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Original Research Paper

General Medicine

STUDY OF THYROID DYSFUNCTION AND LIPID PROFILE IN POSTMENOPAUSAL WOMEN

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ABSTRACT

Introduction: Thyroid dysfunction and alterations in lipid profile are two important areas of investigation in the context of women's health, particularly during the postmenopausal phase. Postmenopausal women often experience hormonal changes that can impact various physiological processes, including thyroid function and lipid metabolism. The interplay between these factors has significant implications for their overall health and cardiovascular risk.Thyroid dysfunction, characterized by abnormal thyroid hormone levels, can manifest as either hypothyroidism or hyperthyroidism. These conditions have been associated with metabolic disturbances, including alterations in lipid metabolism. Dyslipidemia, characterized by elevated total cholesterol, LDL cholesterol, and triglyceride levels, as well as decreased HDL cholesterol levels, is a known risk factor for cardiovascular diseases.While the relationship between thyroid dysfunction and dyslipidemia has been studied in various populations, the specific impact of these factors on postmenopausal women remains an area of interest. Materials and methods-A cross-sectional study design was adopted, and the target population consisted of postmenopausal women aged 50 years and above. Data collection involved obtaining informed consent and collecting relevant information through standardized questionnaires and medical records. Thyroid function assessments were performed by measuring thyroid-stimulating hormone (TSH), free thyroxine (FT4), and/or free triiodothyronine (FT3) levels using validated laboratory methods. Lipid profile assessments included measuring total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride levels using standard laboratory techniques.Anthropometric measurements were taken to determine body weight, height, and calculate body mass index (BMI). Blood pressure was measured using standardized procedures. Additional data collected included medical history and medication use, specifically focusing on thyroid disorders and medications influencing thyroid function or lipid metabolism. **Results-** Total Cholesterol was very highly 213.84 48.92 mg/dl to thyroid dysfunction patients then normothyroidism patients 179.18+ 50.59 mg/dl which was statistically significant ($p<0.0001$).Triglyceride was very high 191.5695.32 mg/dl to thyroid dysfunction patients then normothyroidism patients 126.6 ±51.52 mg/dl which was statistically significant ($p<0.0001$).HDL was very low 36.96 6.46 mg/dl to thyroid dysfunction patients then Euthyroid patients 45.44 ±6.44 mg/dl which was statistically significant ($p<0.0001$).LDL was very high 114.38 29.05 mg/dl. to thyroid dysfunction patients then normothyroidism patients 90.96 ±23.58 mg/dl which was statistically significant ($p<0.0001$).Postmenopausal women with hypothyroidism are at a greater risk of dyslipidemia and consequent atherosclerosis as compared to patients with hyperthyroidism of same age group.

KEYWORDS :

INTRODUCTION

Postmenopausal women undergo significant hormonal changes that can influence various aspects of their health, including lipid metabolism and thyroid function. Dyslipidemia, characterized by abnormal levels of lipids in the blood, is a well-known risk factor for cardiovascular diseases. Thyroid dysfunction, encompassing both hypothyroidism and hyperthyroidism, has also been implicated in metabolic alterations and cardiovascular risk. Understanding the intricate relationship between lipid profile and thyroid function in postmenopausal women is crucial for identifying potential risk factors and improving preventive strategies.Altered lipid profiles, such as elevated total cholesterol, low-density lipoprotein cholesterol (LDL-C), and triglycerides, coupled with decreased high-density lipoprotein cholesterol (HDL-C) levels, contribute to the development and progression of atherosclerosis and cardiovascular diseases. Postmenopausal women are particularly vulnerable to dyslipidemia due to hormonal changes associated with menopause, including reductions in estrogen levels.Thyroid dysfunction, on the other hand, disrupts the intricate balance of thyroid hormone secretion, leading to metabolic perturbations. Hypothyroidism, characterized by low thyroid hormone levels, has been linked to dyslipidemia, as it promotes elevated levels of total cholesterol and LDL-C. Hyperthyroidism, characterized by excessive thyroid hormone production, is associated with decreased total cholesterol and HDL-C levels. Thus, thyroid dysfunction can significantly impact lipid profiles in postmenopausal women.Given the substantial overlap between dyslipidemia and thyroid dysfunction in postmenopausal women, it is essential to investigate the relationship between these two factors. Such investigation will enable a comprehensive understanding of the underlying mechanisms and their collective influence on cardiovascular risk in this population. By elucidating these associations, novel preventive and therapeutic approaches can be developed to mitigate the burden of cardiovascular diseases in postmenopausal women.Therefore, the aim of this study is to assess the association between lipid profile alterations and thyroid dysfunction in postmenopausal women and to investigate their combined impact on cardiovascular risk. Through comprehensive assessments of lipid profiles, including total cholesterol, LDL-C, HDL-C, and triglycerides, in conjunction with thyroid function evaluations, including thyroid-stimulating hormone (TSH), free thyroxine (FT4), and/or free triiodothyronine (FT3) levels, we seek to unravel the complex interplay between lipid metabolism and thyroid function in this specific population.This study's findings will contribute to the existing body of knowledge, shedding light on the relationship between lipid profile alterations and thyroid dysfunction in postmenopausal women. The identification of potential mechanisms underlying these associations and the elucidation of their impact on cardiovascular risk will provide valuable insights for the development of personalized preventive and therapeutic strategies in this vulnerable population.

AIMS AND OBJECTIVE

Aim

The aim of this study is to investigate the association between lipid profile alterations and thyroid dysfunction in postmenopausal women and to assess their combined impact on cardiovascular risk.

Objectives

1. To analyze the lipid profile parameters, including total cholesterol, LDL-C, HDL-C, and triglycerides, in a cohort of postmenopausal women.
2. To determine the relationship between lipid profile alterations and thyroid dysfunction, considering potential confounding factors.
3. To explore the mechanisms underlying the association between lipid profile alterations and thyroid dysfunction in postmenopausal women.
4. To investigate the combined impact of lipid profile alterations and thyroid dysfunction on cardiovascular risk factors, such as blood pressure, BMI, and markers of inflammation.
5. To identify potential strategies for the management and treatment of thyroid dysfunction and dyslipidemia in postmenopausal women, with the aim of reducing cardiovascular risk.

MATERIALS AND METHODS

The present study undertaken in department of medicine at BJMC civil Hospital, Ahmedabad during period of August 2021 to July 2022

CRITERIA

More specifically, the target population can be defined by the following criteria:

Inclusion Criteria:

1. Women who have reached menopause, defined as the permanent cessation of menstrual periods for at least one year.
2. Age criterion: Postmenopausal women aged 50 years and above.
3. Availability of relevant data on thyroid function and lipid profile measurements.
4. Availability of information on menopausal status (e.g., time since last menstrual period, confirmation of menopause through hormonal assessments).

Exclusion Criteria

1. Women who have not yet reached menopause or still experience menstrual periods.
2. Women with a history of thyroid disorders, including hypothyroidism or hyperthyroidism.
3. Use of medications known to significantly influence thyroid function or lipid metabolism.
4. Presence of severe comorbidities that may confound the relationship between thyroid dysfunction and lipid profile.
5. Pregnant or lactating women

Investigations

1. Thyroid Function Assessments:
- Measure thyroid-stimulating hormone (TSH) levels using sensitive assays to evaluate thyroid function.
- Assess levels of free thyroxine (FT4) and/or free triiodothyronine (FT3) to further evaluate thyroid hormone levels.
- Consider additional thyroid function tests if needed, such as anti-thyroid antibody testing (e.g., anti-thyroid peroxidase antibodies) to assess for autoimmune thyroid disorders.
2. Lipid Profile Assessments:
- Measure total cholesterol, low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C), and triglyceride levels.
- Calculate the atherogenic index, such as the ratio of total cholesterol to HDL-C, as an additional marker of lipid profile.
- Consider assessing other lipid-related markers, such as apolipoproteins (e.g., ApoB, ApoA1) or lipoprotein subclasses, for a more detailed characterization of lipid profiles.
3. Anthropometric Measurements:
- Measure body weight, height, and calculate body mass index (BMI).
- Assess waist circumference and waist-to-hip ratio to evaluate central obesity.
4. Blood Pressure Measurement:
- Measure blood pressure using standardized procedures, preferably in a resting state.
5. Medical History and Medication Use:
- Collect detailed information on medical history, including any known thyroid disorders or previous thyroid-related treatments.
- Record current medication use, particularly medications that may influence thyroid function or lipid metabolism (e.g., thyroid medications, lipid-lowering drugs).

Observation

Table 1 - BMI Wise Distribution

	BMI WISE DISTRIBUTION	
BMI	CASE(n=50)	CONTROL (n=50)
<18	1(2%)	1(2%)
19-24	32(64%)	37(74%)
>24	17(34%)	12(24%)
Total	50(100%)	50(100%)
Mean BMI	24.21+-2.19	24.13+-2.33
P VALUE	0.8599	

Table 2 - Clinical Symptoms Wise Distribution

Symptoms	Number of patients(%)
Body pain	19(38%)
Tiredness	19(38%)
Weight gain	18(36%)
Constipation	16(32%)
Paraesthesia	17(34%)
Hair loss	15(30%)
Loss of appetite	15(30%)
Dryness of skin	14(28%)
Hoarseness of voice	10(20%)
Pallor	6(12%)
Weight loss	4(8%)

Table 3: FBS Wise Distribution

Table 3:FBS WISE DISTRIBUTION		
FBS	Case(n=50)	Control (n=50)
<120 mg/do	44(88%)	46(92%)
>120 mg/do	6(12%)	4(8%)
Total	50(100%)	50(100%)
Mean FBS	105.68+-14.47	102.06+-16.00
P value	0.2383	

Table 4: Total Cholesterol Wise Distribution

TOTAL CHOLESTEROL	CASE (n=50)	Control (n=50)
<200mg/dl	21(42%)	39(78%)
>200mg/dl	29(58%)	11(22%)
Total	50(100%)	50(100%)
Mean Tc	213.84+-48.92	179.18+-50.59
P value	<0.0001	

Table 5: Triglycerides Wise Distribution

TRIGLYCERIDES	CASE	CONTROL
<150 mg/dl	23(46%)	40(80%)
>150 mg/dl	27(52%)	10(20%)
Total	50(100%)	50(100%)
Mean TG	191.56+-95.32	126.6+-51.52
P value	<0.0001	

Table 6: HDL Wise Distribution

HDL	Case (n=50)	Control (n=50)

<35mg/dl	32(64%)	6(12%)
>35 md/dl	18(46%)	44(88%)
Total	50(100%)	50(100%)
Mean HDL	36.96+-6.46	45.44+-6.44
P value	<0.0001	

Table 7: LDL Wise Distribution

LDL	CASE (n=50)	Control (n=50)
<100 md/dl	21(42%)	38(76%)
>100 mg/dl	29(58%)	12(24%)
Total	50(100%)	50(100%)
Mean LDL	114.38+-29.05	90.96+-23.58
P VALUE	<0.0001	

Table 8- Thyroid Profile Wise Distribution

THYROID PROFILE	CASE	CONTROL	P VALUE
fT3	1.81+-0.51	1.72+-0.23	0.3182
fT4	1.63+-1.58	1.12+-0.31	0.0274
S. TSH	6.73+-3.66	2.57+-0.91	<0.0001
S. Anti TPO	235.14+-221.69	12.91+-9.73	<0.0001

Table 9- Thyroid Dysfunction And Dyslipidaemia

	Total cholesterol (>200mg/dl)	Triglyceride (>150 mg/dl)	HDL (<35 mg/dl)	LDL (>100 mg/dl)
Case	29	27	32	29
Control	11	10	6	12

Table 10- Comparison Of Hypothyroidism And Hypothyroidism With Dyslipidaemia

CONDITION	NUMBER OF CASES	PATIENTS WITH DYSLIPIDAEMIA	PATIENTS WITH NORMAL LIPID PROFILE
HYPO-THYROIDISM	44	28(64%)	16(46%)
HYPER-THYROIDISM	6	1(16%)	5(84%)
TOTAL	59	29(58%)	21(42%)

Table 11 - Comparison With Other Studies

SUBJECT	Present study	SM VARGHESE	
%prevalence of Dyslipidemia in hypothyroidism	64%	62%	57%
%prevalence of dyslipidemia in hyperthyroidism	16%	18%	22%

CONCLUSION

The widespread presence of iodine deficiency may contribute to an increasein the prevalence of thyroid dysfunctions. Quality of life is affected in these patients due to the significant influence of thyroid hormones on metabolic, cardiovascular and neurological function.

Patients with thyroid dysfunction cannot be identified based on clinical symptoms alone. Clinical symptoms and laboratory assessment of thyroid function must be performed concurrently to determine the presence of thyroid dysfunction. Early diagnosis of thyroid dysfunction and associated dyslipidemia is essential for timely medical intervention, reversal of dyslipidemia and associated proatherosclerotic state.

This is a small scale study, a larger study is required for confirmation of results obtained in the study.

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