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Correlation with Menstrual Irregularities and Hypothyroidism after Pregnancy

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ABSTRACT:
Background: *Menstrual irregularity is a gynecological problem with hypothyroidism after pregnancy and a cause of anxiety to the females and those lose to them. Disturbance of the hypothalamic-pituitary-ovarian (HPO) axis pathway results in an irregular menstrual cycle, Oligomenorrhea, Dysmenorrhea, are the cconditions related to irregular menstruation.*
Objective: *This study aimed to assessment of the menstrual irregularity with hypothyroidism after pregnancy in selected general hospital, Bhopal district, Madhya Pradesh, India in during December 2024 to May 2025.*
Methods: *A cross-sectional study was conducted at general hospital. Data was collected using questionnaires in 100 eligible females having thyroid problem, out of these 50 were hypothyroidism we assess only hypothyroidism as case study other 50 patient's samples as control either hyperthyroidism or normal thyroid profile but problem having menstrual cycle attending outpatient and inpatient department of obstetrics and gynecological and pathology lab at general hospital. Weight and height were measured and Body Mass Index (BMI) was calculated and thyroid profile testing (T3, T4, and TSH) was done after data collection.*
Results: *The result showed that the selected demographic variables such as Age, Residence and Gynaecologic problems in our study, mean value of thyroid profile in total patients were T3- 0.85±0.37, T4 -6.41±3.1 and TSH- 32.02±2.26. Results depict the mean value of T3, T4, TSH hormones level. These results showed that there were significant low levels of both of T3 and T4 levels0.85±0.37, T4 -6.41±3.1 whereas TSH levels 32.02±2.26 higher than its normal values: Total T3: 80–220 ng/dL, Total T4: 5.0–12.0 µg/dL, TSH: 0.4–4.0 mIU/L (optimal range: 0.45–2.5 mIU/L for adults) whereas menstrual irregularities like 10 polymenorrhagia, 8 hypomenorrhea/oligomenorrhea, 10 polymenorrhagia and 7 amenorrhea respectively and mostly cases was 25 menorrhagia. The findings revealed that there was a significant association of menstruation irregularities with menorrhagia.*
Conclusion: *The connection between hypothyroidism and menstrual irregularities is essential for managing your health effectively. Thyroid dysfunction can significantly impact menstrual cycles, the results highlight the necessity of routine thyroid function screenings for women you can take control of your health and improve your quality of life, facilitating precise diagnosis and suitable treatment.*
Keywords: *Reproductive age, Menstrual irregularity, Hhypothyroidism, Marital status, Menorrhagia*

INTRODUCTION

The thyroid is a small gland located in the front of the neck. Triiodothyronine (T3) and thyroxine (T4) are two important hormones produced by the thyroid gland. They travel throughout the body help the entire body system to function properly and regulate body weight, metabolism and brain development. An underactive thyroid gland is responsible for hypothyroidism

Five percent of people suffer from this condition; women are more commonly affected than men. In some people, it remains undiagnosed. Menstruation is a natural biological process that occurs in the female reproductive system. It is a monthly cycle in which the lining of the uterus thickens in preparation for a possible pregnancy. If pregnancy does not occur, the body sheds this uterine lining, resulting in blood and other substances passing out from the body through the vagina. This process normally occurs in a regular, cyclic pattern and is controlled by hormones such as estrogen and progesterone. According to several studies, menstrual irregularities are quite widespread in India accounting for 35.7 and 64.2 percent of women respectively. Lack of sufficient sleep, alcohol consumption, stress, anemia, hereditary causes

and being overweight are the major factors for menstrual irregularities.[5,6] Hypothyroidism multiple affect female reproduction, having both direct and indirect effects at various levels of the female reproductive axis

Menstrual irregularities affect 2-5% of women of child-bearing age, a number that is significantly higher among women under sustained stress during a cycle. A woman's menstrual cycle usually follows a 28-day cycle and ends with the shedding of the uterine lining leading to bleeding. A normal menstrual cycle indicates the proper functioning of hormones, having a normal menstrual cycle indicates a healthy hypothalamic-pituitary axis along with a normal uterus. However, many conditions such as sudden weight loss, over-exercising, medical conditions, and even stress can interrupt with a woman's ability to experience normal menstrual periods. Longer periods of menstrual bleeding and cycle irregularities are both associated with major depression.

Heavy menstrual bleeding (HMB) is a common problem that negatively impacts quality of life and work productivity. About 10-35% of women complain of heavy menstrual bleeding at some stage during their reproductive years, of which 5% consult a physician for investigation of HMB.

Menstrual cycle was defined as normal if the cycle interval is of 21-35 days, with duration being 2-7 days or the amount of blood loss was less than 100 score but more than 10 as on the PBAC (pictorial Blood Assessment Chart). Menstrual pattern was said to be abnormal if it met any of the following criteria: Amenorrhea – Defined as absence of menstruation. Oligomenorrhoea – Menstrual bleeding occurring more than 35 days apart and remains constant at that frequency. Hypomenorrhea – Either a score of less than 10 days on PBAC or bleeding lasting for less than 2 days. Metrorrhagia – Irregular, acyclic bleeding. Menorrhagia – Cyclic bleeding at normal intervals, bleeding being either excessive in amount or duration or both. Polymenorrhagia is a term used to describe a menstrual cycle that occurs more frequently than the typical 21 to 35 days. They are essential for different reproduction processes from menstrual to menopause, and contribute to the regulations of the menstrual cycle, fertility and pregnancy.

Hypothyroidism is usually diagnosed by measuring the levels of TSH in the blood. The slight increase in TSH with normal T3 and T4 levels indicates sub-clinical hypothyroidism, while elevated TSH with low T3 and T4 levels reflects clinical hypothyroidism. The subclinical hypothyroidism, which is more prevalent, can cause anonymity directly or through increased levels of prolactin (PRL). Diagnosis and management of subclinical hypothyroidism is necessary to maintain pregnancy and pregnancy.

Thyroid hormones are essential modulators of the menstrual cycle via a complex Hypothalamic-Pituitary-Gonadal (HPG) axis on the ovaries. These hormones affect reproductive function, influencing the release of Follicle-Stimulating Hormone (FSH) and Luteinizing Hormone (LH), which are necessary for ovulation. Hypothyroidism the gland distorts the intricate balance of hormones. Hypothyroidism lowers T3 (triiodothyronine) and T4 (thyroxine) levels, which increases the production of prolactin hormone. Prolactin is known to inhibit ovulation, another reason why women can experience irregular menstrual periods. On the other hand, hyperthyroidism increases metabolism, causing changes in hormonal balance and disruption of menstrual cycles. These variations directly influence the ovaries' ability to produce adequate estrogen for menstrual cycle regulation.

This study underscores a notable link between hypothyroidism and menstrual irregularities in women of reproductive age. The results highlight the necessity of routine thyroid function screenings for women experiencing menstrual abnormalities, facilitating precise diagnosis and suitable treatment. Realizing the important importance of timely diagnosis and management of hypothyroidism to prevent adverse reproductive results, the purpose of this study is to detect relationships between thyroid profile abnormalities and menstrual irregularities in women of reproductive age. By comprehensive investigation of this relationship, our aim is to provide valuable insights that can improve clinical management and therapeutic strategies for women experiencing potential menstrual irregularities related to thyroid disorders. This study conducted in a tertiary care centre presents a thyroid function and its effect on menstrual health, which contributes to the deep understanding of this complex interrelation. Evaluation criteria for severity of menstrual irregularities in functioning, study ensures a clear and systematic approach to evaluate the impact of hypothyroidism on menstrual health.

MATERIAL AND METHODS

Study Population Sample size: The number of individual or observations in the sample, based on the number of samples, the total sample size was 100 patients. Only 50 patients having hypothyroidism as group I and group II patients having normal thyroid profile and including hyperthyroidism marked as control. When a large proportion of individuals have to be studied, we take a sample. It is not easier to

study the sample than the whole population. This study included two groups:

- Group I: Cases of hypothyroidism (n = 50)
- Group II: control group (n = 50)

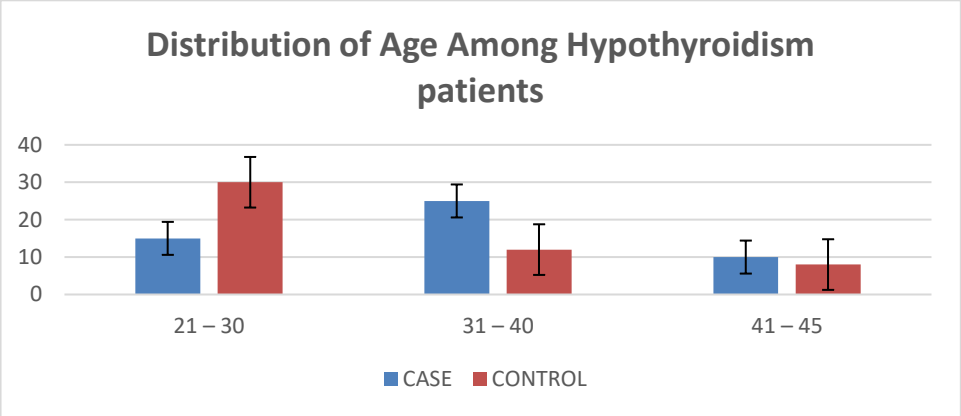
Study Area: The study was conducted in the Department of Pathology (Biochemistry) and Obstetrics and gynaecology Dept. at Rajeev Gandhi College and General Hospital Bhopal, Madhya Pradesh. The study period of 6 months (December 2024 to May 2025).

Study Procedure: The data was collected using an interview followed by self-administered questionnaire. Anthropometric measurements were performed to calculate the body mass index (BMI) of the participants. To meet the study's aims, the questionnaire was built based on the variables. Sociodemographic information, menstrual-related questions, lifestyle and medical & gynaecological history inquiries, dietary factors, family factors and anthropometric measurements are all included in the questionnaire (height and weight). Thyroid profile testing including T3, T4 and TSH and a detailed menstrual history was obtained, focusing on abnormalities such as regular or irregular (Amenorrhea, Oligomenorrhoea, Hypomenorrhea, Metrorrhagia, Menorrhagia, Irregular menstrual cycle) menstruation lasting for more than three months. Data Analysis Data were analysed using Microsoft Excel. It's a cross-sectional study and simple random technique was used to select the participants.

Result: In our study population was 100 patients, out of 100, we considered 50 as case study whereas rest of the 50 were control group including hyperthyroidism**.** Total population with age wise 21-45 years were included. Mean age of this study and control group were 34.14 years and 29.9 years respectively. Most of the women in our study in between 31-40 years in case study whereas same age groups years in control study. Table1. Showed SD in case study were 6.95 and 7.33 in control group.

Table 1: Distribution of Age among patients

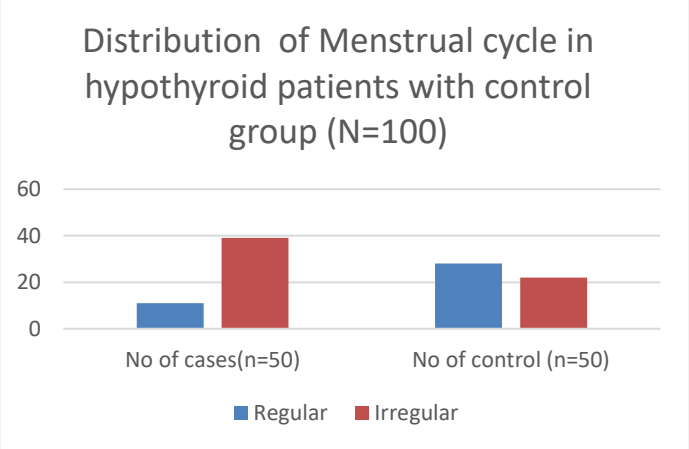
Age (In Years)	Case	Control
21 – 30	15	30
31 – 40	25	12
41 – 45	10	8
Total	50	50
Mean	34.14	29.92
Standard deviation	6.95	7.33



Graph 1. Distribution of Age groups among hypothyroidism patients

Table 2: Distribution of Menstrual cycle in hypothyroid patients with control group (N=100)

Menstrual cycle	No of cases(n=50)	No of control (n=50)
Regular	11	28
Irregular	39	22
Total	50	50

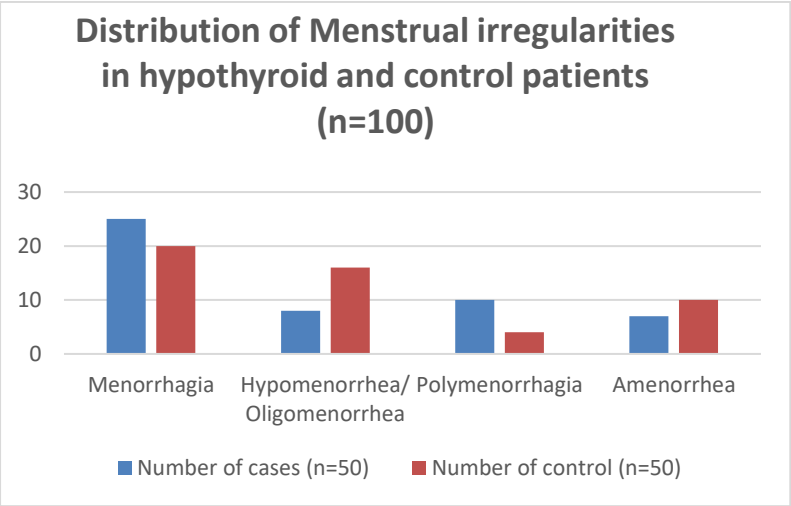


Graph 2. Distribution of Menstrual irregularities in hypothyroid patients with control group

In this study showed that the menstrual irregularities among the reproductive age group women: finding of numbers in menstrual irregularities like 25 Menorrhagia, 8 hypomenorrhea / oligomenorrhea, 10 polymenorrhagia and 7 amenorrhea respectively and mostly cases was found in menorrhagia in case study whereas 20 polymenorrhagia, 16 hypomenorrhea / oligomenorrhea, 4 polymenorrhagia and 10 amenorrhea respectively.

Table 3. Distribution of Menstrual irregularities in hypothyroid and control patients (n=100)

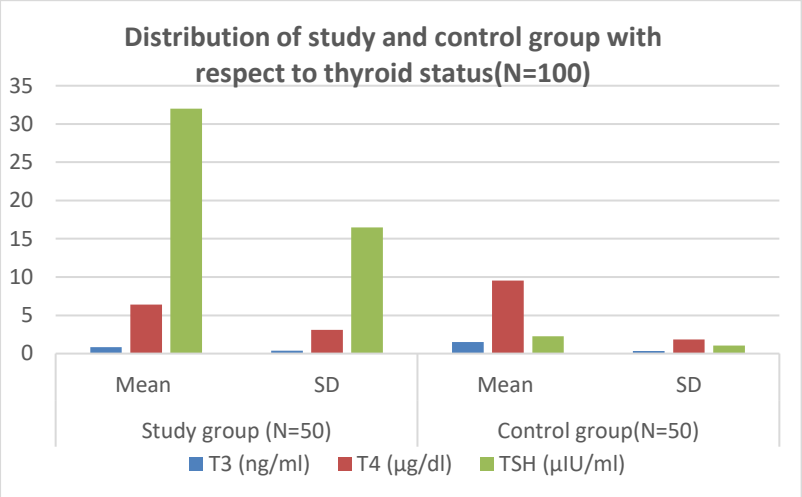
Menstrual dysfunction	Number of cases (n=50)	Number of control (n=50)
Menorrhagia	25	20
Hypomenorrhea/ Oligomenorrhea	8	16
Polymenorrhagia	10	4
Amenorrhea	7	10
Total	50	50



Graph 3. Distribution of Menstrual irregularities in hypothyroid and control patients (n=100)
Table 4: Distribution of study and control group with respect to thyroid status (N=100)

Thyroid status	Study group (N=50)		Control group(N=50)	
	Mean	SD	Mean	SD
T3 (ng/ml)	0.85	0.37	1.5	0.34
T4 (µg/dl)	6.41	3.1	9.56	1.84
TSH (µIU/ml)	32.02	16.5	2.26	1.03

In our study, mean value of thyroid profile in total patients were T3- 0.85±0.37, T4 -6.41±3.1and TSH-32.02±2.26. The above table depicts the mean value of T3, T4, TSH hormones level. These results showed that there were significant low levels of both T3and T4 levels whereas TSH levels higher than its normal values.



Graph 4: Distribution of study and control group with respect to thyroid status (N=100)

Table 5: Demographic distribution associated with menstrual irregularities among reproductive age group women. (N=100)

S. No.	Demographic variables	Category	Numbers	Percentage
1.	Age in years	21-30	37	37%
		31-40	45	45%
		41 -45	18	18%
2.	Residence	Urban	64	64%
		Rural	36	36%
3.	Family history of menstrual irregularity	Yes	38	38%
		No	62	62%
4.	Dietary pattern	Vegetarian	70	70%
		Non-Vegetarian	30	30%
5.	Medical and gynaecological factors			
i.	Have you ever used any Emergency contraception	Yes	48	48%
		No	52	52%
ii.	Do you have any history of Head injury	Yes	6	6%
		No	94	94%
iii.	Do you have any history of anaemia	Yes	60	60%
		No	40	40%
6.	Life Style Related factors	1. BMI for case	25.49 ±4.29	
		BMI for control	25.38±3.74	
		2. Number of births		
		a) 1	80	80%
		b) 1≤	20	20%
		3. Smoking habits		
		A) Yes	10	10%
		B) No	90	90%
		4. Habit of consumption of alcohol		
		A) Yes	30	30%

		B) No	70	70%

Socio-demographic:

In current study shows that **Age wise**- Maximum 45% of reproductive age group women were in the age group of 31-40 years, whereas 37 % were in the age group of 21-30 years.

Residence-Most of the population around 64% of reproductive age group women reside in urban area where as 36 % reside in rural area.

Life style related factors

1. BMI was calculated by Anthropometric Measurements, 25.49 ±4.29 in case study whereas in control study BMI was 25.38±3.74.

2. Number of births-Majority 80 % of reproductive age group women have 1child where as 20% of reproductive age group women more than 1 child**.**

3. Smoking Habits-Majority 90% of reproductive age group women doesn't have habit of smoking. Habit of consumption of alcohol-only 10% of women have habit of consumption of alcohol.

4. **Family history Pattern of menstrual cycles**- 38% of reproductive age group women have irregular menstrual pattern where as 62 % of women have regular menstrual pattern**.**

5. Medical and gynecological factors

i. Dietary factors- It shows Majority 70 % of population were vegetarian and 30 % of women had non vegetarian.

ii. Have you ever used any Emergency contraception-48% said yes, rest of the women said no around 52%.

iii. Do you have any history of Head injury- 6 % population said yes rest of the population were **94** % no injury.

iv. Do you have any history of anaemia-It is very common disease in women so we found that 60% women were suffered from anemia rather than 40% had not found anemia.

DISCUSSION

Thyroid disorders in general and hypothyroidism in particular are the common causes of menstrual disorders in women. Menarche, pubertal growth and development, menstrual cycles, fertility and fetal development, postpartum period, reproductive years, and postmenopausal years are profoundly influenced by the thyroid status of women. It is recognized universally that menstrual disturbances may accompany and even may precede thyroid dysfunction.

Treloar AE (1967) et al concluded that the co-relation of the socio-geniusal characteristics of our study participants, 90.7% of women who were present with the complaint of Menorrhagia were married, of which more than half of them (69.35%) were married in young age (12-24 years), showing that married women are present with more than one (ARR 1.55, CI 1.35–3.74). Women who had more than six children were present more than once with irregular menstrual cycle (AOR 1.48, CI 1.26–6.07). More than half of women (65.5%) complained of menorrhagia for two or more months, 2-10 were 2-10 in the day of bleeding in majority women and 63.9% women did not miss any cycle.

Sherman BM (1974) et al concluded that in this study, 57.4% of women stated the previous history of diseases while 58.7% told the history of minor surgery. The study found that women undergoing normal vaginal delivery are more likely to develop menrazia. Therefore, it shows that women who have passed through surgery methods have 76 times less likely to appear with the complaint of Menorrhagia (AOR 0.24, CI 0.25–0.45), compared to women whose previous surgical history is mild.

Bohnet HG et al, (1981) et al stated that the relationship between the subclinical hypothyroidism (SCH) and infertility remains the subject of debate, due to the inconsistency in TSH cut-off values in studies.

Arvind Kumar et al (2025) stated that a total of 410 cases was determine, including 232 cases of hypothyroidism and 178 cases of youth. Of these, 352 women did not see a decrease in fertility, while 58 were affected, which reflects a clear relationship between thyroid dysfunction and risk of fertility. Conclusion: These findings highlight the important role of thyroid function in reproductive health and emphasize the importance of thyroid screening for women who experience irregularity and infertility of menstruation.

Joshi JV, Krassas GE, Kaur T (1993, 1999, 2011) et al. stated that this study focus attention on strong connections between hypothyroidism and reproductive disorders, especially menstrual irregularities and low fertility. Among the 232 hypothyroid patients, 44 (18.9%) experienced low fertility, while 14 (7.9%) of 178 euthyroid patients experienced low fertility in 14 (7.9%), which reflects the high proliferation of

low fertility in hypothyroid women. Additionally, the occurrence of primary low fertility (26 cases) and secondary low fertility (18 cases) was significantly higher than people with normal thyroid functions in hypothyroid individuals. These findings align with research conducted by **Joshi JV et al. Krassas GE et al.** and **Kaur T et al**. which also reported an increased prevalence of menstrual disturbances and subfertility in hypothyroid women.

Rowland AS (2002) et al stated that in study conducted in North Carolina, we see that smoking is associated with irregular cycles. Odds of having irregular cycles were 3.6 among women who smoked more than a pack a day as compared with non-smokers (95%, CI=1.7–8.0). Even in a study conducted in Northern Carolina, we noticed that smoking is associated with irregular cycles. Women who smoke more than a packet a day were likely to have an irregular cycle, while this possibility was 95% in women who do not smoke, CI = 1.7–8.0.

In our study, patients with menstrual disorders have almost two times higher than the prevalence of hypothyroidism and hyperthyroidism. In a study conducted by **Kaur**, 14 of the 100 patients studied were hypothyroidism.

In a study conducted by **Sharma**, 22% of patients with hypothyroidism and hyperthyroidism in 14% were found to be prevalent. In a study conducted by **Pahwa**' 22% of hypothyroidism and 76% of Hypothyroidism were reported, while **Padmaleela** saw thyroid disorders in 26.5% of patients of DUB. The prevalence of hyperthyroidism in dauby patients was 8.4%, as judged by the findings of their thyroid function tests. The study conducted by Padmaleela was the most common discovery in the endometrial biopsy, proliferative endometrium (59.1%), which was both in cases of hypothyroid (60%) and hyperthyroid (57.1%). Cystic glandular hyperplasia was found in only 13.3% and 26.7% in secretive endometrium hypothyroid patients. Gauri found 17.6% of women with hypothyroidism, 2.7% with subclinical hypothyroidism and 4.7% with hyperthyroidism, which is similar to our study.

IP. Kalyani. et al (2015), In our study, out of 50 hypothyroid women, 22% had normal menstrual cycles and 40% showed menorrhagia as major menstrual dysfunction.18% had oligomenorrhea, followed by 14% with polymenorrhagia and 6% with amenorrhea. Women in the age group of 25-34 years showed menstrual dysfunction in 40% of the cases. 38% of the study group belongs to the age group of 35-44 years and 20% in 15-24 years, 2% in the age group of 45 years & above. 14% of the hypothyroid women had normal T3 & T4 levels. Out of 50 cases 6% had goiter and 20% showed no significant symptoms of hypothyroidism.

Nagma S (2015) et al. stated that Relations between high stress levels (PSS> 20) and hypo-manorea, menorrhagia, dysmenoria, long or short cycle lengths in students. In the current study, the level of tension was increased in about 30% of students (PSS> 20). A relationship between high stress levels and irregular menstrual cycles was established using a curry test. But no connections could be established between the stress levels and menstrual abnormalities such as hypomania, menorrhagia, dysmenoria, long cycle length and short cycle length, using the curry testing and accurate tests of fisher.

Ajmani NS, Sarbhai V (2016) et al. the third of patients with menstrual disorders at the Tertiary Care Center of Wald City in Delhi had the role of thyroid dysfunction, 44% of patients with menstrual disorders were thyroid disorders, 20% of which were subclinical hypothyroidism in 20%, clear hypothyroidism in 14% and clear hyperthyroidism in 8% women. Autoimmune thyroid antibodies were present in 30% of patients with women with menstrual disorders. On endometrial sampling, hypothyroid patients had primarily proliferative endometrium (42.85%) while hyperthyroid had atrophic endometrium (60%).

Zafar M. (2020) et al. stated that the information obtained in this study suggests that one of the major menstrual problems of menstruation, whose possibility of being can be reduced by stopping certain variable risk factors such as hormonal imbalances, smoking and contraception. These factors should be prevented by creating awareness among women such as avoiding the use of nicotine etc., and making any policy to avoid menstrual disorders. [15]

Kathirvel Srinath & Ravneet Kaur. (2025) et al., the study shows that the prevalence of any menstrual disorder ranges from 3% to 87%. Among all menstrual disorders, dysmenoria were found to be the most (46% to 76%) in women, followed by premenstrual symptoms (PMS) (40% to 71%), while PCOS (3% to 14.14%) was less. The study further found that irregular lifestyle, obesity, insufficient diet, marriage age, family history, smoking and residence factors are associated with menstrual disorders in India. As far as health demand for menstrual disorders is concerned, one -third of women demanded treatment for menstrual disorders.

LIMITATION OF THE STUDY

The reproductive age group women may not have menstrual irregularities. And Sample may hesitate to participate in this study at the time questionnaire.

CONCLUSION

Hypothyroidism affects the reproductive system more frequently in women. Thyroid diseases in general & particularly hypothyroidism in premenopausal women are often associated with menstrual abnormalities. In women of fertile age hypothyroidism may result in, changes in cycle length & amount of bleeding i.e. oligomenorrhea, amenorrhea, polymenorrhagia, & menorrhagia. Menorrhagia is due to estrogen breakthrough bleeding secondary to anovulation.

Ethical consideration

The study was approved by the competent authority of department and permission was taken from the respective departments before start of data collection. Questions were asked after taking informed consent and taking part in this study is completely voluntary. The patient may skip any questions that they do not want to answer and are free to withdraw at any time. There were no specific benefits to the patients but it will help us to find the causes of menstrual irregularities in women and refer to treatment.

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Conflicts of interest: There are no conflicts of interest between authors.

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