THYROID FUNCTION ACROSS MENOPAUSAL TRANSITION: A CROSS-SECTIONAL STUDY OF PERI-MENOPAUSAL AND POST-MENOPAUSAL WOMEN

Farida Ahmad[1], Afsheen Mahmood[1], Azra Kanwal[2], Bushra Rauf[3], Abdul Jalil Khan[4], Amina Waqas[5], Zara Khan[6]

ABSTRACT

Objective: Our study aimed to determine the frequency of thyroid disorders in peri-menopausal and postmenopausal women and to determine any association of thyroid disorders with menopausal symptoms.

Material and Methods: This analytical cross-sectional study was carried out at Hayat Abad Medical Complex from January 2025 to August 2025. The sample size was 246. All peri and post-menopausal women aged 45 to 50 were included. The women who were on hormone replacement therapy and had known thyroid disorders were excluded from the study. They were examined clinically. Serum TSH, free T4 was sent to the hospital lab. The Menopausal Rating Scale (MRS) was used to assess the severity of menopausal symptoms.

Results: The study cohort consisted of 246 peri and post-menopausal women. Amongst them, 52.1% were postmenopausal and 47.9% were peri-menopausal.The frequency of subclinical hypothyroidism was12.2%, hypothyroidism, 8.7%, hyperthyroidism, 1.3% and euthyroid, 74.8%. While there was no significant difference in the median total MRS score between the groups with different thyroid problems, participants with hypothyroidism tended to have more psychogenic symptoms, while those with hyperthyroidism tended to have more somatic symptoms. Thyroid conditions did not significantly correlate with MRS score.

Conclusion: Women with hypothyroidism showed a tendency toward more psychogenic symptoms, and those with hyperthyroidism reported relatively higher somatic complaints; the overall MRS scores did not differ significantly among the various thyroid disorder groups.

Keywords: Thyroid disorders, menopause, perimenopause, menopausal rating scale

INTRODUCTION

Thyroid dysfunction, which is more common in females and older age, has a prevalence of 3 - 21% .[1] As far as pre- and postmenopausal women are concerned, 13.3% of them have hypothyroidism, 3.4% have hyperthyroidism, 23.3% subclinical hypothyroidism, and 6.7% have subclinical hyperthyroidism.[2]

[1] Khyber Girls Medical College, Peshawar
[2] Watim Medical and Dental College, Rawalpindi
[3] Hayatabad Medical Complex, Peshawar
[4] Institute of Family Medicine, Khyber Medical University, Peshawar
[5] Dr. Farooq Hospital, Mardan
[6] Third year MBBS student, Khyber Girls Medical College, Peshawar

Address for correspondence:
Dr. Afsheen Mahmood,
Associate Professor, Department of Physiology,
Khyber Girls Medical College Peshawar, Pakistan.
afsheenmahmood66@gmail.com

Hypothyroidism becomes more common with age, particularly in postmenopausal women. The prevalence of hypothyroidism among postmenopausal women is significant. A cross-sectional study in India reported a prevalence of 27.3%.[3]

The relationship between thyroid function and the reproductive system is intricate, influencing each other throughout a woman's fertile period. As women age, changes in thyroid physiology include a reduction in iodine uptake and, as a result, reduced synthesis of free thyroxine, while thyroid-stimulating hormone levels remain normal or tend to be at higher limits. Complications of menopause, such as coronary atherosclerosis and osteoporosis, may be aggravated by hyperthyroidism or hypothyroidism.[4] In menopausal women who have subclinical hypothyroidism, loss of hormones and aging itself can worsen the cardio-metabolic profile, like dyslipidemia and hypertension. However, vigorous research on the remunerations of thyroxin treatment for subclinical hypothyroid menopausal women is still missing; caution should be taken in its use. TSH suppression must be avoided in patients

being treated for hypothyroidism.[5] Besides an increase in cardiovascular risk, estrogen depletion also has adverse effects on bone health. Hyperthyroidism and menopause have similar symptoms. In hyperthyroidism, bone density is decreased, and the risk of vertebral fractures is increased. Early detection and treatment of hyperthyroidism are required to mitigate the increased risk of heart and bone diseases during menopause.[6]

The intricate relationship between thyroid dysfunction, menopause, and their combined impact on cardiovascular health, bone density, and overall mortality necessitates further investigation. Although both thyroid disorders and menopausal symptoms are independently well-documented, there is limited evidence from our population exploring their coexistence and the extent to which thyroid dysfunction may contribute to the severity or pattern of menopausal symptoms. This gap in the current literature underscores the need for focused evaluation in women undergoing menopausal transition. Therefore, our study aimed to determine the frequency of thyroid disorders in peri-menopausal and postmenopausal women and to assess any association between thyroid dysfunction and menopausal symptoms.

MATERIALS AND METHODS

The present study is an analytical cross-sectional study that was carried out at Hayat Abad Medical Complex (HMC), Peshawar and Watim Medical and Dental College, Rawalpindi, after attaining approval from the Ethical Committee, HMC number 2430, dated 17/12/2024. This study was carried out from January 2025 to August 2025. Sample size was calculated by open-epi with a prevalence of 20% ,95% confidence level and 5% of margin of error the sample size turned out to be 246.[7] All peri-menopausal and postmenopausal women attending the gynecology OPD, aged 45 to 50, who achieved menopause naturally, or who were in their peri menopausal stage and were willing to contribute to the study, were included. Written informed consent was signed by all the participants."Peri menopause was defined by the occurrence of amenorrhea of 60 days or longer plus other cycle irregularities and vasomotor symptoms. Menopause was defined as complete cessation of menstruation for 12 cycles"[8]. The women who were on hormone replacement therapy and had known thyroid disorders were excluded from the study. Participants who were taking iodide, amiodarone, salicylates, propranolol, lithium, or corticosteroids were also excluded.

They were examined clinically to assess menopausal symptoms; menopause rating scale (MRS) was used. It is an 11-item analysis consisting of three domains namely somatic, psychological and urogenital domain. "Each item of the MRS was scored from 0 (no complaints) to 4 (very severe symptoms). Subscale scores were computed by summing items within each domain. The total MRS score ranged from 0 to 44, with scores 0–4 = No or minimal symptoms, 5–8= Mild, 9–15= Moderate, ≥16 = Severe symptoms[9]. TSH and free T4 levels were sent to the hospital Laboratory. Data was analyzed using SPSS Statistics version 20. The correlations between thyroid status and MRS score were examined separately for both groups, i.e., peri-menopausal and postmenopausal, using Spearman correlation Based on the analysis, the women were grouped into normal thyroid levels, hypothyroidism/hyperthyroidism, and subclinical hypothyroidism/hyperthyroidism to determine the frequency of thyroid disorders in peri- and post-menopausal women.

RESULTS

This study included a total of 246 participants. Out of 246, 118 (47.9%) were peri-menopausal, while 128 (52.1%) were postmenopausal. According to the thyroid status, 176 (74.8%) were euthyroid, 24(8.7%) hypothyroid, 7(1.3%) hyperthyroid, and 39 (12.2%) were subclinical hypothyroid, respectively. The frequencies of thyroid disorders according to menopausal status are shown in table 1.

Table 1: Frequency of thyroid diseases in peri and postmenopausal women

Thyroid status	Peri -menopausal (%) N= 118	Post-menopausal (%) N= 128
Euthyroid	73	87
Hypothyroid	14	15
Hyperthyroid	4	0
Subclinical hypothyroid	15	26

The correlations between thyroid status and MRS score were examined separately for both groups, i.e., perimenopausal and postmenopausal. The MRS score had no correlation with thyroid status in both perimenopausal ($\rho = -.020$, $p = .83$) and postmenopausal ($\rho = .059$, $p = .521$) groups.

To compare MRS scores across the thyroid status, the Kruskal-Wallis test was applied. The median total MRS score did not differ significantly between euthyroid, hypothyroid, and hyperthyroid women ($H = 2.40$, $df = 2$, $p = 0.301$). Participants with hypothyroidism had higher psychogenic symptoms, and hyperthyroidism tended to have higher somatic symptoms, but this was not statistically significant. Also, when stratified by menopausal status, there was no significant association between thyroid status and MRS score in either group of perimenopausal and postmenopausal women, except that the perimenopausal group showed a higher trend of somatic symptoms with hypothyroidism and hyperthyroidism compared to the euthyroid group.

DISCUSSION

Multiple studies have explored the correlation between menopausal symptoms and thyroid disorders, but discrepancies exist due to varying definitions, patient selection criteria, and study designs. The functional outcome of the thyroid during premenopausal and postmenopausal periods should be interpreted cautiously. Some studies focus solely on thyroid function disorders without correlating them with menopausal symptoms, while others compare results between peri-menopausal and post-menopausal women.

Our study aimed to conclude the overall frequency and trend of thyroid disorders in peri-menopausal groups and post-menopausal groups, and establish any correlation between thyroid status and menopausal status through MRS scores. Our research supports the existing literature that identifies menopausal women as a high-risk group for thyroid disorders. Shaikh et al reported that nearly one in eight women may have a thyroid disorder, with the risk of subclinical hypothyroidism being more prevalent with advancing age. Differentiating between post-menopausal symptoms and thyroid-related symptoms can be challenging, and reliable recommendations for evaluating thyroid function in menopausal women are lacking. [12]

Shetty et al. emphasized that thyroid disorders are more prevalent in women and older adults, suggesting the need for checking serum T3, T4, and TSH levels in post-menopausal women to prevent thyroid dysfunction.[11]

We also found that both peri-menopausal and post-menopausal groups are at risk of developing thyroid disorders. A key finding was that subclinical hypothyroidism was the most common thyroid disorder identified in both perimenopausal and postmenopausal women. This finding is also observed in other studies. Bordoloi et al. found that postmenopausal women had a higher prevalence of hypothyroidism, with subclinical hypothyroidism being more common than clinical hypothyroidism.[13] This suggests a potential link between female reproductive hormones and thyroid hormones. The decline of female reproductive hormones during the menopausal phase might influence thyroid hormone levels as well.[14] This also highlights the importance of screening women for thyroid disorders during the menopause phase. However, it is important to note that our study did not identify any significant difference in serum TSH and free T4 levels between the two menopausal groups.

Another objective of our study was to see whether thyroid dysfunction could influence menopausal symptoms. Contrary to our initial hypothesis, there was no statistically significant association identified between thyroid status and the severity of menopausal symptoms measured by the MRS score for either of the peri-menopausal or post-menopausal groups. This suggests that the somatic and psychological symptoms reported by menopausal women in the peri- and post-menopausal phase may not be only caused

due to underlying thyroid dysfunction. Hence, treating thyroid dysfunction alone may not improve these symptoms, contradicting the assumptions of many clinicians [15]. So, these complaints should first be carefully evaluated independently to identify the root cause and then managed appropriately to improve patient care.

A key strength of this study lies in its systematic assessment of menopausal symptoms in relation to different thyroid states, providing a nuanced understanding that extends beyond broad symptom severity scores. By highlighting that thyroid dysfunction is more closely related to the quality of symptoms rather than the quantity, these findings refine our understanding of the complex interplay between endocrine health and menopausal experiences.

From a clinical perspective, these results imply that routine thyroid evaluation in menopausal women may not necessarily predict overall symptom burden, but it can help guide more tailored management strategies for specific domains such as psychological well-being or somatic discomfort. From a research standpoint, the study advances the field by encouraging a domain-focused rather than a global approach in future investigations, potentially informing more individualized therapeutic interventions and contributing to a more holistic model of women's health during the menopausal transition.

LIMITATIONS

Despite these findings, limitations such as small sample sizes were acknowledged, which led to even smaller thyroid disease subgroups. Additionally, future studies are recommended to explore correlations between age, menopausal symptoms, and thyroid levels. The collective evidence suggests a potential association between thyroid disorders and menopausal women, emphasizing the importance of monitoring thyroid levels based on risk factors and taking into account family history, rather than relying on somatic and psychogenic symptoms, in individuals going through menopause**.**

CONCLUSION

While women with hypothyroidism showed a tendency toward more psychogenic symptoms and those with hyperthyroidism reported relatively higher somatic complaints, the overall MRS scores did not differ significantly among the various thyroid disorder groups. This indicates that thyroid dysfunction may not substantially influence the overall burden of menopausal symptoms, though it can shape the pattern of specific symptom domains.

Authors' contributions

Author Name	**Contribution**
Dr. Farida Ahmad	Conception and design of the study, critical appraisal of the manuscript
Dr. Afsheen Mahmood	Conception and design of the study, critical appraisal of the manuscript
Azra Knwal	critical appraisal of the manuscript
Bushra Rauf	critical appraisal of the manuscript
Amina ifthekhar	critical appraisal of the manuscript
Zara khan	critical appraisal of the manuscript
Dr.Abdul jalil klhan	critical appraisal of the manuscript

Conflicts of interest: None

Funding: None

REFERENCES:

1. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. The Colorado thyroid disease prevalence study. Archives of internal medicine. 2000;160(4):526-34.
2. Yadav M, Kose V, Bhalerao A. Frequency of Thyroid Disorder in Pre-and Postmenopausal Women and Its Association With Menopausal Symptoms. Cureus. 2023;15(6).
3. Sharma P, Verma A. Prevalence of hypothyroidism among postmenopausal women in an urbanised village of northern India: A cross-sectional study. Journal of Family Medicine and Primary Care. 2024;13(9):3815-21.
4. Uygur M, Yoldemir T, Yavuz D. Thyroid disease in the perimenopause and postmenopause period. Climacteric. 2018;21(6):542-8.

5. Capozzi A, Scambia G, Lello S. Subclinical hypothyroidism in women's health: from pre-to post-menopause. Gynecological Endocrinology. 2022;38(5):357-67.
6. Frank-Raue K, Raue F. Thyroid Dysfunction in Peri-and Postmenopausal Women—Cumulative Risks. Deutsches Ärzteblatt International. 2023;120(18):311.
7. Abro AH, Memon SH, Shah SZA, Devrajani BR, Devrajani T, Memon A, et al. Thyroid Dysfunction in Postmenopausal Women. Diabetes. 2021;80(07):14.
8. Harlow SD, Gass M, Hall JE, Lobo R, Maki P, Rebar RW, et al. Executive summary of the Stages of Reproductive Aging Workshop+ 10: addressing the unfinished agenda of staging reproductive aging. Climacteric. 2012;15(2):105-14.
9. Meeta M, Digumarti L, Agarwal N, Vaze N, Shah R, Malik S. Clinical practice guidelines on menopause:* An executive summary and recommendations: Indian Menopause Society 2019–2020. Journal of Mid-life Health. 2020;11(2):55-95.
10. Abbas R, Abbas HG, Shahid A, Chand S, Nawaz S. Reference Intervals for Free T. Journal of the College of Physicians and Surgeons Pakistan. 2014;24(11):806-9.
11. Shetty A, Lingaraju S, Chandregowda M. Study of thyroid profile in pre and post-menopausal women: A case control study. Int J Adv Med. 2021;8:1069-72.
12. Shaikh S, Noor F, Azli S, Sajjad S. Hypothyroidism screening in menopausal women. Pak J Med Health Sci. 2017;11:14-7.
13. Bordoloi G, Jahan W. A study of thyroid function in premenopausal and postmenopausal women of Dibrugarh town, Assam, India. International Journal of Research in Medical Sciences. 2018;6(9):3015-9.
14. Santin AP, Furlanetto TW. Role of estrogen in thyroid function and growth regulation. J Thyroid Res. 2011;2011:875125.
15. Feller M, Snel M, Moutzouri E, Bauer DC, de Montmollin M, Aujesky D, et al. Association of Thyroid Hormone Therapy With Quality of Life and Thyroid-Related Symptoms in Patients With Subclinical Hypothyroidism: A Systematic Review and Meta-analysis. JAMA. 2018;320(13):1349-59.