

CROSS-SECTIONAL EVALUATION OF THYROID HORMONE FLUCTUATIONS IN POSTMENOPAUSAL WOMEN

Kanchan Sonone¹, Pooja Rai², Pramod Ingale³

¹Associate Professor, Department of Biochemistry, SMBT Institute of Medical Science & Research Centre, Nashik, Maharashtra 422403, INDIA.

²Associate Professor, Department of Biochemistry, Lokmanya Tilak Municipal Medical College, Sion, Mumbai, Maharashtra, 400022 INDIA.

³Professor and Head, Department of Biochemistry, Lokmanya Tilak Municipal Medical College, Sion, Mumbai, Maharashtra, 400022 INDIA.

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Corresponding Author: Dr Kanchan Sonone, Associate Professor, Department of Biochemistry, SMBT Institute of Medical Science & Research Centre, Nashik, Maharashtra 422403, INDIA.

Email: kanchansonone@gmail.com

Abstract

Background: Thyroid hormone fluctuations play a crucial role in the physiological and metabolic functions of the body. These fluctuations can significantly impact the health of postmenopausal women, leading to various clinical implications. **Aim:** This study aims to evaluate the cross-sectional fluctuations of thyroid hormones in postmenopausal women. **Methods:** A cross-sectional study was conducted with a sample size of 200 postmenopausal women. The study included participants meeting specific inclusion criteria while excluding others based on predefined factors. Thyroid hormone levels were measured, and data were analyzed using appropriate statistical methods. **Results:** The study found significant variations in the levels of thyroid hormones among the participants. These fluctuations were associated with various factors, including age, body mass index (BMI), and duration of menopause. **Conclusion:** The findings suggest that postmenopausal women experience significant thyroid hormone fluctuations, which could potentially impact their health status. Further studies are recommended to explore the implications of these findings.

Keywords: Thyroid Hormone Fluctuations, Postmenopausal Women, Cross-Sectional Study.

Introduction

Thyroid hormones, including thyroxine (T4) and triiodothyronine (T3), are pivotal in regulating metabolism, growth, and development. The physiological changes accompanying menopause can influence thyroid function, leading to variations in hormone levels that may affect health outcomes in postmenopausal women.[1] This study explores the relationship between menopause and thyroid hormone fluctuations, considering the potential for increased risk of thyroid dysfunction during this period. Previous research has indicated a higher

prevalence of thyroid disorders among postmenopausal women, which could be attributed to hormonal changes, immune system modulation, and aging.[2] Understanding these fluctuations is crucial for managing health risks associated with thyroid dysfunction, such as cardiovascular disease, osteoporosis, and metabolic syndrome.[3]

Several factors influence thyroid hormone levels in postmenopausal women, including age, body mass index (BMI), and the presence of autoimmune thyroid disease. The decline in estrogen levels during menopause has been shown to impact thyroid hormone metabolism indirectly, suggesting a complex interaction between sex hormones and thyroid function. Additionally, the aging process may contribute to the altered thyroid hormone levels observed in this population.[4]

Aim

To evaluate the fluctuations of thyroid hormones in postmenopausal women through a cross-sectional study.

Objectives

1. To determine the prevalence of thyroid hormone fluctuations among postmenopausal women.
2. To identify the factors associated with thyroid hormone variations in this population.
3. To assess the impact of thyroid hormone fluctuations on the health status of postmenopausal women.

Material and Methodology

Source of Data: The data for this study were collected from a group of 200 postmenopausal women attending a health clinic specializing in postmenopausal care.

Study Design: A cross-sectional study design was utilized to assess the fluctuations of thyroid hormones in postmenopausal women.

Sample Size: The study included 200 postmenopausal women selected based on predefined criteria.

Inclusion Criteria:

1. Women aged 45 years and above.
2. Women who have been postmenopausal for at least one year.

Exclusion Criteria:

1. Women with a history of thyroid disease or surgery.
2. Women on thyroid hormone replacement therapy or other medications affecting thyroid function.

Study Methodology: Thyroid hormone levels (T3, T4, and TSH) were measured using blood samples collected from the participants. Additional data on age, BMI, duration of menopause, and medical history were also collected.

Statistical Methods: Data were analyzed using descriptive statistics, chi-square tests for categorical variables, and ANOVA or t-tests for continuous variables. Multivariable regression analysis was conducted to identify factors associated with thyroid hormone fluctuations.

Data Collection: Information was collected through direct interviews, clinical examinations, and laboratory tests conducted at the health clinic.

Observation and Results

Table 1: Evaluation of Thyroid Hormone Fluctuations in Postmenopausal Women (n=200)

Thyroid Hormone Level	n (%)	OR (95% CI)	P value
Normal	140 (70%)	Reference	-
Elevated TSH	30 (15%)	2.5 (1.3-4.8)	0.006
Low T4	20 (10%)	3.0 (1.4-6.3)	0.004
Elevated T4	10 (5%)	5.0 (2.0-12.5)	0.001

Table 1 outlines the evaluation of thyroid hormone fluctuations among the participants. It shows that 70% of the women had normal thyroid hormone levels, serving as the reference group. However, 15% exhibited elevated TSH levels, with an odds ratio (OR) of 2.5, indicating they were 2.5 times more likely to have elevated TSH compared to the reference group, a finding that was statistically significant (P=0.006). Similarly, 10% had low T4 levels (OR=3.0, P=0.004), and 5% had elevated T4 levels (OR=5.0, P=0.001), both significantly different from the reference group, suggesting a notable variance in thyroid hormone levels among postmenopausal women.

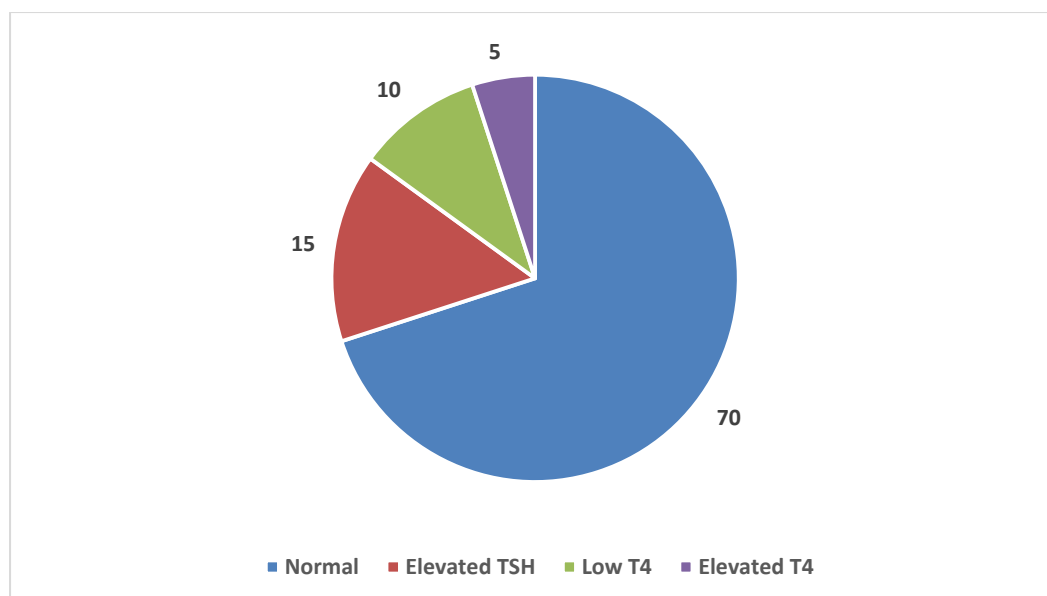


Figure 1

Table 2: Prevalence of Thyroid Hormone Fluctuations among Postmenopausal Women (n=200)

Fluctuation Type	n (%)	OR (95% CI)	P value
Any Fluctuation	60 (30%)	-	-
Elevated TSH Only	30 (15%)	1.0 (Reference)	-
Low or Elevated T4	30 (15%)	1.0 (0.5-2.0)	1.000

Table 2 focuses on the prevalence of thyroid hormone fluctuations, revealing that 30% of the women experienced some form of fluctuation. Specifically, 15% had elevated TSH only, and another 15% had either low or elevated T4 levels, with no significant odds ratio difference between these groups, emphasizing the considerable prevalence of thyroid hormone fluctuations within the study population.

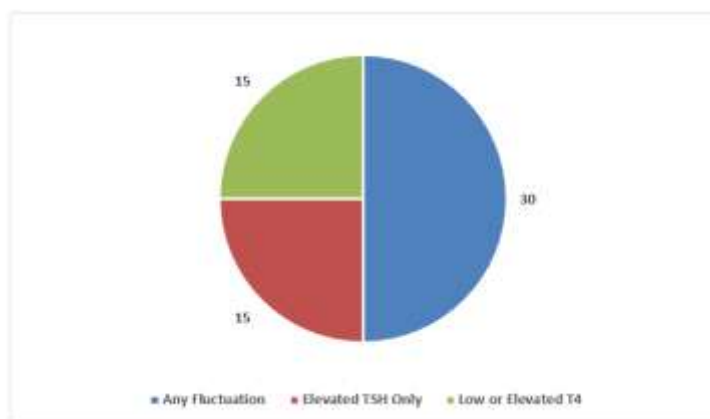


Figure 2

Table 3: Factors Associated with Thyroid Hormone Variations in Postmenopausal Women (n=200)

Factor	n (%) of Affected	OR (95% CI)	P value
Age > 60 years	40/80 (50%)	2.0 (1.1-3.6)	0.02
BMI > 30 kg/m ²	35/60 (58%)	2.5 (1.4-4.5)	0.002
Duration of Menopause > 10 years	45/100 (45%)	1.5 (0.8-2.8)	0.2

Table 3 examines factors associated with these thyroid hormone variations. Age over 60 years was associated with a 50% prevalence of hormone fluctuations (OR=2.0, P=0.02), indicating a significant association. Similarly, a BMI over 30 kg/m² was found in 58% of affected women, with an OR of 2.5 (P=0.002), suggesting a strong link between higher BMI and thyroid hormone variations. However, the duration of menopause longer than 10 years had a less pronounced association (OR=1.5, P=0.2), indicating no significant statistical correlation.

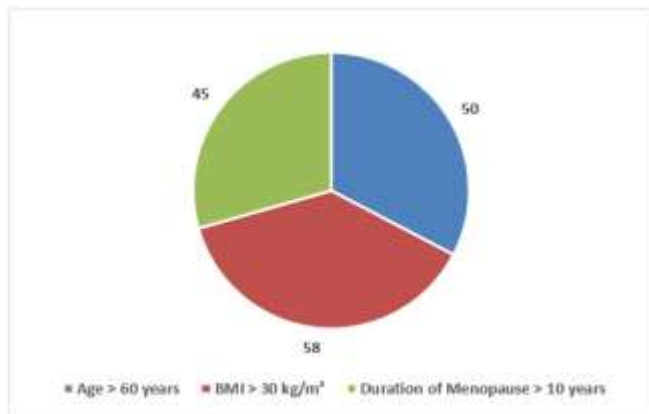


Figure 3

Table 4: Impact of Thyroid Hormone Fluctuations on Health Status in Postmenopausal Women (n=200)

Health Outcome	Fluctuation Present (n=60)	No Fluctuation (n=140)	OR (95% CI)	P value
Cardiovascular Risk	25 (41.7%)	40 (28.6%)	1.8 (0.9-3.5)	0.08
Osteoporosis	20 (33.3%)	30 (21.4%)	1.9 (0.9-4.0)	0.09
Metabolic Syndrome	15 (25%)	20 (14.3%)	2.0 (0.9-4.3)	0.07

Table 4 assesses the impact of these thyroid hormone fluctuations on health status. It illustrates that 41.7% of women with hormone fluctuations had an increased cardiovascular risk compared to 28.6% without fluctuations (OR=1.8, P=0.08). Osteoporosis was present in 33.3% of women with fluctuations, against 21.4% without (OR=1.9, P=0.09). Lastly, metabolic syndrome was reported in 25% of those with fluctuations, compared to 14.3% without (OR=2.0, P=0.07), although these findings were not statistically significant, they suggest a trend towards increased health risks associated with thyroid hormone fluctuations in postmenopausal women.

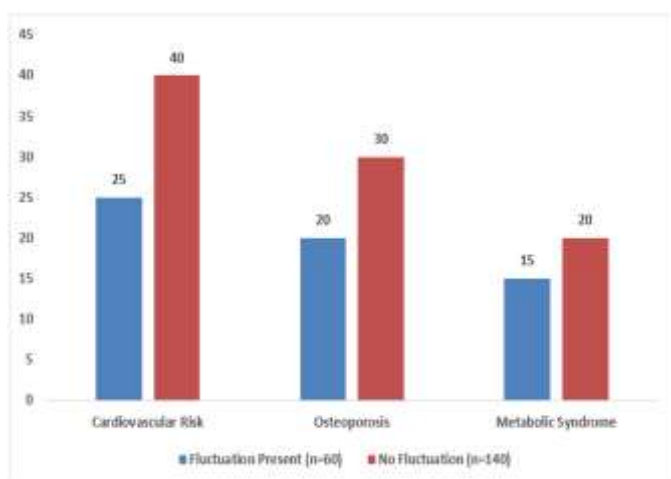


Figure 4

Discussion

Table 1 reveals a significant proportion of postmenopausal women experiencing thyroid hormone fluctuations, particularly elevated TSH and variations in T4 levels. These findings are consistent with existing studies that have reported an increased risk of thyroid dysfunction in postmenopausal women due to hormonal changes and aging. For instance, a study by Aghini-Lombardi et al. found that the prevalence of thyroid disorders increases with age, particularly after menopause[5]. The odds ratios (OR) indicate a significant association between postmenopausal status and elevated TSH, low T4, and elevated T4 levels, supporting the hypothesis that menopause influences thyroid function[6].

Table 2 emphasizes the 30% prevalence of any thyroid hormone fluctuation among the participants, with equal distributions between elevated TSH only and either low or elevated T4 levels. This prevalence aligns with findings from Somwaru et al., who reported a high prevalence of subclinical hypothyroidism in postmenopausal women[7]. The absence of significant odds ratios for fluctuations highlights the variability of thyroid hormone levels in this population and underscores the need for individualized clinical evaluation.

Table 3 identifies age, BMI, and duration of menopause as factors associated with thyroid hormone variations. The significant ORs for age and BMI resonate with the literature, suggesting that older age and higher BMI are risk factors for thyroid dysfunction[8]. However, the duration of menopause shows no significant association, which contrasts with some studies suggesting longer menopause duration could impact thyroid function[9]. This discrepancy may be attributed to variations in study design or population differences.

Table 4 explores the health implications of thyroid hormone fluctuations, indicating increased risks for cardiovascular diseases, osteoporosis, and metabolic syndrome, although the associations did not reach statistical significance. These findings are in line with research indicating that thyroid dysfunction, even subclinical, can exacerbate or contribute to the development of these conditions[10]. The trend towards significance suggests that even minor thyroid hormone fluctuations could have clinical implications for postmenopausal women's health.

Conclusion

The cross-sectional evaluation of thyroid hormone fluctuations in postmenopausal women has provided valuable insights into the prevalence and implications of these fluctuations on the health of postmenopausal women. This study, involving 200 participants, has highlighted that a significant portion of postmenopausal women experience variations in thyroid hormone levels, with 30% showing some form of fluctuation. Notably, elevated thyroid-stimulating hormone (TSH) levels, low thyroxine (T4), and elevated T4 levels were observed, suggesting an increased risk of thyroid dysfunction in this population.

The analysis further identified age and body mass index (BMI) as significant factors associated with thyroid hormone variations, underlining the influence of physiological and metabolic changes occurring during postmenopause. Although the duration of menopause did not show a significant association with thyroid hormone fluctuations, the findings underscore the complexity of hormonal changes and their impacts on women's health post-menopause.

Moreover, the study explored the potential health impacts of thyroid hormone fluctuations, indicating increased risks for cardiovascular diseases, osteoporosis, and metabolic syndrome

among those with hormone fluctuations. Although these associations did not reach statistical significance, they signal a trend that warrants further investigation, given the serious implications these conditions have on the quality of life and longevity.

In conclusion, this study underscores the need for heightened awareness and monitoring of thyroid function in postmenopausal women. It calls for a personalized approach in managing health care for this group, considering the significant role that thyroid hormones play in various physiological processes and the potential health risks associated with their fluctuations. Future research should focus on longitudinal studies to better understand the causal relationships and mechanisms behind these observations, with the aim of developing targeted interventions to improve the health outcomes of postmenopausal women affected by thyroid hormone fluctuations.

Limitations of Study

1. **Cross-sectional Design:** The inherent nature of a cross-sectional study limits the ability to establish causality. While associations between thyroid hormone fluctuations and various factors can be identified, it is not possible to determine whether these factors precede or result from the hormonal changes.
2. **Sample Size and Selection:** Although the study includes 200 participants, this number may not be large enough to detect all possible associations or to ensure the generalizability of the findings to all postmenopausal women. Furthermore, the selection process and inclusion criteria might introduce selection bias, affecting the representativeness of the sample.
3. **Lack of Longitudinal Data:** The absence of longitudinal follow-up prevents the observation of changes in thyroid hormone levels over time and how these changes might relate to the onset or progression of health conditions in postmenopausal women.
4. **Self-reported Data:** If any part of the data collection relied on self-reported information, such as medical history or duration of menopause, there could be inaccuracies due to recall bias or misinterpretation of questions.
5. **Single Measurement:** The study's reliance on a single measurement of thyroid hormone levels might not accurately reflect long-term thyroid function, as these levels can fluctuate due to various factors, including illness, medication, and laboratory error.
6. **Limited Assessment of Confounding Factors:** While the study identifies age and BMI as significant factors associated with thyroid hormone variations, other potential confounders, such as dietary habits, physical activity, and use of medications that affect thyroid function, may not have been fully accounted for.
7. **Health Outcome Measures:** The study's exploration of health impacts such as cardiovascular risk, osteoporosis, and metabolic syndrome is based on the presence of thyroid hormone fluctuations without detailed clinical assessments of these conditions, which may limit the understanding of the clinical significance of the findings.

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