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Menstrual Cycle Irregularities a Reproductive Signal of Thyroid Dysfunction

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ABSTRACT

Background: Thyroid hormones play an important role in physiological activities of reproduction in women. Even the slightest disturbances with the thyroid activity can alter the normalcy of the menstrual cycle, ovulation and endometrial stability. Mostly in this way, menstrual complaints are the first clinical manifestations of a latent thyroid disorder particularly in the women of reproductive age.

Objective: To determine the frequency of menstrual cycle irregularities among women with thyroid dysfunction and to assess the association between thyroid status and different menstrual patterns.

Methodology: It was an observational study carried out in the Liaquat Memorial Hospital, Kohat, between 1st January 2025 to 30th June 2025. Seventy two-two women between the ages of 15 to 45 years who reported with menstrual complaints were enrolled. The detailed menstrual and reproductive history was interviewed and clinical examination and thyroid functioning tests were performed: serum TSH, free T4, and thyroid peroxidase antibodies. The participants were categorized based on thyroid condition and their menstrual cycles were compared. Appropriate tests were used to carry out statistical analysis where a p-value of less than 0.05 was considered statistically significant.

Results: Of the 72 participants, thyroid dysfunction was noted in 44 (61.1%). Women who were hypothyroid and hyperthyroid had significantly increased incidence of menstrual irregularities compared to euthyroid individuals ($p = 0.001$). The most prevalent abnormalities observed in the menstrual cycle are oligomenorrhea, menorrhagia and amenorrhea. The positivity of thyroid peroxidase antibody was more among women having irregular cycles.

Conclusion: Thyroid dysfunction, particularly hypothyroidism, is strongly associated with menstrual cycle irregularities. Routine evaluation of thyroid function in women presenting with abnormal menstrual patterns may allow early diagnosis and timely management, thereby improving reproductive health outcomes..

Keywords: Thyroid dysfunction, menstrual irregularities, hypothyroidism, reproductive health, thyroid hormones..

1. INTRODUCTION

The normal menstrual functioning requires a coordination of action among the hypothalamus, pituitary gland,

ovaries and peripheral body endocrine organs. Thyroid hormones are involved in the central role of this interaction; they affect the secretion of gonadotropin, the production of ovarian steroids, ovarian responsiveness; and endometrial responsiveness. Consequently, menstrual cyclicity and ovulation can be disrupted by a disturbance of thyroid functioning [1-3].

One of the most prevalent endocrine diseases in reproductive age women is thyroid disorders. In most of the instances, menstrual dysfunctions like oligomenorrhea, menorrhagia, and amenorrhea can be the precursors of the classical systemic symptoms of thyroid disease. These reproductive presentations tend to make women consult a gynecologist prior to the diagnosis of the endocrine [4-6].

Although thyroid dysfunction has been identified as a cause of menstrual abnormalities, thyroid screening is not always included in the routine assessment programs on the menstrual abnormalities, especially in resource-constrained environments. Thyroid disease can be easily diagnosed early in life and this is a good chance to make right the reversible causes of menstrual disturbances and avoid the long-term reproductive problems [7-9].

This study was therefore designed to evaluate the pattern of menstrual irregularities among women with thyroid dysfunction and to examine the association between thyroid status and menstrual cycle abnormalities in a tertiary care hospital setting.

2. METHODOLOGY

It was conducted as a hospital based observational research at the Liaquat Memorial Hospital, Kohat. The collection of data was done between 1st January 2025 and 30th June 2025 with a duration of six months. The hospital is a large referral unit within the districts it serves, which enabled the women with diverse endocrine and menstrual problems to be recruited. It was an attempt to investigate the correlation between thyroid dysfunction and menstrual cycle abnormalities in reproductively aged women.

The sample size was 72 women. A consecutive sampling method was used to select the participants with all qualified patients visiting the gynecology outpatient department within the study period being invited till the required sample size was reached. Females aged 15 to 45 years who came with complaints of disrupted menstrual patterns, delayed cycles, excessive bleeding or unexplainable amenorrhea were taken into consideration. Those patients who were pregnant, had a prior diagnosis of polycystic ovarian syndrome, were on hormonal contraception, or had undergone pelvic surgery recently, or were previously diagnosed with thyroid disease and were already taking hormonal contraception were excluded to reduce confounding variables.

Each participant was provided with an informed consent and then an interview conducted by the investigator took place in a separate place in a structured format. A pre-designed proforma was used to gather information which included demographic, reproductive history, age at menarche, parity, and past obstetric results and family history of thyroid disorders. The history of menstruation was examined, such as the length of menstrual cycle, regularity, length of bleeding, dysmenorrhea, intermenstrual spotting, and change in cycle pattern. The standardized equipment was used to measure body mass in terms of weight and height and the Body mass index was calculated. Only a short general physical check-up to observe the characteristics indicative of thyroid malfunctioning like goiter, dry skin, baldness or tremors was done.

All the participants were suggested to have a thyroid function test. Blood samples were collected under sterile conditions and sent to the hospital laboratory. The TSH, FT4 and TPO-Ab levels were calculated by using standard tests of chemiluminescence immunoassay technique. The laboratory reference ranges used were TSH 0.4–4.5 mIU/L, FT4 0.8–1.8 ng/dL, and TPO-Ab <35 IU/mL. Individuals with TSH and FT4 within these ranges were considered as euthyroid, individuals with TSH raised and FT4 lowered were considered hypothyroid whereas individuals with TSH lower and FT4 raised were considered hyperthyroid. Subsequent correlation was made between laboratory results and the menstruation feedback of participants.

Data collected was entered into a computerized database and verified to be complete and accurate before analysis. The age, body mass index, and TSH levels are quantitative variables that were summarized using the mean and standard deviation, whereas the categorical variables were summarized as frequencies and percentages. The chi-square test was used to assess the relationship between thyroid status and menstrual irregularities. P-values of 0.05 and below were regarded as significant. The presentation of results was in the form of simple tables and figures to make them easy to interpret.

3. RESULTS

There were 72 women who were enrolled in the present study. Many of the participants are 20 – 29 years reproductive age groups and roughly two-third is married. Many had elevated body mass index known to affect endocrinal and reproductive function.

Table 1. Demographic and Baseline Characteristics of Participants (n = 72)

Variable	Category	n (%)
Age (years)	<20	6 (8.3)
	20–24	18 (25.0)
	25–29	20 (27.8)
	30–34	16 (22.2)
	≥35	12 (16.7)
Marital status	Single	24 (33.3)
	Married	48 (66.7)
Residence	Urban	44 (61.1)
	Rural	28 (38.9)
BMI category	Underweight	8 (11.1)
	Normal	34 (47.2)
	Overweight	20 (27.8)
	Obese	10 (13.9)
Family history of thyroid disease	Present	19 (26.4)
	Absent	53 (73.6)

More than 50% participants were experiencing thyroid dysfunction. Overt or subclinical hypothyroidism was the most prevalent abnormality witnessed. A significant number of these persons also showed a positive result in the thyroid peroxidase antibodies, which points to a high number of autoimmune causes.

Table 2. Thyroid Status and Hormonal Profile (n = 72)

Variable	Category	n (%) / Mean ± SD
Thyroid status	Euthyroid	28 (38.9)
	Subclinical hypothyroid	16 (22.2)
	Overt hypothyroid	14 (19.4)
	Subclinical hyperthyroid	8 (11.1)
	Overt hyperthyroid	6 (8.3)
Serum TSH (mIU/L)	Mean ± SD	6.14 ± 4.62
Free T4 (ng/dL)	Mean ± SD	1.11 ± 0.38
TPO antibodies	Positive	26 (36.1)
	Negative	46 (63.9)

The population of the research was regularly faced with menstrual disturbances. About 66 percent of women reported having irregular menstrual cycle. The most prevalent patterns were oligomenorrhea and menorrhagia. Dysmenorrhea was also widely reported with the effects of thyroid imbalance on the menstrual health.

Table 3. Pattern of Menstrual Irregularities (n = 72)

Variable	Category	n (%)
Cycle regularity	Regular	24 (33.3)
	Irregular	48 (66.7)
Oligomenorrhea	Yes	22 (30.6)
Amenorrhea	Yes	12 (16.7)
Menorrhagia	Yes	18 (25.0)
Polymenorrhea	Yes	10 (13.9)
Hypomenorrhea	Yes	10 (13.9)
Dysmenorrhea	Yes	28 (38.9)

Thyroid status and the menstrual patterns were strongly associated. Women with hyperthyroidism and hypothyroid have irregular menstrual cycles compared to euthyroid women. The correlation was strong showing the reproductive effect of thyroid dysfunction.

Table 4. Association Between Thyroid Status and Menstrual Irregularity (n = 72)

Thyroid status	Regular cycles n (%)	Irregular cycles n (%)	p-value
Euthyroid	18 (64.3)	10 (35.7)	
Hypothyroid (overt + subclinical)	4 (13.3)	26 (86.7)	**0.001**
Hyperthyroid (overt + subclinical)	2 (14.3)	12 (85.7)	

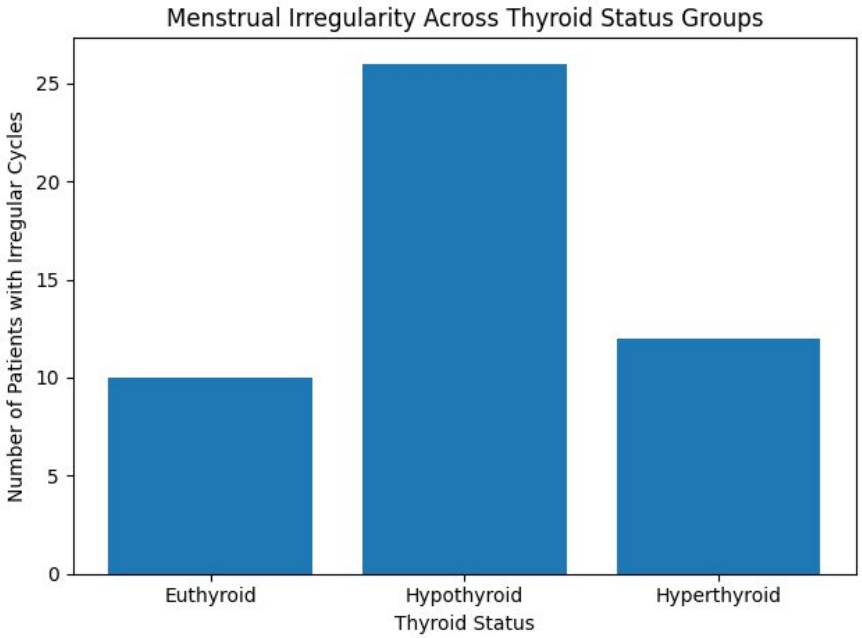

Figure 1: Menstrual Irregularity Across Thyroid Status Groups

The visual representation of this figure indicates that the prevalence of menstrual abnormalities was significantly greater in women with thyroid dysfunction than in the euthyroid participants.

4. DISCUSSION

Menstrual abnormalities are also prone to be the earliest reproductive symptoms of endocrine malfunction and the ongoing

studies clearly demonstrate that significant association exists between changes in menstrual patterns and thyroid dysfunction. In our cohort, nearly 2/3 of the women patients were reported to have irregular menstrual cycles with hypothyroidism being the most frequent underlying abnormality. The finding, in its turn makes the discovery believable with regards to the fact that the hypothalamic pituitary may be severely impacted by the slight yet evident disturbance in the levels of thyroid hormones [10] ovarian axis, thereby altering ovulatory function and menstrual regularity [11, 12].

The high prevalence of hypothyroidism found in this research is in line with the regional and international literature which has indicated that hypothyroidism is more often related to menstrual complaints compared to hyperthyroidism. The most common abnormalities included oligomenorrhea, amenorrhea and menorrhagia that can be attributed to disrupted estrogen metabolism, decreased gonadotropin secretion, and related hyperprolactinemia typical of hypothyroid conditions. Such hormonal imbalances may cause abnormal uterine bleeding patterns, endometrial instability and anovulation [13-15].

The second observation was that thyroid peroxidase antibody was positive in a significant proportion of women with menstrual disturbances which indicated an autoimmune etiology of thyroid dysfunction in a significant proportion of cases. Autoimmune thyroiditis has been also noted as a significant cause of the reproductive morbidity, such as menstrual abnormalities, infertility, and miscarriages. This prompt diagnosis of women with menstrual complaints having autoimmune thyroid disease may hence have a chance to prevent further reproductive complications in the later stages.[16-18].

The relationship between thyroid dysfunction and menstrual abnormalities in this research article is statistically significant, which indicates the clinical importance of regular thyroid screening in women who complain of having irregular menstrual cycles [19, 20]. In the light of the fact that thyroid functional analysis is relatively simple, relatively cost-effective, and is usually easily available, the recommendation to incorporate it into the initial evaluation of menstrual disorders could potentially lead to quicker diagnosing, timely intervention, and improved reproductive outcomes.

5. CONCLUSION

Irregularities in menstrual cycles are strongly associated with a thyroid dysfunction specifically hypothyroidism. Women with abnormal menstrual cycles should be examined regularly to determine the presence of thyroid disorders to enable early diagnosis and proper treatment. The inclusion of thyroid screening in gynecology practice can be of significant use in enhancing the reproductive health and quality of life of the affected women

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