Yemen Journal of Medicine

https://yemenjmed.com

Article information

DOI: 10.63475/yjm.v4i3.0220

Article history:
Received: 13 November 2025
Accepted: 04 December 2025
Published: 31 December 2025

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How to cite this article:
Sumyia U, Abedin N, Ullah MS, Hassan K, Munira S, Ahmed F, et al. Thyroid dysfunction as a contributing factor to subfertility in women: Evidence from a cross-sectional study. Yemen J Med.2025;4(3):554-563.

Original Article

Thyroid Dysfunction as a Contributing Factor to Subfertility in Women: Evidence From a Cross-Sectional Study

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ABSTRACT

Background: Hypothyroidism is an important cause of female subfertility. It is increasingly recognized that early detection and treatment can improve reproductive outcomes. This study assessed the frequency and types of hypothyroidism among women presenting with subfertility.

Methods: A cross-sectional study was conducted among 59 subfertile women at BIRDEM General Hospital, Dhaka, Bangladesh, from March 2018 to February 2023. Thyroid status was classified as euthyroid (thyroid-stimulating hormone [TSH], 0.45–4.12 mIU/L), subclinical hypothyroid (TSH, 4.12–10 mIU/L), or overt hypothyroid (TSH >10 mIU/L). Researchers analyzed clinical, biochemical, and demographic data using SPSS v. 25. Statistical tests included t-test, Mann–Whitney U test, chi-square, Fisher's exact test, and logistic regression. Significance was set at $P < 0.05$. Ethical approval was obtained from the BIRDEM Ethical Review Committee.

Results: Participants had a mean age of 30.9 ± 0.6 years and a body mass index of 28.2 ± 4.0 kg/m^2. Thyroid dysfunction was found in 32.2% of women—20.3% with subclinical and 11.9% with overt hypothyroidism—while 67.8% were euthyroid. Primary subfertility accounted for 76.3% of cases. Family history of thyroid disease, TSH level, and thyroid peroxidase (TPO) antibody status significantly differed between thyroid-function groups ($P < 0.05$). Nearly half (49.2%) had a TSH

level greater than 2.5 mIU/L, which was strongly associated with TPO antibody positivity (P = 0.002).

Conclusions: A notable proportion of subfertile women had thyroid dysfunction, mostly subclinical hypothyroidism. Routine thyroid screening—especially for women with elevated TSH or a family history of thyroid disease—should be integrated into infertility workups to support early management and improved reproductive outcomes.

Key words: Subfertility, hypothyroidism, subclinical hypothyroidism, overt hypothyroidism, thyroid dysfunction

INTRODUCTION

Subfertility refers to reduced fertility with prolonged time to conception, while infertility is the inability to conceive after one year of unprotected intercourse. [1,2] Global fertility rates have declined in recent decades, with 10% to 15% of couples affected by infertility. [3] Regional prevalence varies: 8% to 12% worldwide, up to 15% in developing countries, and 4% to 15% in Bangladesh. [4–7] Infertility has profound psychological and social implications, particularly in low-income societies where childlessness carries stigma. [8]

Thyroid function plays a central role in reproductive health. Hypothyroidism alters the hypothalamic–pituitary–ovarian axis, leading to menstrual irregularities, anovulation, and luteal phase defects. [9] Increased thyrotropin-releasing hormone elevates prolactin (PRL), suppressing gonadotropin-releasing hormone pulsatility and ovulation. Subclinical hypothyroidism may present as menstrual disorders or recurrent miscarriage. [10]

Thyroid disorders, particularly hypothyroidism and autoimmune thyroiditis, are common among women of reproductive age [11,12] and complicate 2% to 3% of pregnancies. [13,14] They are linked to menstrual dysfunction, polycystic ovary syndrome, miscarriage, and infertility. [15,16] Women with recurrent pregnancy loss, family history of thyroid disease, or unexplained subfertility should undergo thyroid evaluation, including thyroid-stimulating hormone (TSH), free thyroxine (FT4), and thyroid peroxidase (TPO) antibodies. [11]

In Bangladesh, limited studies have explored thyroid dysfunction among subfertile women. This study, therefore, aimed to determine the frequency and risk factors of hypothyroidism among women with subfertility attending a tertiary care hospital.

MATERIALS AND METHODS

STUDY DESIGN, SETTING, AND POPULATION

A hospital-based cross-sectional study was conducted at BIRDEM General Hospital, Dhaka. Participants were 18 to 45-year-old subfertile women who met the inclusion criteria and provided informed consent.

Sample Size

Based on a 4% infertility prevalence [17] and a 95% confidence interval, the calculated sample size was 59 using the formula $n = (z^2pq)/d^2$.

Eligibility

Inclusion criteria: Women aged 18 to 45 years presenting with subfertility.

Exclusion criteria: Women with pelvic inflammatory disease, tubal blockage, genital tuberculosis, systemic illness, known thyroid disease, or an infertile male partner.

Variables and Definitions

Sociodemographic: Age, education, occupation, residence.

Anthropometric: Height, weight, body mass index (BMI), waist and hip circumference, waist–hip ratio.

Biochemical: FT4, TSH, and TPO antibody levels.

Operational definitions:

- Subfertility = failure to conceive after 12 months of unprotected intercourse. [16]
- Primary = no prior conception; Secondary = inability to conceive after a previous pregnancy. [18–20]
- Hypothyroidism classification based on American Thyroid Association/American Association of Clinical Endocrinologists guidelines. [21,22]
- Anti-TPO antibody > 60 U = positive; TSH ≥ 2.5 mIU/L as cutoff for LT4 initiation in TPO-positive women. [22]
- BMI categories (Asian criteria): normal = 18.5 to 22.9, overweight = 23 to 24.9, obese I = 25 to 29.9, obese II ≥30 kg/m^2. [23]

Case Selection and Recruitment

Participants were selected based on predefined inclusion and exclusion criteria. Recruitment occurred at BIRDEM General Hospital among women presenting with subfertility during the study period.

Data Collection and Analysis

Detailed Data Analysis

Normality of data distribution was assessed using the Shapiro–Wilk test.

- An independent sample *t*-test was used for normally distributed continuous variables.
- Mann–Whitney *U* test was applied for non-normally distributed variables.
- Chi-square and Fisher's exact tests were used for categorical variables.
- Logistic regression was performed to identify predictors of thyroid dysfunction.

A *P*-value <0.05 was considered statistically significant.

Anthropometric data were obtained using standardized methods. Blood samples were analyzed by enhanced chemiluminescence immunoassay (ECLIA) for TSH and FT4 (reference range: TSH, 0.45–4.12 mIU/L; FT4, 9.14–23.18 pmol/L). Statistical analysis was conducted using SPSS v. 25.

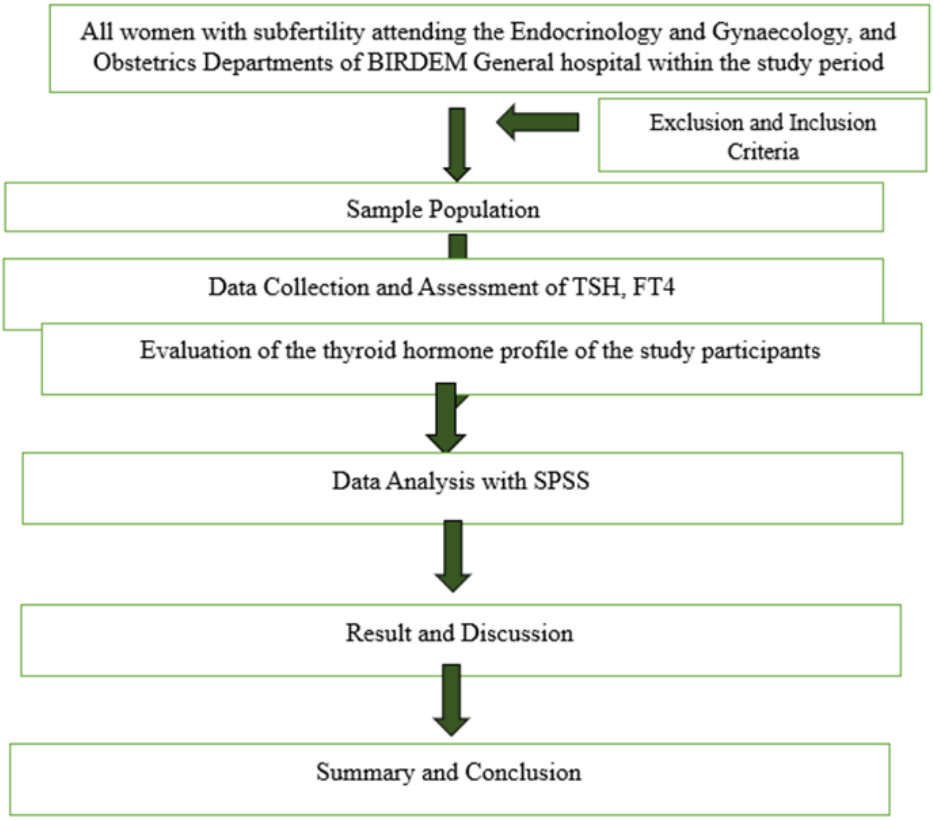

Figure 1: Flow chart illustrating the overall methodological steps of the study. FT4: free thyroxine; TSH: thyroid-stimulating hormone.

Ethical Considerations

Formal ethical approval for this study was obtained from the institutional review board (IRB) of BIRDEM General Hospital, Dhaka, Bangladesh (IRB No.: BIRDEM/IRB/2023/339; dated May 02, 2023). Participation was voluntary, and written informed consent was obtained from all participants before enrollment. Confidentiality and anonymity were strictly maintained throughout the study.

Study Flow Chart

Figure 1 shows the illustration of the overall methodological steps of the study.

RESULTS

Sociodemographic and Anthropometric Characteristics of the Study Participants

Table 1 summarizes the sociodemographic and anthropometric characteristics of the 59 subfertile women. Most participants (69.5%) were aged 27 to 35 years (mean, 30.9 ± 0.6 years), with 66.1% having over 12 years of education and 59.3% being homemakers. The mean BMI was 28.2 ± 4.0 kg/m^2; 40.7% were classified as obese class I, and 35.6% as obese class II. Central obesity was common, with 93.2% having a waist circumference >80 cm and 94.9% a waist–hip ratio >0.85. Overall, the majority of participants were overweight or obese, reflecting a high prevalence of central adiposity among subfertile women.

Thyroid Dysfunction Among Study Participants

Table 2 shows the distribution of thyroid function among the 59 subfertile women. Most participants (67.8%) were euthyroid, while 20.3% had subclinical and 11.9% overt hypothyroidism. Mean FT4 and TSH levels were 13.51 ± 2.55 pmol/L and 2.52 ± 0.81 mIU/L in euthyroid women, 13.51 ± 2.55 pmol/L and 6.89 ± 2.59 mIU/L in subclinical cases, and 8.72 ± 0.40 pmol/L and 10.60 ± 0.21 mIU/L in overt hypothyroidism. Overall, a notable proportion of participants exhibited thyroid dysfunction.

Thyroid Autoimmunity Among the Study Participants

Figure 2 shows the distribution of thyroid peroxidase antibody (TPO Ab) status across thyroid dysfunction groups. A significant association was found between thyroid function and TPO Ab positivity ($P < 0.001$). All overt hypothyroid patients were TPO Ab positive, whereas all euthyroid participants were negative. Only one (12.5%) case of subclinical hypothyroidism showed positivity, indicating a strong link between overt hypothyroidism and thyroid autoimmunity.

Table 1: Sociodemographic and anthropometric characteristics of the study participants (N = 59).

Variable	Category	Frequency (n)	Percentage (%)	Mean ± SD
Age (years)	18–26	8	13.6	
	27–35	41	69.5	
	36–45	10	16.9	
	Total	**59**	**100.0**	**30.88 ± 0.55**
Level of education	>12 years of schooling	39	66.1	
	≤12 years of schooling	20	33.9	
Occupation	Homemaker	35	59.3	
	Service	18	30.5	
	Business	6	10.2	
Body mass index (kg/m^2)	Normal (18.5–22.9)	3	5.1	
	Overweight (23–24.9)	11	18.6	
	Obese I (25–29.9)	24	40.7	
	Obese II (≥ 30)	21	35.6	
	Total	**59**	**100.0**	**28.23 ± 3.98**
Waist circumference (cm)	≤80 cm	4	6.8	
	>80 cm	55	93.2	
	Total	**59**	**100.0**	**94.47 ± 10.99**
Waist-hip ratio	≤0.85	3	5.1	
	>0.85	56	94.9	
	Total	**59**	**100.0**	**0.94 ± 0.04**

Data are presented as frequency (n), percentage (%), and mean ± SD as appropriate.

Table 2: Thyroid dysfunction in the study participants (N = 59).

Type of thyroid dysfunction	Frequency	Percentage (%)	FT4 (pmol/L) mean ± SD	TSH (mIU/L) mean ± SD
Euthyroid (TSH: 0.45–4.12)	40	67.8	13.51 ± 2.55	2.52 ± 0.81
Primary (overt) hypothyroidism (TSH: >10)	7	11.9	8.72 ± 0.40	10.60 ± 0.21
SCH (TSH: 4.12–10)	12	20.3	13.51 ± 2.55	6.89 ± 2.59
Total	59	100.0		

Data presented as frequency and percentages over columns.

FT4: free thyroxine; TSH: thyroid-stimulating hormone; SCH: subclinical hypothyroidism.

Types of Subfertility

Figure 3 illustrates the distribution of participants according to the type of subfertility. The majority of participants, 76.3% (n = 45), had primary subfertility, whereas 23.7% (n = 14) had secondary subfertility. This indicates that primary subfertility was more common among the study population.

Comparison of Sociodemographic and Clinical Variables Among Subfertility Groups

Table 3 compares sociodemographic and clinical variables between primary and secondary subfertility groups. Significant differences were found in family history of thyroid disease (P = 0.024), duration of seeking medical care (P = 0.014), and TPO antibody positivity (P = 0.014). Secondary subfertility participants more often had a family history of thyroid disease and TPO Ab positivity. No significant differences were observed in age, BMI, waist circumference, waist-hip ratio, or ovulation induction history (P > 0.05)

Comparison of Thyroid Dysfunction Between Primary and Secondary Subfertility Groups

Table 4 compares thyroid dysfunction between primary and secondary subfertility groups. Among women with primary subfertility, 75.6% were euthyroid, 17.8% had subclinical, and 6.7% had overt hypothyroidism. In contrast, 42.9% of secondary subfertility cases were euthyroid, while 28.6% each had overt or subclinical hypothyroidism. A significant association was found between subfertility type and

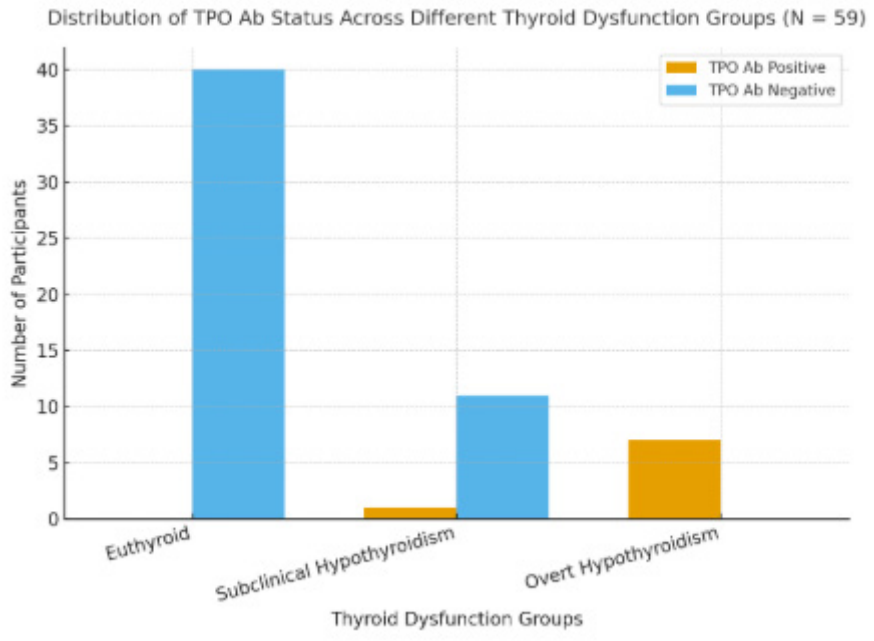

Figure 2: Distribution of TPO Ab status across different thyroid dysfunction groups among the study participants (N = 59). TPO Ab: thyroid peroxidase antibody; SCH: subclinical hypothyroidism. Data analyzed using Fisher's exact test (P < 0.001).

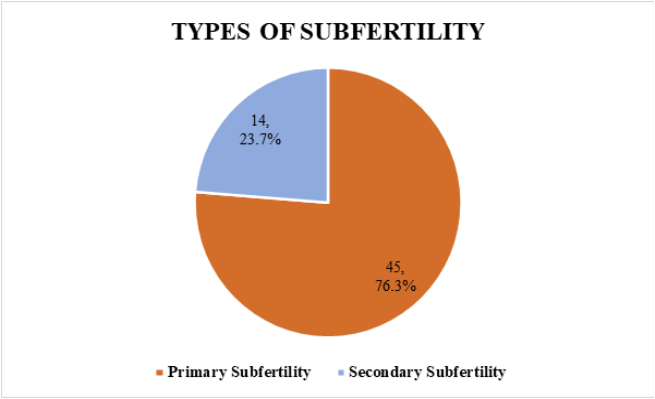

Figure 3: Distribution of study participants according to the type of subfertility (N = 59).

thyroid status (*P* = 0.046 for euthyroid; *P* = 0.048 for overt hypothyroidism), indicating that overt hypothyroidism was more frequent in secondary subfertility.

Hormonal Profile of Primary and Secondary Subfertility Groups

Table 5 compares hormonal levels between primary and secondary subfertility groups. Mean FT4 was lower in the secondary group (11.91 ± 2.71 pmol/L) than in the primary group (13.49 ± 2.72 pmol/L), though not statistically significant (*P* = 0.063). Mean TSH was significantly higher in the secondary subfertility group (5.74 ± 3.39 mIU/L vs. 3.53 ± 2.36 mIU/L; *P* = 0.021), indicating greater thyroid dysfunction among these participants.

Distribution of Participants According to the Recommended TSH Cut-Off Value for Initiating Levothyroxine Therapy

Table 6 shows the distribution of participants according to the recommended TSH cut-off for initiating levothyroxine (LT4) therapy. Among 59 women, 49.2% had TSH > 2.5 mIU/L, and 50.8% had TSH ≤ 2.5 mIU/L. All eight TPO Ab–positive participants had TSH > 2.5 mIU/L, while none of the TPO Ab–negative participants were in this range. The association between TPO Ab status and elevated TSH was statistically significant (*P* = 0.002), indicating a higher likelihood of LT4 indication among TPO Ab–positive women.

Comparison of Significant Variables Across Thyroid Dysfunction Groups

Table 7 summarizes sociodemographic and clinical variables across thyroid dysfunction groups. Most participants in all groups were aged 27 to 35 years, with no significant differences in mean age, BMI, waist circumference, or waist–hip ratio (*P* > 0.05). A significant association was observed between family history of thyroid disease and thyroid dysfunction (*P* = 0.001); 57.1% of overt and 16.7% of subclinical hypothyroid women had a positive family history, compared to none among euthyroid participants.

Table 3: Comparison of sociodemographic and clinical characteristics between primary and secondary subfertility groups (N = 59).

Variables	Primary subfertility (n = 45)	Secondary subfertility (n = 14)	*P* value
	Frequency (%)	Frequency (%)	
Age (in years)			
18–26	8 (17.8)	0 (0)	
27–35	31 (68.9)	10 (71.4)	[a]0.160[ns]
36–45	6 (13.3)	4 (28.6)	
Mean ± SD	30.35 ± 4.32	32.57 ± 3.85	[b]0.092[ns]
BMI (kg/m^2)			
Normal (18.5–22.9)	2 (4.4)	1 (7.1)	
Overweight (23–24.9)	9 (20)	2 (14.3)	[a]>0.99[ns]
Obese-I (25–29.9)	18 (40)	6 (42.9)	
Obese-II (>30)	16 (35.6)	5 (35.7)	
Mean ± SD	27.97 ± 3.77	29.05 ± 4.64	[b]0.380[ns]
Waist circumference (cm)			
Mean ± SD	94.38 ± 11.45	94.75 ± 9.74	[c]0.979[ns]
Waist-hip ratio			
Mean ± SD	0.94 ± 0.05	0.95 ± 0.03	[c]0.852[ns]
F/H of thyroid disease			
Positive	2 (4.4)	4 (28.6)	[a]0.024[s]
Negative	43 (95.6)	10 (71.4)	
The duration for seeking medical care for subfertility			
Mean ± SD	4.86 ± 2.14	6 ± 1.30	[c]0.014[s]
TPO Ab			
Positive	3 (6.7)	5 (35.7)	[a]0.014[s]
Negative	42 (93.3)	9 (64.3)	
H/O ovulation induction			
Positive	43 (95.6)	14 (100)	[a]>0.99[ns]
Negative	2 (4.4)	0 (0)	
Number of cycles receiving ovulation induction			
Mean ± SD	4.44 ± 1.47	4.14 ± 1.16	[c]0.256[ns]

BMI: body mass index; TPO Ab: thyroid peroxidase antibody; s: significant; ns: not significant.

P-values derived from: [a] Fisher's Exact test; [b] Independent sample *t*-test for normally distributed data; [c] Mann–Whitney *U*-test for non-normally distributed data.

Predictive Factors Associated With Hypothyroidism in Subfertile Women

Table 8 presents predictors of thyroid dysfunction among subfertile women based on binary logistic regression. After adjusting for confounders, family history of thyroid disease was the only significant predictor of overt hypothyroidism (OR = 33.33 [95% CI, 4.25–261.20]; *P* = 0.001). Women with a positive family history were 33 times more likely to develop overt hypothyroidism. Although not statistically significant, duration of seeking medical care (OR = 1.21) and family history (OR = 2.15) showed weak associations with subclinical hypothyroidism.

DISCUSSION

This study evaluated the relationship between thyroid dysfunction and subfertility in women of reproductive age. Most participants (69.5%) were aged 27 to 35 years (mean, 30.88 ± 0.55), consistent with Saeed et al. [24] The mean BMI

Table 4: Comparison of thyroid dysfunction between primary and secondary subfertility groups (N = 59).

Type of thyroid dysfunction	Primary subfertility (n = 45)	Secondary subfertility (n = 14)	*P* value
	Frequency (%)	Frequency (%)	
Euthyroid (TSH: 0.45–4.12)	34 (75.6)	6 (42.9)	[a]0.046[s]
Primary (overt) hypothyroidism (TSH: >10)	3 (6.7)	4 (28.6)	[a]0.048[s]
SCH (TSH: 4.12–10)	8 (17.8)	4 (28.6)	[a]0.453[ns]

SCH: subclinical hypothyroidism; TSH: thyroid-stimulating hormone; s: significant; ns: not significant.

P-values derived from a Fisher's Exact test.

Table 5: Comparison of hormonal levels between primary and secondary subfertility groups (N = 59).

Hormones	Primary subfertility (n = 45)	Secondary subfertility (n = 14)	*P* value
	Mean ± SD	Mean ± SD	
FT4 (pmol/L)	13.49 ± 2.72	11.91 ± 2.71	[b]0.063[ns]
TSH (mIU/L)	3.53 ± 2.36	5.74 ± 3.39	[c]0.021[s]

FT4: free thyroxine; TSH: thyroid-stimulating hormone; s: significant; ns: not significant.

P-values derived from: b Independent sample t-test for normally distributed data and c Mann–Whitney U-test for non-normally distributed data.

Table 6: Distribution of participants according to the recommended TSH cut-off value for initiating levothyroxine therapy (N = 59).

TSH	Frequency	Percentage (%)
≤2.5 (mIU/L)	30	50.8
>2.5 (mIU/L)	29	49.2
Total	59	100
	TPO Ab Positive	TPO Ab Negative
	Frequency (%)	Frequency (%)
≤ 2.5 (mIU/L)	0 (0)	30 (58.8)
>2.5 (mIU/L)	8 (100)	21 (41.2)
P-value	[a]0.002[s]	

TSH: thyroid-stimulating hormone; TPO Ab: thyroid peroxidase antibody; s: significant; ns: not significant.

P-values derived from the chi-square test and a Fisher's Exact test.

(28.23 ± 3.98 kg/m^2) indicated predominance of overweight and obesity, aligning with the same study, and 40.7% were classified as obese class I.

Thyroid assessment showed 67.8% euthyroid, 20.3% subclinical, and 11.9% overt hypothyroidism, similar to Deeba et al. [25] FT4 levels were lower among overt hypothyroid women, emphasizing the need for thyroid screening in infertility workups. TPO antibody positivity differed significantly between euthyroid and overt hypothyroid groups ($P < 0.05$), confirming an autoimmune link consistent with Dhillon et al. [26]

Primary subfertility was found in 76.3% of women, secondary in 23.7%, mirroring Anwar et al. [6] and Magdum et al. [17] Family history of thyroid disease and TPO Ab positivity were more common in secondary subfertility, while obesity predominated in primary cases.

Overt hypothyroidism was more prevalent among women with secondary subfertility (28.6%), while subclinical cases were more frequent in primary subfertility (17.8%). These results partly differ from Anwar et al., [4] who found higher overall hypothyroidism rates but did not distinguish between subtypes. Elevated TSH among secondary subfertile women also supports findings by Anwar et al. [4]

Nearly half of the participants (49.2%) had TSH > 2.5 mIU/L, and all TPO Ab–positive women belonged to this group ($P = 0.002$), consistent with Dhillon et al. [26] Family history of thyroid disease was significantly associated with overt hypothyroidism ($P < 0.05$), as also shown by Dhillon et al. [26]

Binary logistic regression identified family history of thyroid disease as the strongest predictor of overt hypothyroidism (OR = 33.33; $P = 0.001$). Duration of seeking medical care showed a mild positive association, while other factors were nonsignificant. These findings reinforce genetic predisposition as a key determinant of thyroid dysfunction, differing from Dhillon-Smith et al., [11] who found stronger autoimmune associations in a multicenter UK study.

Overall, the study highlights a high prevalence of thyroid dysfunction—particularly hypothyroidism—among subfertile women. Routine thyroid screening, including TSH and TPO Ab testing, should be integrated into infertility evaluations to enable early diagnosis and improve reproductive outcomes.

Limitations of the Study

The main limitations include a small sample size (N = 59), which may affect generalizability and limit statistical power. As a single-center cross-sectional study, causal relationships could not be established. Larger, multicenter, longitudinal studies are needed for confirmation.

Table 7: Distribution of significant variables across different thyroid dysfunction groups (N = 59).

Variables	Euthyroid (TSH: 0.45–4.12)	Primary (overt) hypothyroidism (TSH: >10)	SCH (TSH: 4.12–10)
	Frequency (%)	Frequency (%)	Frequency (%)
Age (in years)			
18–26	3 (7.5)	2 (28.6)	3 (25)
27–35	30 (75)	5 (71.4)	6 (50)
36–45	7 (17.5)	0 (0)	3 (25)
P-value	[a]0.175[ns]	[a]0.232[ns]	[a]0.192[ns]
Mean ± SD	31.35 ± 4.01	29 ± 4.65	30.41 ± 4.99
P-value	[b]0.227[ns] [b]0.220[ns]		[b]0.678[ns]
BMI (kg/m^2)			
Normal (18.5–22.9)	2 (5)	1 (14.3)	0 (0)
Overweight (23–24.9)	7 (17.5)	0 (0)	4 (33.3)
Obese-I (25–29.9)	16 (40)	5 (71.4)	3 (25)
Obese-II (>30)	15 (37.5)	1 (14.3)	5 (41.7)
P-value	b0.941[ns]	[b]0.122[ns]	[b]0.362[ns]
Mean ± SD	28.30 ± 3.88	27.25 ± 3.39	28.57 ± 4.81
P-value	[a]0.848[ns]	[a]0.495[ns]	[a]0.745[ns]
Waist circumference (cm)			
Mean ± SD	93.90 ± 10.95	93.28 ± 10.91	97.08 ± 11.71
P-value	[c]0.826[ns]	[c]0.882[ns]	[c]0.698[ns]
Waist-hip ratio			
Mean ± SD	0.93 ± 0.04	0.93 ± 0.08	0.96 ± 0.02
P-value	[c]0.100[ns]	[c]0.845[ns]	[c]0.081[ns]
F/H of thyroid disease			
Positive	0 (0)	4 (57.1)	2 (16.7)
Negative	40(100)	3 (42.9)	10 (83.3)
P-value	[a]**0.001**[s]	[a]**0.001**[s]	[a]0.591[ns]
The duration for seeking medical care for subfertility			
Mean ± SD	5.07 ± 1.99	5.85 ± 2.54	4.91 ± 1.92
P-value	[c]0.523[ns]	[c]0.146[ns]	[c]0.644[ns]

BMI: body mass index; SCH: subclinical hypothyroidism; TPO Ab: thyroid peroxidase antibody; TSH: thyroid-stimulating hormone; s: significant; ns: not significant.

P-values obtained using: [a]Fisher's Exact test, [b]independent sample *t*-test (for normally distributed data), and [c]Mann–Whitney *U*-test (for non-normally distributed data).

CONCLUSIONS

Hypothyroidism was a major contributor to subfertility, affecting one in three women studied (11.9% overt, 20.3% subclinical). Family history of thyroid disease was the strongest predictor of thyroid dysfunction. Early screening and management of thyroid disorders in subfertile women can improve conception rates and fertility outcomes.

AUTHORS' CONTRIBUTION

Each author has made a substantial contribution to the present work in one or more areas, including conception, study design, conduct, data collection, analysis, and interpretation. All authors have given final approval of the version to be published, agreed on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

Table 8: Factors influencing hypothyroidism in individuals with subfertility (N = 59).

Predictors	Thyroid dysfunction groups							
	Primary (overt) hypothyroidism (TSH: >10)				SCH (TSH: 4.12–10)			
	OR	95% CI		*P* value	OR	95% CI		*P* value
		Lower	Upper			Lower	Upper	
Age (20–30 years vs 31–40 years)	0.810	0.165	3.983	0.795	0.745	0.207	2.687	0.653
BMI (normal vs overweight/obese)	0.240	0.019	3.060	0.272	____	_____	_____	_____
Family history of thyroid disease (positive vs negative)	33.33	4.254	261.203	0.001[s]	2.150	0.344	13.424	0.413
TPO Ab (positive vs negative)	_____	_____	_____	_____	0.519	0.058	4.684	0.559
Duration of seeking medical care for subfertility	1.208	0.834	1.750	0.318	0.933	0.674	1.290	0.673

OR: odds ratio; CI: confidence interval; BMI: body mass index; SCH: subclinical hypothyroidism; TPO Ab: thyroid peroxidase antibody; TSH: thyroid-stimulating hormone.
Binary logistic regression was used to assess predictors of thyroid dysfunction, including age, BMI, family history of thyroid disease, TPO antibody status, and duration of seeking medical care for subfertility. s = significant (P < 0.05).

SOURCE OF FUNDING

None.

CONFLICT OF INTEREST

None.

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