

# Menstrual Pattern of Reproductive Age Group Women and Their Association with Thyroid Dysfunction

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## ABSTRACT

**Background and Aim:** Thyroid hormones play a significant role in physiology of normal reproductive system. Thyroid dysfunction is extremely common in women and effect certain metabolic process and menstrual irregularities. The present study aimed to assess the menstrual pattern of reproductive age group women and their association with thyroid dysfunction.

**Methodology:** This cross-sectional study was carried out on 140 women with menstrual irregularities who were assessed for thyroid dysfunction in the Department of Obstetrics and Gynecology outpatient Department of Sindh Government Hospital Karachi, January 2021 to December 2021. All the reproductive age group women between (15-45 years) with menstrual irregularities were enrolled. Women with a history of thyroid dysfunction and taking anti-thyroid drugs were excluded from the study. Individual age, thyroid hormones level, and type of menstrual irregularities were recorded. ELISA technique was used for the determination of thyroid hormones. Thyroid stimulating hormone (TSH) levels, serum free triiodothyronine (T3), and free thyroxine (T4) were used for the assessment of thyroid dysfunction. SPSS version 25 was used for data analysis.

**Results:** The overall mean age of the study population was  $27.8 \pm 5.3$  years with an age range from 15 years to 45 years. The age-wise distribution of patients were as follows; 15-25 years n=67, (47.8%), 26-35 years n=46 (32.9%), and 36-45 years n=27 (19.3%). The prevalence of thyroid dysfunction was 22% (n=31). The clinical presentations of menstrual patterns were as follows; Irregular menstruation 66.4% (n=93), Oligomenorrhea 4.3% (n=6), Menorrhagia 15.7% (n=22), Polymenorrhea 7.9% (n=11), and Metropathia 6.4% (n=9). Of the total 31 thyroid dysfunction women, the incidence of normal, hypothyroidism and hyperthyroidism was 82 (58.6%), 12 (38.7%) and 1 (1.4%) respectively. The median TSH level was 2 mIU/L IQR (1.0-4.0). The mean level of T3 and T4 was  $2.83 \pm 1.13$  pg/ml and  $1.38 \pm 1.1$  ng/dl respectively.

**Conclusion:** The present study found that hypothyroidism is the most prevalent thyroid dysfunction among women of reproductive age with different menstrual irregularities. The most common clinical presentation was menorrhagia, polymenorrhea, and oligomenorrhea. Hence the thyroid function evaluation should be mandatory in cases of DUB to detect thyroid dysfunction so the cases have to be evaluated for further medical help

**Keywords:** Menstrual Pattern, Reproductive age group women, Thyroid dysfunction

## INTRODUCTION

Thyroid hormones play a significant role in physiology of the normal reproductive system. It might directly act on reproductive system through explicit receptors that moderate the organs development and metabolism and indirect act with other hormones through multiple interactions affecting growth factors such as insulin-like growth factor, estrogen, and prolactin by gonadotropin-releasing hormone released in hypothalamic-pituitary-gonadal axis [3]. As a result, variation in levels of serum TSH such as hyper and hypothyroidism can lead to infertility among women [4]. The prevalence of hypothyroidism in reproductive age women varies from 0.3% to 4.3% [5, 6]. Gland function might be lost due to destruction of thyroid proteins such as thyroglobulin and thyroid peroxidase caused by the antibodies reactions to own bodies known as autoimmune thyroiditis [7]. The delayed puberty, menstrual irregularities, anovulation, number of spontaneous abortion, preterm birth, and congenital anomalies could be other factors for hypothyroidism among women of reproductive age [8].

Hypothyroidism in reproductive age women may lead to Graves' disease caused by increased antibodies against the thyroid-stimulating hormone (TSH) receptor. Hyperthyroidism is less prevalent than hypothyroidism due to increased follicular atresia, menstrual disorders, and ovarian cysts [9]. Thyroid disorders develop with age and approximately 26% menopausal and premenopausal women have thyroid disease [10]. Women are more susceptible to thyroid disorders than men. Irregular uterine bleeding, amenorrhea, dysmenorrhea, and oligomenorrhea are different menstrual patterns among women. Menstrual irregularities, changes in cycle length, abnormal sexual development, blood flow, and infertility are variety of reproductive disorders associated with hypothyroidism. Mild disturbance in duration and menstrual amount known as occult menorrhagia has been associated with hypothyroidism. According to previous studies patients suffering from metabolic syndrome, diabetes, and kidney disease are more susceptible to thyroid dysfunction [11,

12]. There is scarcity of data regarding the association of menstrual irregularities with thyroid dysfunction. Therefore, the current study aimed to determine the menstrual pattern of reproductive age group women with thyroid dysfunction.

## METHODOLOGY

This cross-sectional study was carried out on 140 reproductive age group women with menstrual irregularities who were assessed for thyroid dysfunction in the Department of Obstetrics and Gynecology outpatient Department of Sindh Government Hospital Karachi, January 2021 to December 2021. All the reproductive age group women (15-45 years) with menstrual irregularities were enrolled. Women with a history of thyroid irregularities and taking anti-thyroid drugs were excluded from the study. Individual age, thyroid hormones level, and type of menstrual irregularities were recorded. ELISA technique was used for the determination of thyroid hormones. Thyroid stimulating hormone (TSH) levels, serum free triiodothyronine (T3), and free thyroxine (T4) were used for the assessment of thyroid dysfunction. Competitive ELISA principle was used for the estimation of fT3 and fT4. All the reproductive age women were categorized into three distinct groups based on menstrual pattern; group-I of menstrual irregularities consists of polymenorrhea and oligomenorrhea, group-II of amenorrhea, and group-III with menorrhagia. The normal range of fT3 and fT4 thyroid hormones was 1.3-4.3 pg/ml and 0.9-2.3 ng/dl respectively. The normal range of TSH was 0.38-6.21 mIU/L. Thyroid hormones within range were considered normal (euthyroids). Hypothyroidism was referred to in cases where  $TSH > 6.21$  mIU/L with normal range of fT3 and fT4 value. Hypothyroidism was referred to a case where  $TSH < 0.38$  mIU/L with normal range of fT3 and fT4.

SPSS version 25 was used for data analysis. Numerical variables were described as mean  $\pm$  SD whereas categorical variables were expressed as frequency and percentage. ANOVA test was applied to continuous variables and chi-square test for

categorical variables at 5% level of significance and 95% confidence interval.

**RESULTS**

The overall mean age of the study population was 27.8 ± 5.3 years with an age range from 15 years to 45 years. The age-wise distribution of patients were as follows; 15-25 years n=67, (47.8%), 26-35 years n=46 (32.9%), and 36-45 years n=27 (19.3%). The prevalence of thyroid dysfunction was 22% (n=31) and 1.4% (n=2) respectively. The clinical presentations of menstrual patterns were as follows; Irregular menstruation 66.4% (n=93), Oligomenorrhea 4.3% (n=6), Menorrhagia 15.7% (n=22), Polymenorrhagia 7.1% (n=10), and Metropathia 6.4% (n=9). Of the total 140 reproductive age group women, the incidence of normal, hypothyroidism and hyperthyroidism was 82 (58.6%), 56 (40%) and 2 (1.4%) respectively. The median TSH level was 2 mIU/L IQR (1.0-4.0). The mean level of T3 and T4 was 2.83±1.13 pg/ml and 1.38±1.1 ng/dl respectively. Figure-1 illustrates the age-wise distribution of all the reproductive age group women. The menstrual disturbance pattern is demonstrated in Figure-2. Thyroid dysfunction status is depicted in Figure-3. Association of thyroid status with age and menstrual pattern are shown in Table-I and Table-II. Table-III represents the thyroid hormones levels with menstrual pattern.

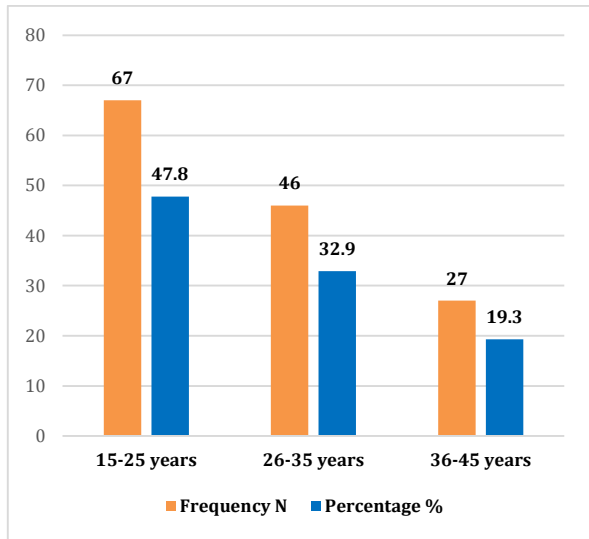


Figure-1: Age-wise distribution of all the women (n=140)

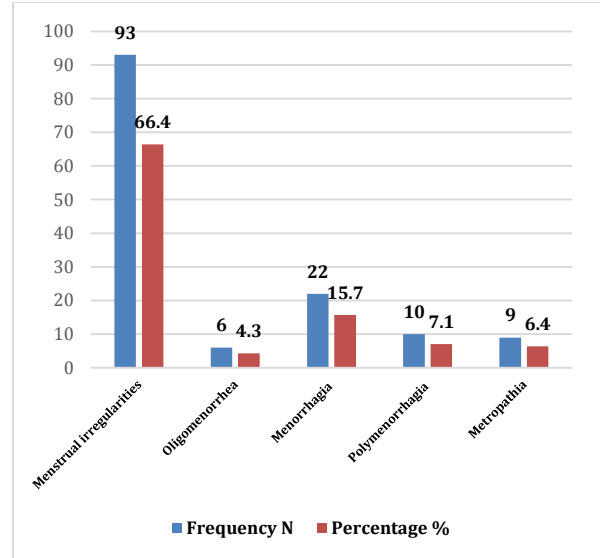


Figure-2: Menstrual irregularities among reproductive age group (n=140)

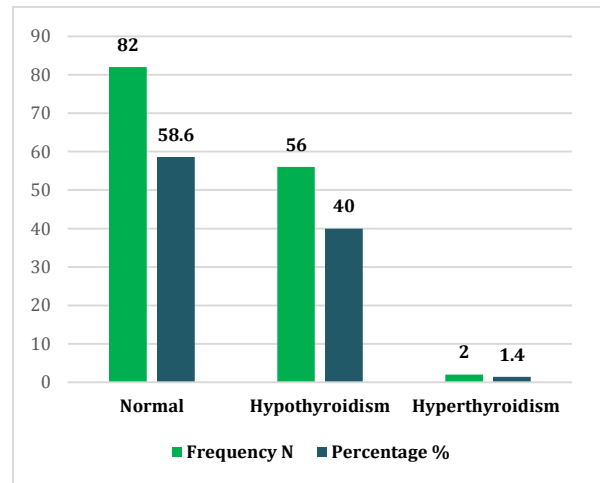


Figure-3: Status of thyroid dysfunction

Table-1: Thyroid status with age group

Age (years)	Normal N (%)	Hypothyroidism N (%)	Hyperthyroidism N (%)	Total N (%)
15-25	30 (36.6)	9 (16.1)	0 (0)	39 (27.9)
26-35	24 (29.3)	19 (33.9)	1 (50)	44 (31.4)
36-45	28 (34.1)	28 (50)	1 (50)	57 (40.7)
Total	82 (100)	56 (100)	2 (100)	140 (100)

Table-2: Association of thyroid status with menstrual pattern

Menstrual irregularities	Normal N (%)	Hypothyroidism N (%)	Hyperthyroidism N (%)	Total
Oligomenorrhea	2 (2.4)	3 (5.4)	1 (50)	6 (4.3)
Irregular menstruation	53 (64.6)	40 (71.4)	0 (0)	93 (66.4)
Menorrhagia	16 (19.5)	6 (10.7)	0 (0)	22 (15.7)
Polymenorrhagia	6 (7.3)	4 (7.2)	0 (0)	10 (7.1)
Metropathia	5 (6.2)	3 (5.4)	1 (50)	9 (6.4)
Total	82 (100)	56 (100)	2 (100)	140 (100)

Table-3: Thyroid hormones level based on menstrual irregularities

Thyroid hormones	Total N=140	Irregular menstruation N=93	Oligomenorrhea N=6	Menorrhagia N=22	Polymenorrhagia N=10	Metropathia N=9	P-value
ft3 (pg/ml)	2.83±1.13	2.83±1.13	2.79±0.73	2.29±0.92	3.03±1.36	3.21±1.51	0.031
ft4 (ng/dl)	1.38±1.1	1.38±1.1	1.39±0.52	1.21±0.41	1.31± 2.77	1.61±0.70	0.056
TSH (mIU/L)	2.0 (1-4).	2.0 (1-4).	2 (1-3)	5 (2.5-6)	2 (1-4)	2 (1-4)	0.011

## DISCUSSION

The present study we have found the menorrhagia was the chief major complaint among reproductive age group women with menstrual irregularities. Hypothyroidism is the most prevalent thyroid dysfunction among reproductive age women with menstrual irregularities. Majority of the patients were between 15 years to 25 years. A study reported up to 28% irregular menstrual cycle patterns among reproductive age group women [13]. Pahwa et al conducted similar study on 100 women with menstrual dysfunction and found the menorrhagia (50%) followed by polymenorrhea, metropathia, and oligomenorrhea [14]. Another study Iraq based study showed menstrual irregularities 23.8% among adolescent girls [15]. In the present study, menorrhagia (15.7%) was the prevalent clinical presentation of menstrual disorder followed by polymenorrhea, oligomenorrhea, and metropathia. Thyroid dysfunction might affect menstrual cycle, menarche, postpartum period, pubertal growth, postmenopausal years, and fertility.

In the present study the incidence of hypothyroidism in women of reproductive age with irregular menstruation is 22%. Menorrhagia was the most prevalent complaint in reproductive age group women with thyroid disorders. Similar findings were reported in a study conducted by Abalovich et al [16]. Kaur et al [17] conducted their study on 100 patients and found hypothyroidism was present in 14 patients. Sharma et al [18] reported incidence of hypothyroidism and hyperthyroidism was 22% and 14% respectively in patients with disturbed menstrual bleeding. Korevaar et al reported the prevalence of hypothyroidism and euthyroidism in 22% and 76th% cases [19]. The prevalence of hypothyroidism among women with abnormal uterine bleeding was 8.4%. Similarly, Al-Naffii et al [20] found the hypothyroidism and hyperthyroidism 17.6% and 4.7% respectively among the reproductive age group women.

Maraka et al [21] found that menorrhagia was present in 55.3% cases among women with irregular menstrual bleeding. Another study carried out by Ajamani et al [22] found 50% prevalence of menorrhagia among disturbed uterine bleeding women. Verrma et al [23] reported 4% hyperthyroidism which was higher than 1% reported in the current study. Based on the statistics of the current study, hypothyroid cases were mostly seen in women >35 years old and few women in age group <20 years. Hyperthyroidism cases were in the age group 26 to 45 years. There is strong association between thyroid disorders and women's age group ( $p < 0.001$ ).

Another study conducted on 171 hypothyroid patients reported that the prevalence of regular and irregular menstrual cycles was 76.6% and 23.4% respectively. In the present study, about 66.4% women had irregular menstruation. The prevalent menstrual irregularities were menorrhagia, polymenorrhea, and oligomenorrhea. Additionally, their study conceded that menstrual irregularity is less frequently associated with hypothyroidism. Also, women with hypothyroidism severe form are more susceptible to menstrual irregularities compared to those with milder disease [24].

Thyroid dysfunction was seen in 22% women in the current study with menstrual irregularities in 66.4%. It has been reported that lower T3 and higher TSH level were seen in women with menorrhagia as a menstrual irregularities. Women with thyroid dysfunction had a higher incidence of hypothyroidism than hyperthyroidism. Previous studies conducted on menstrual irregularities women had varying thyroid dysfunction rate among different population [25, 26].

In the present study we have observed that all types of menstrual abnormalities were significantly more frequent in women with thyroid disorders. The hormonal dysfunctions like hypothyroidism and hyperthyroidism has great impact on menstrual cycle irregularities [27]. Menstrual irregularities can occur as a result of hypothyroidism. Thyroid hormones influence normal function of reproductive system in both ways directly affecting ovaries and ultimately through interactions with bonding proteins of sex hormone.. Thyroid dysfunction can be treated to

improve fertility by reversing menstrual irregularities [28]. However, it is worth noting that, in contrast to, in most cases, hyperthyroidism does not disrupt ovulation, menstruation, and pregnancy unless it is severe enough to cause amenorrhea [29].

## CONCLUSION

The thyroid dysfunction is closely related to menstrual disorders. Menorrhagia is the most common and chief symptoms in hypothyroid followed by oligomenorrhea, polymenorrhea present study found that hypothyroidism is the most prevalent thyroid dysfunction among reproductive age women with menstrual irregularities.. Thus, the thyroid assessment should be carried out in all the patients presents with menstrual irregularities that would be cost effective to avoid unnecessary surgeries or advanced treatments

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