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Menstrual Irregularities and Their Public Health Implications among Bangladeshi Women

Mohammad Abdul Hannan[1], Shahjada Selim[2], Abu Shaim Md Mesbah Uddin[3], Md. Masud Rana[4]

[1]Department of Endocrinology, Northeast Medical College, Sylhet-3100, Bangladesh
[2]Department of Endocrinology, Bangladesh Medical University, Dhaka-1000, Bangladesh
[3]Department of Medicine, Northeast Medical College, Sylhet-3100, Bangladesh
[4]Department of Endocrinology, Bangladesh Medical University, Dhaka-1000, Bangladesh

Abstract

Background: Women in reproductive age groups face menstrual irregularities that affect regularity, bleeding patterns, and symptomatology. Medical problems and endocrine disorders are the main causes of amenorrhea, oligomenorrhea, and menorrhagia.

Objectives: The purpose of the study was to assess menstrual health in a representative sample of women in Bangladesh and evaluate the correlation between irregular menstruation and associated systemic diseases in Bangladesh.

Methods: The study was cross-sectional in nature. The data was collected from July 2015 to December 2025 at the Department of Endocrinology, Bangabandhu Sheikh Mujib Medical University in Bangladesh. The study consisted of 154 married women. The descriptive analysis was performed by IBM SPSS 29 software.

Results: The study revealed that 9.1%, while the number of women who were newly detected adult hypothyroid women. The major menstrual problems experienced by the women included amenorrhea (22.7%), oligomenorrhea (11.7%), irregular menstrual cycles (10.4%), and menorrhagia (9.7%), while paraesthesia (26.0%) was the most common non-menstrual symptom. Multivariable logistic regression analysis revealed that Goiter Grade 1 was significantly associated with the outcome (OR = 11.77, 95% CI: 2.99-46.27, $p<0.001$.

Conclusion: This study identified a high incidence of menstrual disorders such as amenorrhoea and oligomenorrhoea. This clearly indicates that there is a need for more awareness, early diagnosis, and treatment. This study clearly indicates that public health services help women to live a better life and avoid problems. Systemic diseases like joint pains and cognitive disturbances may be related to menstrual health. This study clearly indicates that more research should be done to identify the causes and their socioeconomic and cultural impact.

Keywords: Menstrual disorders, Amenorrhoea, Oligomenorrhea, Menstrual health, Bangladesh.

Introduction

Hypothyroidism is the most common endocrine disease characterized by decreased production of thyroid hormones, which in turn causes a general slowing of metabolic activities. The thyroid gland secretes two

hormones: thyroxine (T4) and triiodothyronine (T3). These hormones are required for metabolism, thermogenesis, cardiovascular functions, and neurological development. Deficiency of these hormones leads to symptoms such as fatigue, gain in weight, intolerance to cold, depression, dry skin, constipation, bradycardia, and cognitive impairment [1]. Hypothyroidism occurs in 4-10% of the population worldwide. However, it has a higher prevalence in women and elderly individuals. Hypothyroidism can be classified as: Primary hypothyroidism: This is the most common form of hypothyroidism. In this form of hypothyroidism, the thyroid gland secretes inadequate amounts of thyroid hormones. The causes include autoimmune thyroiditis or inadequate intake of iodine. Secondary hypothyroidism: This form of hypothyroidism occurs due to inadequate secretion of thyroid-stimulating hormone by the pituitary gland. The causes include pituitary gland tumors, trauma, or injury to the hypothalamus. Hashimoto's thyroiditis, or chronic autoimmune thyroiditis, is the most common cause of primary hypothyroidism. The occurrence of this form of hypothyroidism is closely associated with the presence of anti-thyroid antibodies [2].

Autoimmune disease is significantly influenced by the immune system. In the case of Hashimoto's thyroiditis, the immune system incorrectly identifies the antigens of the thyroid gland as foreign substances. The body produces autoantibodies that lead to the progressive destruction of the thyroid follicular cells through immune-mediated cytotoxicity [3]. The two anti-thyroid antibodies (ATAbs) that trigger hypothyroidism are: TPOAb is an antibody that targets the thyroid peroxidase enzyme, which is significant in the production of thyroid hormones and the oxidation of iodide. TPOAb is positive in 90% of people suffering from Hashimoto's thyroiditis, making it a very sensitive test for the diagnosis of autoimmune thyroid disease [4]. Elevated levels of TPOAb are associated with increased levels of inflammation, lymphocyte infiltration, and glandular atrophy, leading to a deficiency in thyroid hormones. TgAb targets thyroglobulin (Tg), which acts as a precursor for thyroid hormones. TgAb is present in 70-80% of patients with autoimmune hypothyroidism but not as specific for TPO antibodies. An increased level of TgAb indicates increased thyroid dysfunction and acts as a marker for tissue destruction in the thyroid gland [5].

The presence of TPOAb and TgAb is well-documented in autoimmune hypothyroidism, its clinical implications in newly diagnosed patients necessitate more research. Numerous studies have examined the relationship between anti-thyroid antibodies and thyroid function, although the results have been incongruous. Certain studies indicate that elevated levels of TPOAb and TgAb correlate with more severe hypothyroidism, evidenced by increased TSH levels and decreased FT4 levels. Certain studies indicate that the concentration of anti-thyroid antibodies in the body does not consistently correlate with the severity of the illness [6]. Individuals with elevated antibody levels may maintain normal thyroid function for extended periods. Clinical applications of ATAbs in the diagnosis and prognosis of early disease: Increased ATAb titers are likely to advance from subclinical to manifest hypothyroidism. The assessment of ATAb distinguishes autoimmune hypothyroidism from alternative aetiologies, such as iodine deficiency, pharmacological hypothyroidism, or post-operative thyroid impairment. Long-term management strategies: Individuals who are ATAb-positive can be effectively treated through timely intervention and increased surveillance, especially pregnant women and those with a hereditary susceptibility to thyroid disorders [7,8].

Menstrual irregularities such as amenorrhoea are common among women in Bangladesh and are associated with increased systemic symptoms. Though it has been established that autoimmune thyroiditis is associated with hypothyroidism, it is important to carry out an extensive investigation into the effects that anti-thyroid antibodies have on the thyroid in recently diagnosed hypothyroid patients. These

correlations can be used to predict the course of the disease and create individual plans for treatment and risk of complications. This study sought to determine the menstrual health among a representative sample of women in Bangladesh and the correlation of menstrual irregularities with associated systemic diseases.

Material and Methods

Study Design and Setting: This was a cross-sectional study. The study was conducted from July 2015 to December 2015 at the Department of Endocrinology, Bangabandhu Sheikh Mujib Medical University in Bangladesh. The study was conducted in the Department of Endocrinology at Bangabandhu Sheikh Mujib Medical University (BSMMU) located in Dhaka, Bangladesh. BSMMU is a tertiary care center that provides medical care to a wide range of patients. This makes it an appropriate place for conducting a study on thyroid problems in people from different backgrounds and health conditions.

Sample Size: The sample size was considered adequate for establishing statistically significant relationships between TPOAb/TgAb levels and thyroid function. The study was to be done on 154 patients, based on an effect size of 0.3, a 95% confidence level, and 80% power.

Study Population: Sample size was determined by using the following formula:

$$n = \frac{Z^2 \times p \times (1-p)}{d^2}$$

Where:

n = required sample size

Z = Z value at 95% confidence level = 1.96

p = estimated prevalence (proportion)

d = margin of error (precision)

Applying the Formula to Your Study

If no prior national prevalence estimate is available, a conservative prevalence is commonly used:

$$p = 0.50$$

$d = 0.08$(8% margin of error)

$$n = \frac{(1.96)^2 \times 0.50 \times (1-0.50)}{(0.08)^2}$$

$$n = \frac{3.84 \times 0.25}{0.0064}$$

$$n = \frac{0.96}{0.0064} = 150$$

After adjusting for non-response (3–5%):

$$n = 150 + 4 = 154$$

Inclusion Criteria: The study participants should be adults aged 18 years or older with a recent diagnosis of primary hypothyroidism, characterized by elevated levels of thyroid-stimulating hormone (TSH) and decreased levels of free T4.

Exclusion Criteria: Individuals with secondary or central hypothyroidism. Individuals diagnosed with non-thyroidal illness syndrome or other systemic disorders that affect thyroid hormone function. Pregnant or nursing women. Individuals who have had a thyroidectomy or radioactive iodine treatment or are currently on levothyroxine.

Data Collection: A detailed medical history that includes symptoms, duration of the disease, and family history of thyroid disease and autoimmune disorders. A physical examination that includes palpation of

the thyroid gland to check for goitre or nodules. The serum levels of TSH, free T4, and free T3 were estimated by chemiluminescent immunoassay (CLIA). TPOAb and TgAb were detected by enzyme-linked immunosorbent assay (ELISA). The data collected will be grouped according to age, sex, BMI, dietary iodine intake, smoking habits, and healthcare accessibility, which will be done through questionnaires. A symptom questionnaire was filled out by all patients to measure the severity and importance of symptoms associated with hypothyroidism.

Statistical Analysis: The attributes of the study subjects, symptoms, and signs were described in terms of mean, median, and frequency distribution. The study subjects were classified into different groups according to TPOAb/TgAb levels. Differences in study subjects' signs and symptoms were compared across different TPOAb/TgAb levels. The independent effect of TPOAb/TgAb levels on thyroid function was determined by multivariate regression analysis. The confounding factors were age, sex, and BMI. The descriptive analysis of the study was done using IBM SPSS software version 29.

Ethical Considerations: The study was conduction in place of Department of Endocrinology, Bangabandhu Sheikh Medical University. Written informed consent was obtained from all participants. All the data confidentiality was maintained by anonymizing patient information. Ethical approval given by BSMMU/2015/004,

Results

From the figure1, the study participants were comprised of individuals 9.1% had a family history of thyroid disease, which indicates that the study population has a low level of thyroid diseases that are inherited. Concerning the participants' places of residence, 27.3% were from urban areas, whereas 72.7% were from rural regions.

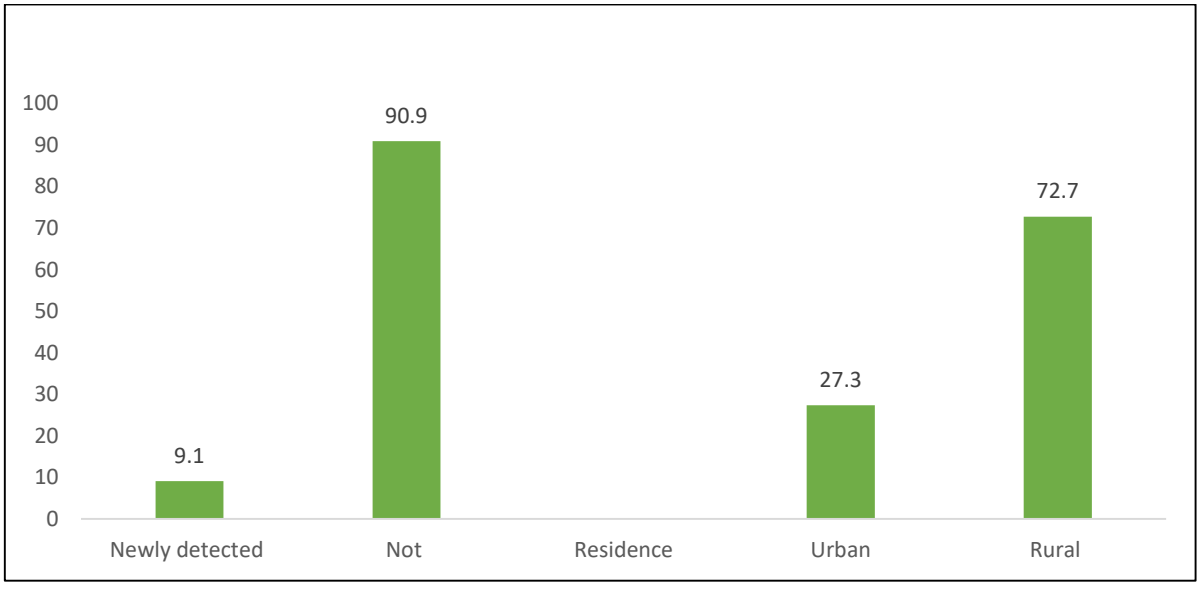

Figure 1: Characteristics of the newly detected adult hypothyroid patients

In figure2, a large number of participants have amenorrhoea and oligomenorrhoea, and a smaller number have other menstrual problems. The results indicate that there is a wide range of menstrual health among the participants. Many participants (46 or 29.9%) have not experienced any menstrual problems. 35 participants (22.7%) have amenorrhoea, which is the absence of menstruation. 18 participants (11.7%) have oligomenorrhoea, which is the infrequent menstruation. 16 participants (10.4%) have menstrual

problems, which indicate the irregularities in menstruation. Menorrhagia, or heavy menstrual bleeding, was reported by 15 participants (9.7%). Finally, 24 participants (15.6%) have not experienced any menstrual roblems.

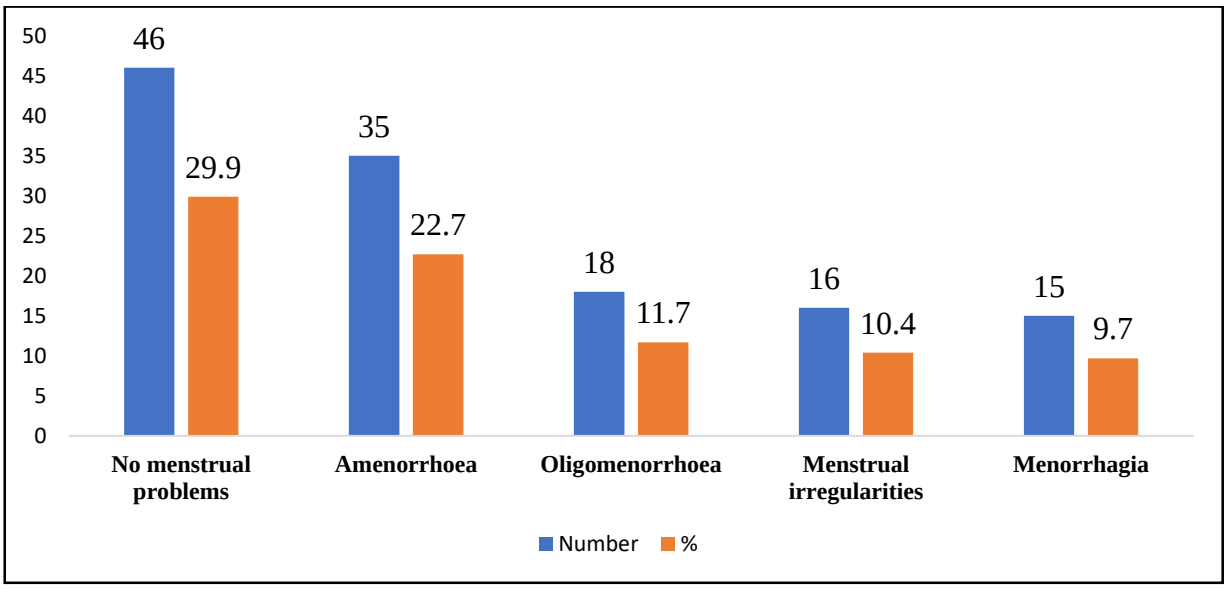

Figure2: Menstrual history of the subjects

From figure3, this implies that half of the participants did not experience any negative obstetrical events, while the other half faced challenges, with the most common bad obstetrical history being spontaneous abortion. The participants' sample size was 154, and the bad obstetrical history is distributed as follows: 29.9%, or 46 participants, reported that they did not have any history of bad obstetrical events. 16.2%, or 25 participants, reported that they had a history of spontaneous abortion. 3.9%, or 6 participants, reported that they had a history of intrauterine fetal death. 50.0%, or 77 participants, reported that they did not have any issues in their obstetrical history.

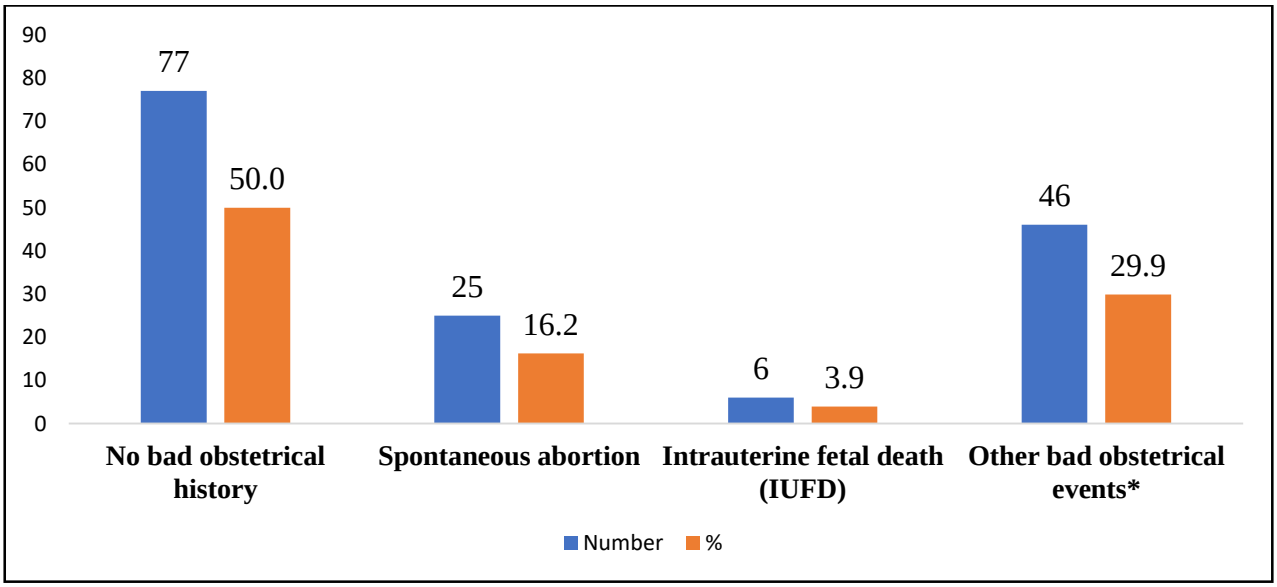

Figure3: Bad obstetric history distribution of the subjects

There was a considerable number of participants experiencing amenorrhoea and oligomenorrhoea, while others reported other menstrual irregularities. Overall, the results revealed various menstrual health patterns among the participants. A significant number of participants (46 or 29.9%) reported no menstrual problems. On the other hand, 35 participants (22.7%) reported experiencing amenorrhoea, which is the absence of menstruation. Moreover, 18 participants (11.7%) reported experiencing oligomenorrhoea, which is the infrequent occurrence of menstrual cycles. In addition, 16 participants (10.4%) reported experiencing menstrual irregularities. Menorrhagia, which is heavy menstrual bleeding, was reported by 15 participants (9.7%). Lastly, 24 participants (15.6%) reported no menstrual problems(figure4).

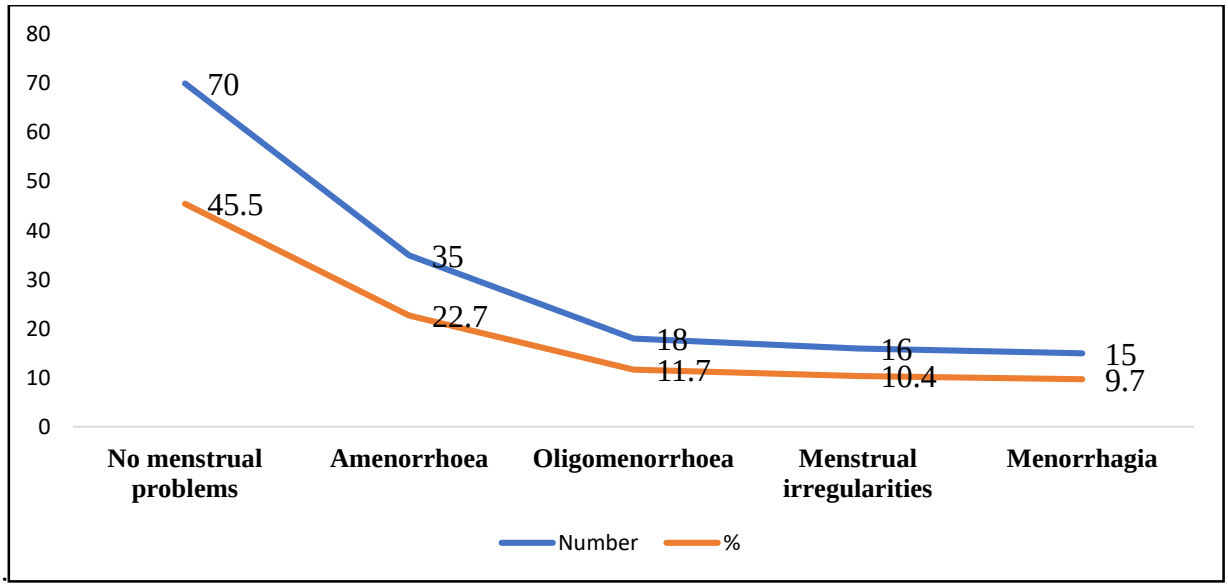

Figure4: Systematic symptoms of the subjects

As shown in table 1, it demonstrates the complaints of adult hypothyroid patients. Out of 100 patients, 73.4% complaints were related to weight gain. Among them, a greater number of patients with positive anti-thyroid antibodies were significant (p = 0.043). 71.0% complaints were related to Somnolence. Among them, a greater number of patients with positive anti-thyroid antibodies were significant (p = 0.041). Although all other complaints were present in a greater number of patients with positive anti-thyroid antibodies, but not significant.

Table 1: Presenting symptoms of the newly detected adult hypothyroid patients

Presenting Symptoms	**Total n=154**	**Anti body**		**P value**
		Positive (n=137)	**Negative (n=17)**	
Fatigability	136 (88.3%)	123 (90.4%)	13 (9.6%)	0.107
Weight gain	113 (73.4%)	104 (92.0%)	9 (8.0%)	**0.043**
Decreased libido	100 (64.9%)	89 (89.0%)	11 (11.0%)	0.983
Body ache	96 (62.3%)	85 (89.0%)	11 (11.0%)	0.831
Voice change	95 (61.7%)	85 (89.0%)	10 (11.0%)	0.797
Scalp hair loss	85 (55.2%)	75 (88.0%)	10 (12.0%)	0.750

Menstrual disturbance	84 (54.5%)	76(90.0%)	8(10.0%)	0.511
Cold intolerance	82 (53.2%)	73 (89.0%)	9 (11.0%)	0.979
Constipation	77 (50.0%)	69 (90.0%)	8 (10.0%)	0.797
Decreased sweating	50 (32.5%)	45 (90.0%)	5 (10.0%)	0.775
Bad obstetrical history	31 (20.1%)	27(87.0%)	4(13.0%)	0.711
Somnolence	14 (9.1%)	10 (71.0%)	4 (29.0%)	**0.041**
Subfertility	9 (5.8%)	9 (100%)	0 (0.00%)	0.598
Galactorrhoea	1 (0.6%)	1 (100.0%)	0 (0.00%)	1.000

In Table2, the logistic regression analysis revealed that Goiter Grade 1 had a significant association with the outcome, as the odds ratio of 11.77 with a 95% confidence interval of 2.99 to 46.27 and it was statistically significant p<0.001. Though the p-value for FT4 levels was statistically significant (p <0.036; OR = 3.54), the 95% confidence interval of 0.061 to 206.09 crossing 1 is not stable and should be interpreted with caution.

Table2: Multiple regression analysis with anti-TPO and anti-Tg antibody

Symptoms	**B**	**S.E.**	**p-value**	**OR**	**95% CI of OR**	
					Lower	**Upper**
Age	-0.005	0.025	0.825	0.995	0.947	1.044
Residence (rural)	-0.193	0.671	0.774	1.212	0.325	4.516
Goiter (Grade 1)	2.465	0.699	**0.001**	11.766	2.992	46.266
Goiter Grade 2)	1.148	0.721	0.111	3.153	0.768	12.952
FT4	2.073	1.265	0.036	3.544	0.061	206.09
TSH	-0.001	0.008	0.931	0.999	0.984	1.015

Discussion

The current research offers valuable information regarding the trends and correlations of menstrual health issues with thyroid-related aspects among Bangladeshi women. The dominance of female respondents in this study is a reflection of the gender-specific nature of menstrual disorders, as is the case with other endocrine and reproductive health issues in South Asia. The relatively small percentage of respondents who reported a family history of thyroid disorders indicates that non-hereditary aspects, such as autoimmune and environmental factors, could have a more significant role in the detected thyroid dysfunction, as has been found in earlier studies in the region [10, 11].

A high prevalence of menstrual irregularities was found, with amenorrhoea being identified as the most common disorder, followed by oligomenorrhoea, irregular cycles, and menorrhagia. The results of the study are consistent with previous studies that found hypothyroidism to be commonly associated with disturbances of the hypothalamic-pituitary-ovarian axis, resulting in menstrual disorders [12,13]. Amenorrhoea and oligomenorrhoea were found to be the dominant menstrual disorders in women with thyroid disorders in previous studies from India and Bangladesh [14]. Deficiency of thyroid hormones is known to influence gonadotropin-releasing hormone pulsatility and estrogen metabolism, which could account for the high prevalence of menstrual disorders found in the study.

In terms of obstetrical outcomes, almost half of the study participants experienced adverse obstetrical outcomes, and the most common of these was spontaneous abortion. This is in keeping with previous

evidence indicating that untreated or subclinical hypothyroidism and thyroid autoimmunity are associated with miscarriage, intrauterine fetal death, and adverse pregnancy outcomes [16]. The symptom profile of the study participants, particularly in relation to the high incidence of weight gain, is in keeping with the classical symptomatology of hypothyroidism. The high incidence of positive anti-thyroid antibody status in patients experiencing weight gain is in keeping with previous evidence indicating that autoimmune thyroiditis is commonly associated with metabolic syndromes and weight gain [18, 19]. Although cognitive disturbances, joint pain, paresthesias, and general sickness were also more common in antibody-positive patients, the differences were not statistically significant. These findings may be related to individual variations in symptom reporting, duration of illness, and possibly the sample size, as has been reported in previous studies [20-22]. A strong and independent relationship between grade 1 goitre and the positivity of thyroid antibodies. The strongly elevated odds of antibody positivity among subjects with goitre reinforce the established relationship between autoimmune thyroiditis and thyroid enlargement. Such observations have been made in previous studies conducted in South Asia and other iodine-variable areas, where there is coexistence between autoimmune phenomena and endemic patterns of goitre [23]. The lack of significant relationships with other variables indicates that early structural changes in the thyroid may be a better clinical predictor of autoimmune activity than symptoms alone [24-25].

Conclusion:

This study revealed a high prevalence rate of disorders in menstrual health, especially amenorrhoea and oligomenorrhoea. This high prevalence rate of these disorders indicates a need to address issues of awareness, diagnosis, and treatment of menstrual disorders. This study highly recommends that screening for menstrual disorders should be included in primary health care services, especially for women who are at risk of developing endocrine and metabolic disorders. Standardized guidelines should be followed in managing amenorrhoea and oligomenorrhoea. Healthcare professionals should be trained to identify these disorders in their patients and counsel them accordingly. Further studies should be conducted to develop evidence-based policies on menstrual health.

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