

**ORIGINAL RESEARCH**

# Assessment of Thyroid Profile Among Pre and Post-Menopausal Women: A Cross-Sectional Study

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**ABSTRACT**

**Background and Objectives:** Thyroid disorders are globally prevalent conditions. Maintaining optimal thyroid hormone levels is essential for normal reproductive function. The incidence of thyroid disorders increases with age. Women often experience menstrual cycle-related symptoms and are at a higher risk of developing thyroid dysfunction. This study aimed to compare the thyroid profile among pre and postmenopausal women.

**Materials & methods:** 85 premenopausal women (age >40 years) and 90 postmenopausal women (menopause duration ≤ 5 years) were selected. Thyroid profile assessment was conducted in all subjects in a basal-fasting state, ensuring standardized conditions.

**Results:** The mean levels of thyroid-stimulating hormone (TSH), FT3, and FT4 were higher in the postmenopausal women. Similarly, the mean levels of were slightly higher in the postmenopausal group. However, no statistically significant differences were observed in the thyroid hormone profile between the pre and postmenopausal groups.

**Conclusion:** Although the current study did not yield statistically significant differences, it is important to that further research with a larger sample size in the Indian population is necessary to thoroughly evaluate the association between thyroid profile and premenopausal and postmenopausal status.

**Key words:** Female, Menopause, Thyroid Hormones, Menstrual Cycle

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**Introduction**

Thyroid disorder is widely recognized as the most prevalent endocrine disease in India [1]. With approximately 42 million individuals affected nationwide, the prevalence of thyroid disorder varies based on factors such as age, sex, race, geographical location, and the presence of antithyroid antibodies [2].

Subclinical hypothyroidism (SCH) is characterized by elevated levels of thyroid-stimulating hormone (TSH) along with normal levels of free triiodothyronine (FT3) and free thyroxine (FT4). Studies indicate that individuals with SCH may experience increased cardiovascular mortality [1].

Moreover, SCH is more frequently observed among elderly women [3]. The progression of SCH is typically gradual, with manifestations often taking months or even years to become noticeable, often going unnoticed by family and friends [4].

Thyroid disease is known to exhibit an increased prevalence with advancing age, and it has been estimated that approximately 26% of both premenopausal and postmenopausal women are diagnosed with thyroid disorders [4].

In view of this, the primary objective of this study was to evaluate and compare the thyroid profiles of premenopausal and postmenopausal women. By examining various thyroid parameters, this research

sought to contribute to a better understanding of the potential differences in thyroid function between premenopausal and postmenopausal women, shedding light on the association between menopausal status and thyroid health.

### Materials & Methods

This study employed a cross-sectional study design and was conducted among women visiting a tertiary care hospital in India. The study population consisted of 85 premenopausal women aged 40 years or older and 90 postmenopausal women with a menopause duration of no more than 5 years. Postmenopausal status was defined as the absence of menstruation for a minimum duration of 1 year.

The inclusion criteria for this study involved the enrollment of premenopausal subjects who were aged 40 years or older, as well as postmenopausal subjects with a menopause duration not exceeding 5 years. Individuals with known cases of thyroid disorders were excluded, along with those who had a family history of thyroid disorders. Additionally, patients who were receiving antithyroid or thyroid replacement therapy, or had any other endocrine

disorder, were not included in the study. Individuals with a history of hypertension, diabetes mellitus, or systemic diseases were also excluded.

Blood samples were collected from the study participants under basal conditions, and the levels of FT3, FT4, and TSH were assessed at the central laboratory of the institute. Prior to participating in the study, all individuals provided their informed consent. The research was conducted in accordance with the ethical guidelines [5].

### Results

The thyroid profile of premenopausal and postmenopausal women was compared using various statistical tests, including Fisher exact test, Chi-square test, Mann-Whitney U-test, and unpaired t-test. Tables 1, 2, and 3 present the distribution of TSH, FT3, and FT4 status, respectively. However, the specific results from Table 4 shows comparison of thyroid parameters between the two groups. The overall analysis suggests that there were no statistically significant differences observed in the thyroid profile between premenopausal and postmenopausal women.

**Table 1: Serum TSH Levels in study participants**

Serum TSH Level	Postmenopausal Women	Premenopausal Womrn	Total	P-value (Fisher exact test)
Normal	67	68	135	0.47
Increase	12	15	27	
Decrease	6	7	13	
Total	85	90	175	

**Table 2: Serum FT3 Levels in study participants**

Serum FT3 Level	Postmenopausal Women	Premenopausal Womrn	Total	P-value
Normal	63	75	138	0.25
Increase	17	20	37	
Total	80	95	175	

**Table 3: Serum FT4 Levels in study participants**

Serum FT4 Level	Postmenopausal Women	Premenopausal Womrn	Total	P-value
Normal	74	84	158	0.38
Increase	3	5	8	
Decrease	3	6	9	
Total	80	95	175	

**Table 4: Comparison of Thyroid parameters in study population**

Thyroid Parameter	Postmenopausal Women	Premenopausal Womrn	P-value
TSH (MIU/L)	3.28 ± 3.94	2.73 ± 2.31	0.12
FT3 (pmol/L)	5.44 ± 0.59	5.15 ± 0.70	0.07
FT4 (pmol/L)	11.95 ± 2.91	11.29 ± 2.17	0.08

### Discussion

Our study findings suggest that there were no statistically significant differences observed in the

thyroid profile between premenopausal and postmenopausal women.

In a study conducted by Sowers et al., it was observed that 6.2% of women had a TSH level

greater than 5.0 mIU/ml, while 3.2% had a TSH level less than 0.5 mIU/ml [6, 7]. In our study, we found that the mean TSH level in the postmenopausal group was  $3.28 \pm 3.94$ , and in premenopausal women, it was  $2.73 \pm 2.31$ . Faughnan et al. reported an overall prevalence of 7.2% for thyroid disease, with 6.6% being hypothyroidism, and they detected 4.6% of new cases of thyroid dysfunction, half of which were classified as overt disease [8, 9]. These findings suggest that TSH alone can be a sufficient screening tool if appropriate reference values are carefully established [10].

In our study, we observed difference in TSH values between premenopausal and postmenopausal women, which contrasts with the findings of Rojas and Nieves who reported no significant difference in TSH levels based on menopausal stage [11-15]. In our study, we also noticed slight differences in TSH, FT3, and FT4 values between premenopausal and postmenopausal women. This is consistent with the findings of Kolanu et al., who found slightly elevated TSH levels in postmenopausal women compared to premenopausal women [3]. These variations suggest that the menopausal status may indeed influence thyroid function.

The activities of T4 and T3 showed no significant variation among the study groups. However, in our study with a sample size of 175 (80+95), we observed variations in TSH, FT3, and FT4 values between premenopausal and postmenopausal women. Specifically, we found higher levels of TSH, FT3, and FT4 in postmenopausal women compared to premenopausal women. However, these differences did not reach statistical significance. Therefore, conducting a study with a larger population would provide a more robust and statistically significant result

## Conclusion

The findings of this study indicate a slight difference in thyroid parameters between premenopausal and postmenopausal women, but the differences did not reach statistical significance. Therefore, further research with a larger sample size within the Indian population is necessary to accurately evaluate the association between thyroid status and pre- and postmenopausal status. It is recommended to include thyroid screening as a routine investigation for women in both the premenopausal and postmenopausal periods.

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