorrhagia may be the only presenting complain in hypothyroid women [13].

With the advent of modern hormonal assay techniques precise estimation of thyroid hormones in serum is possible in a rapid and reliable manner. Treatment of hypothyroidism is very satisfying as it usually relieves patient of all the symptoms. Hence in investigating a patient with menorrhagia and/or menstrual irregularities, evaluation of thyroid functional status forms an essential component. Early detection of hypothyroidism in such subjects saves the patient from recurrent curettage and at times hysterectomy.

Among the patients with abnormal uterine bleeding, maximum patients were seen in age group of 31–40 (70%). Study by Deshmukh *et al.* [14] showed that almost 44% patients were in same age group i.e. 31–40. Similar study done by komathi *et al.* [15] and Bhavani *et al.* [10] showed same results, maximum number of patients in age group of 30–45 years (78%) and 41–50 years (40%) respectively. Study done by Dhanapal *et al.* [16]

showed maximum patients of abnormal uterine bleeding in age group of 25–31 years (41%).

In the present study, 181 out of 364 patients (50%) were having menorrhagia in age group of 31–40 years followed by metrorrhagia (21%) in same age group. But in age group of 21–30 years maximum patients were having oligomenorrhoea (32%) followed by menorrhagia (22%). In study done by Deshmukh *et al.* menorrhagia was most common bleeding pattern in age group of 31–40 years (27%) followed by polymenorrhagia (22%). In patients of age group 21–30 years most common bleeding pattern was menorrhagia followed by oligomenorrhoea. p value for this table was 0.000001, which is highly significant.

In present study 211 patients out of 520 (40%) were having menorrhagia followed by metrorrhagia (17%) and polymenorrhoea (16%) bleeding pattern. Similar study done by Deshmukh *et al.* [14] and Bhavani *et al.* [10] were having most common bleeding pattern was menorrhagia followed by metrorrhagia and polymenorrhagia respectively 54%, 20%, 8% and 40%, 21%, 18%. Study done by Dhanapal *et al.* [16] seen most common bleeding pattern was menorrhagia (59%) followed by oligomenorrhoea (27%). Study by Parveen *et al.* [17] showed that most common bleeding pattern was menorrhagia followed by metrorrhagia and oligomenorrhoea.

In this study, the prevalence of hypothyroidism and hyperthyroidism in patients with menstrual disorders is almost 16 % (13%+3%) and 2%. Almost similar studies were done in different cities of India and their prevalence were.

In present study mean age of thyroid dysfunction was 21–30 years. Study by Dhanapal *et al.* mean age of thyroid dysfunction was 25 ± 5 years. Similar studies done by Parveen *et al.* and Bhavani *et al.* mean age of thyroid dysfunction was 31–40 years and 41–50 years. Study by Deshmukh *et al.* showed that mean age of thyroid dysfunction was 41–45 years followed by less than 20 years. p value for this table was 0.08 which not significant [14–17].

In present study prevalence of leiomyoma, adenomyosis, endometrial hyperplasia and PCOS high in abnormal uterine bleeding respectively

	Parveen Patana, 2017	Deshmukh Mumbai, 2015	Bhavani AP, 2015	Vaithianathan Madras 2018 [18]
Euthyroid	82%	70%	81%	68%
Subclinical hypothyroidism	11%	18%	10%	19% (SCH+OVERT)
Overt hypothyroidism	5%	9%	7.5%	
hyperthyroidism	2%	3%	1.5%	13%

Studies	M/C no pelvic pathology	M/C bleeding pattern	M/C bleeding pattern in thyroid disorder
Deshmukh <i>et al.</i> , Mumbai, 2015	SCH	Menorrhagia (40%)	Polymenorrhagia (83%)
Bhavani <i>et al.</i> , AP, 2015	SCH	Menorrhagia (54%)	Polymenorrhoea (57%)
Dhanapala <i>et al.</i> , Madras, 2016	SCH	Menorrhagia (59.2%)	Menorrhagia (70%)
Parveen <i>et al.</i> , Patana, 2016	SCH	Menorrhagia (47%)	Polymenorrhoea (42%)
Phulkan <i>et al.</i> , Assam, 2016	SCH	Menorrhagia	Menorrhagia
Vaithianathan Chennai, 2018	SCH	Menorrhagia	Menorrhagia
In present study	SCH	Menorrhagia	Polymenorrhoea

28% and 13% each in patients of abnormal uterine bleeding. N Bhavani *et al.* [10] study on prospective study on correlation between abnormal uterine bleeding and thyroid dysfunction found that among the causes of abnormal uterine bleeding, Structural causes accounted for 54.5% of cases. Leiomyoma (38.5%) is the commonest Cause of abnormal uterine bleeding.

It was observed in our study that majority of patients were having menorrhagia (40%) followed by metrorrhagia and polymenorrhoea, but it was also observed that polymenorrhoea was maximally associated with thyroid dysfunction (26%). p value was 0.009 which signifies highly significant. Similar findings observed in study by Bhavani *et al.* and Parveen *et al.* study by Dhanapala *et al.* and study by Vaithianathan found that menorrhagia was the most common bleeding disorder and also was most commonly associated with thyroid dysfunction. And it also showed in studies correct diagnosis of this etiology of AUB would help in proper management of the patient, treating both the menstrual abnormality along with the thyroid disorder, and would be cost-effective as well [14–17].

The similar study done by Subedi *et al.* in Nepal and findings were mean age of patients involved in study was 35–40 years. Prevalence of thyroid disorder was 11%. And menorrhagia most commonly associated with thyroid dysfunction [20].

Conclusion

Abnormal uterine bleeding is frequently seen to be associated with thyroid dysfunction and in majority of the patients, menstrual abnormality may even precede the occurrence of other clinical signs and symptoms of thyroid dysfunction. Any type

of menstrual disorder should be considered as a possible presenting symptom of thyroid dysfunction and thyroid assessment deemed necessary in such cases. Thyroid dysfunction is arising in India with recent studies highlighting tremendous increase in incidence. Unless proper evaluation of thyroid function is done among these patients, we often miss an important etiology of AUB. This may in turn lead to unnecessary exposure of the patient to a variety of nonspecific and ineffective diagnostic and therapeutic procedures, including both invasive (surgical) and non-invasive (hormonal) techniques. Correct diagnosis of this etiology of AUB would help in proper management of the patient, treating both the menstrual abnormality along with the thyroid disorder, and would be cost-effective as well.

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Conflicting Interest: None

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