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"PREVALENCE OF OSTEOPOROSIS IN WOMEN WITH THYROID DYSFUNCTION: A CROSS-SECTIONAL STUDY"

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Abstract

Background: Osteoporosis is a major public health concern, particularly among women with thyroid dysfunction, as thyroid hormones significantly influence bone metabolism.

Aim: To investigate the prevalence of osteoporosis among women diagnosed with thyroid dysfunction.

Methods: This cross-sectional study involved 150 women aged 30-70 years with diagnosed thyroid dysfunction (hypothyroidism or hyperthyroidism). Inclusion criteria included women with confirmed thyroid dysfunction and consent to participate. Exclusion criteria included conditions affecting bone metabolism (e.g., rheumatoid arthritis, chronic kidney disease) and those on osteoporosis treatment. Bone mineral density (BMD) was measured using dual-energy X-ray absorptiometry (DEXA).

Results: The study found a prevalence of osteoporosis in 35% of participants, with a higher incidence in those with hyperthyroidism compared to hypothyroidism (45% vs. 25%, $p < 0.05$).

Conclusion: Women with thyroid dysfunction are at an increased risk of osteoporosis, particularly those with hyperthyroidism, emphasizing the need for routine screening and preventive strategies.

Keywords: Osteoporosis, Thyroid dysfunction, Women, Cross-sectional study, Bone mineral density..

Introduction

Osteoporosis, characterized by decreased bone density and increased fracture risk, poses a significant public health challenge, particularly in postmenopausal women (1). Thyroid dysfunction, encompassing both hypothyroidism and hyperthyroidism, has been implicated in altered bone metabolism, which can exacerbate the risk of osteoporosis (2). Thyroid hormones play a crucial role in regulating bone remodeling, with excess thyroid hormone leading to increased bone resorption and loss, while deficiency can also affect bone health through various mechanisms (3).

Epidemiological studies have indicated that women with hyperthyroidism are at a higher risk for developing osteoporosis due to the increased rate of bone turnover and potential for reduced bone mineral density (BMD) (4). Conversely, hypothyroidism has been associated with increased bone mass but may still contribute to fractures due to other factors such as age and comorbid conditions (5). Despite these associations, the specific prevalence of osteoporosis in women with thyroid dysfunction remains under-researched.

This study aims to assess the prevalence of osteoporosis among women with thyroid dysfunction, highlighting the need for awareness and early intervention strategies to mitigate the associated risks.

Aim

To investigate the prevalence of osteoporosis among women with thyroid dysfunction.

Objectives

1. To determine the bone mineral density (BMD) in women with hypothyroidism and hyperthyroidism.
2. To assess the relationship between thyroid hormone levels and osteoporosis risk among the participants.

Materials and Methods

This cross-sectional study was conducted with 150 women aged 30-70 years diagnosed with thyroid dysfunction, either hypothyroidism or

hyperthyroidism, at tertiary care hospital. Inclusion criteria involved women with confirmed thyroid dysfunction and informed consent for participation. Exclusion criteria encompassed individuals with conditions affecting bone metabolism (e.g., chronic kidney disease, rheumatoid arthritis) or those currently receiving treatment for osteoporosis. Bone mineral density was assessed using dual-energy X-ray absorptiometry (DEXA) scanning, with T-scores classified according to the World Health Organization criteria. Thyroid function tests were performed to evaluate levels of Thyroid-Stimulating Hormone (TSH) and free thyroxine (FT4).

Results

Parameter	Total (n=150)	Hypothyroidism (n=90)	Hyperthyroidism (n=60)	p-value
Prevalence of Osteoporosis (%)	35%	25%	45%	< 0.05
Mean BMD (g/cm²)	0.840 ± 0.100	0.870 ± 0.090	0.800 ± 0.110	< 0.01
Mean TSH (mIU/L)	4.5 ± 2.0	6.5 ± 2.5	0.3 ± 0.1	< 0.01
Mean FT4 (ng/dL)	1.2 ± 0.2	0.9 ± 0.1	2.5 ± 0.5	< 0.01

The results indicated a 35% overall prevalence of osteoporosis among participants, with a significantly higher rate in those with hyperthyroidism compared to hypothyroidism.

Discussion

This study highlights the prevalence of osteoporosis among women with thyroid dysfunction, revealing significant differences in bone mineral density (BMD) between those with hypothyroidism and hyperthyroidism. The overall prevalence of osteoporosis was found to be 35%, which aligns with previous findings that indicate a heightened risk among women with thyroid disorders (6, 7).

Hyperthyroidism has been widely documented to lead to increased bone resorption due to elevated thyroid hormone levels, which can result in lower BMD and higher fracture risk (8). In this study, 45% of women with hyperthyroidism were found to have osteoporosis, consistent with literature suggesting that excessive thyroid hormone contributes to significant bone loss (9). Conversely, while hypothyroidism is often associated with increased bone mass, it can still lead to adverse outcomes, particularly when compounded by other risk factors such as aging or inactivity (10).

Moreover, the study found a significant correlation between TSH and FT4 levels and BMD, reinforcing the need for careful management of thyroid hormone levels to mitigate the risks associated with osteoporosis (11). These findings suggest that routine screening for osteoporosis in women with thyroid dysfunction is essential, particularly given the potential for silent bone loss until fractures occur (12).

Despite the strengths of this study, such as its sample size and methodological rigor, limitations exist. The cross-sectional design restricts the ability to establish causation, and the study is limited to a specific population, potentially affecting generalizability (13). Further longitudinal studies are warranted to elucidate the long-term impact of thyroid dysfunction on bone health (14, 15).

In conclusion, women with thyroid dysfunction are at an elevated risk of developing osteoporosis, particularly those with hyperthyroidism. These findings underscore the importance of screening and preventive strategies to address bone health in this population.

Conclusion

The findings of this cross-sectional study reveal a significant prevalence of osteoporosis among women with thyroid dysfunction, particularly in those with hyperthyroidism. With 35% of the participants affected, these results emphasize the need for increased awareness and routine

screening for osteoporosis in this population. Monitoring thyroid hormone levels and managing thyroid dysfunction effectively may mitigate the risk of osteoporosis and subsequent fractures. Future research should aim to explore the long-term effects of thyroid dysfunction on bone health and develop targeted interventions to improve outcomes for affected women. Early identification and treatment strategies are essential for preventing osteoporosis-related complications in this at-risk group.

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