

Prevalence of Ischemic Heart Disease and Dyslipidemias in Patients of Subclinical Hypothyroidism

Ischemic Heart
Disease and
Dyslipidemias in
Hypothyroidism

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ABSTRACT

Objective: To determine the prevalence of ischemic heart disease and dyslipidemias in patients of subclinical hypothyroidism.

Study Design: Cross sectional observational study

Place and Duration of Study: This study was conducted at the Department of Medicine of Al-Nafees Medical College and Hospital, Islamabad from March, 2019 to August, 2019.

Materials and Methods: After hospital ethical committee approval the study was conducted. Demographic data such as age, gender, family history of thyroid disease and dyslipidemias were taken after fully informed consent. Patients with evidence of subclinical hypothyroidism were selected by thyroid profile after fulfilling of inclusion criteria and sub categorized on the basis of gender. Fasting lipid profile, ECG, ETT and Echocardiography were performed. Collected information was analyzed by using SPSS 23 version.

Results: The mean age of patients in our study was 51.21 ± 5.94 year. 36(54.5%) were male and 30(45.5%) were female. In our study the cases of ischemic heart disease were 29(43.9%) and dyslipidemias were 27(40.9%). The mean value with standard deviation of serum cholesterol was 203.90 ± 4.91 mg/dL, HDL was 23.97 ± 4.43 mg/dL, LDL was 141.21 ± 4.43 mg/dL and triglyceride was 139.97 ± 4.11 mg/dL in patients of ischemic heart disease while in non-ischemic heart disease serum cholesterol was 156.81 ± 12.47 mg/dL, HDL was 39.14 ± 5.92 mg/dL, LDL was 107.00 ± 12.11 mg/dL and triglyceride was 124.30 ± 2.93 mg/dL. The p value for all was significant ($p = 0.000$).

Conclusion: In our study we concluded that there was high prevalence of ischemic heart disease and dyslipidemia in subclinical hypothyroidism patients

Key Words: Dyslipidemias, ischemic heart disease, prevalence, subclinical hypothyroidism

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INTRODUCTION

Subclinical hypothyroidism is defined as elevation of serum thyroid-stimulating hormone (TSH) levels beyond the normal range despite normal serum levels of free thyroxine.¹ Subclinical hypothyroidism is the most common thyroid dysfunction and prevalence increases with age and is higher in women. The prevalence of subclinical hypothyroidism ranges between 7.5–8.5% in women and 4.4% in men. In south Asian region, Pakistan is found to be one of the countries where severely iodine-deficient population is present.

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In Pakistan's general population, the prevalence of hypothyroidism and subclinical hypothyroidism was 4.1% and 5.4%, respectively.² Patients with subclinical hypothyroidism are usually asymptomatic so this is solely a laboratory diagnosis.³

Subclinical hypothyroidism is risk factor for the dyslipidemias, coronary artery disease and atherosclerosis. Subclinical hypothyroidism is associated not only with elevated low-density lipoprotein-cholesterol (LDL-C) levels and decreased high-density lipoprotein-cholesterol (HDL-C) levels but also with elevated lipoprotein(a).⁴ Dyslipidemia is one of the many modifiable risk factors associated with subclinical hypothyroidism can be a cause of the ischemic heart disease, diastolic dysfunction and heart failure which increased risk of the mortality and morbidity.⁵

By aiming to know the prevalence and treating subclinical hypothyroidism which is the prevalent cause of dyslipidemias we can possibly save the long term cost of cholesterol lowering drug therapies and also decrease the incidence of cardiovascular events.⁶

Treatment of Subclinical hypothyroidism with the levothyroxine improves life quality, decreases

cardiovascular events and dyslipidemia.⁴ Our aim is to see the prevalence of ischemic heart disease and dyslipidemia in the subclinical hypothyroid population so that early treatment with levothyroxine can prevent the complications and disease burden.

MATERIALS AND METHODS

This Cross sectional observational study was conducted at the outpatient department, Department of Medicine, Al- Nafees Medical College and Hospital Islamabad for six months 1st march 2019 to 31st Aug 2019 after approval from the hospital's ethical committee. The sample size was calculated (n=66) by non-probability consecutive sampling with confidence interval 95%, estimated true proportion 50% by Epitools software.

Complete history, full clinical examination and relevant laboratory and imaging tests were done on every patient. Asymptomatic patients with raised levels of TSH and normal levels of T3 and T4 were included and patients were excluded who are suffering from diabetes, tuberculosis and congestive cardiac failure, having renal Insufficiency or taking drugs like thyroxine, statins, steroids and oral contraceptive pills.

66 diagnosed patients of subclinical hypothyroidism who were fulfilling inclusion criteria were enrolled in the study. The blood sample was collected in a sterile manner after an overnight fasting of 12 hours for serum cholesterol, triglycerides, low density lipoprotein, very low density lipoprotein and high density lipoprotein levels. All samples were sent to hospital laboratory and verified by pathologist. The ECG, ETT and Echocardiography were performed in all patients to rule out the ischemic heart disease.

The collected data was analyzed by using the SPSS 23 version. For qualitative variables like gender and presence of ischemic heart disease, frequency with percentages was calculated while for quantitative variables, like fasting lipid profile and thyroid function tests mean with standard deviation were calculated. Independent sample t test was used to compare the values of lipid profile and thyroid function tests in patients. P value less than 0.05% taken as significant.

RESULTS

We enrolled 66 patients in our study. The mean age of patients was 51.21 ± 5.94 year. Out of 66 patients 36(54.5%) were male and 30(45.5%) were female as shown in Figure 1.

The results of thyroid function tests showed the mean value of Triiodothyronine (pmol/L) in patients was 4.50 ± 0.50 , similarly for Thyroxine (pmol/L) 10.95 ± 0.77 and for Thyroid stimulating hormone (mIU/L) was 5.36 ± 3.10 as shown in Table 1.

The results of fasting lipid profile showed the mean value of cholesterol in study patients was 177.50 ± 25.51 mg/dL. Similarly the mean value for HDL was 32.47 ± 9.24 mg/dL, for LDL was 122.03 ± 19.55 mg/dL,

for VLDL was 18.97 ± 6.10 mg/dL and for triglycerides was 131.18 ± 8.57 mg/dL as shown in Table 2.

In our study the prevalence of ischemic heart disease was 29 patients (43.9%) and dyslipidemias was 27 patients (40.9%) in patients of subclinical hypothyroidism as shown in Figure 2.

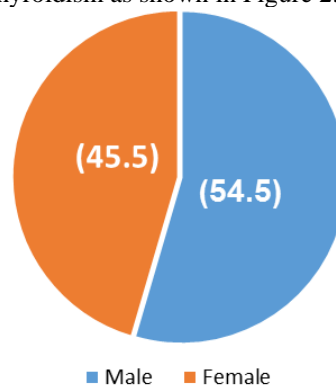


Figure No.1: Frequency distribution of gender (n=66)

Table No.1: Descriptive statistics of Thyroid Function Tests (n=66)

Thyroid Function Tests (TFTs)	Min.	Max.	Mean with SD
Triiodothyronine (pmol/L)	4.00	5.00	4.50±0.50
Thyroxine (pmol/L)	10.00	12.00	10.95±0.77
Thyroid stimulating hormone (mIU/L)	2.00	11.00	5.36±3.10

Table No.2: Descriptive statistics of fasting lipid profile (n=66)

Fasting Lipid Profile	Min.	Max.	Mean with SD
Serum Cholesterol (mg/dL)	140.00	214.00	177.50± 25.51
HDL (mg/dL)	18.00	49.00	32.47 ± 9.24
LDL (mg/dL)	90.00	151.00	122.03± 19.55
VLDL (mg/dL)	10.00	30.00	18.97 ± 6.10
Triglycerides (mg/dL)	120.00	148.00	131.18 ± 8.57

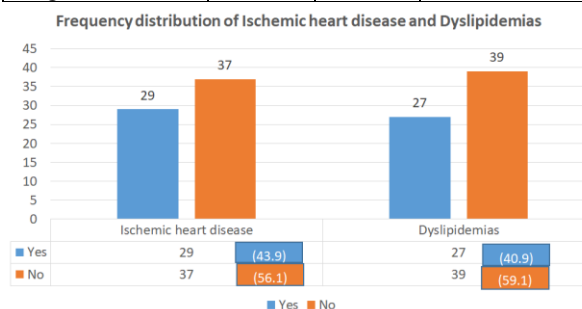


Figure No.2: Frequency distribution of Ischemic heart disease and Dyslipidemias in patients of subclinical hypothyroidism (n=66)

DISCUSSION

The prevalence of subclinical hypothyroidism is upto 5–10 percent of adult population. It has been found to be associated with adverse medical consequences, including abnormal blood lipids, increased risk of ischemic heart disease and well documented progression to overt hypothyroidism.⁷

The diagnosis of subclinical hypothyroidism should be confirmed by elevated TSH levels and normal T3, T4 level. Usually, treatment is not essential unless the TSH exceeds 7.0-10 mIU/L. In double-blinded randomized controlled trials, treatment has no effect on symptoms or cognitive function if the TSH level is less than 10 mIU/L. While cardiovascular morbidity and mortality may be decreased in patients under age 65 with subclinical hypothyroidism who are treated with levothyroxine, but treatment may be detrimental in elderly patients with subclinical hypothyroidism. TSH goals are age dependent, with a 97.5 percentile (upper limit of normal) of 3.6 mIU/L for patients under age 40, and 7.5 mIU/L for patients over age 80.⁸

In our study the prevalence of ischemic heart disease was 43.9% and dyslipidemias was 40.9% in patients of subclinical hypothyroidism which indicates that there was high risks of cardiovascular disease and dyslipidemia in patients of subclinical hypothyroidism. Similar to our study, another study was done in Nepal to determine the risk factors of cardiovascular diseases in subclinical hypothyroidism patients. They checked thyroxine, triiodothyronine, TSH, cholesterol, HDL, LDL in blood serum samples of patients. Patients had high levels of TSH, cholesterol, LDL and low levels of HDL and they concluded that hypothyroid patients had higher risks of cardiovascular diseases which confirmed the results of our study.⁹ Subclinical hypothyroidism was correlated with increased risk of cardiovascular events in patients with a serum TSH concentration ≥ 10 mIU/L and cardiovascular mortality in individuals with a serum TSH concentration ≥ 7 mIU/L.¹⁰

Rizvi et al. also conducted study to determine the prevalence of dyslipidemia in thyroid dysfunction patients at CMH Kharian. They checked cholesterol, LDL, triglyceride and HDL in blood serum sample. The mean age of patients was 51.8 ± 16.51 years and male were 57.7% and female were 42.6%. The study showed 41.5% dyslipidemia in patients. These results are also in accordance with the outcomes of our study.¹¹

Shahad et al. in Egyptian conducted a research which had sample size of 57 patients of hypothyroidism and found the prevalence of dyslipidemia was 34%.¹²

Another study in India found a strong correlation between dyslipidemia and hypothyroidism and found the results similar to our study results.¹³

Kim et al also found that the additional assessment of serum TSH levels provided little incremental benefit for the prediction of cardiovascular risk.¹⁴

Our results suggest that assessment of TSH in patients with dyslipidemia may provide extra benefit for the management of cardiovascular disease patients. Since subclinical hypothyroidism is common in our population, the management of subclinical hypothyroidism in such population might reduce the cardiovascular diseases burden.

CONCLUSION

In our study we concluded that there was high prevalence of ischemic heart disease and dyslipidemia in subclinical hypothyroidism patients. There was strong correlation in between thyroid disorders and dyslipidemia with cardiovascular disease. There is also increased prevalence of dyslipidemia with cardiovascular disease with increase duration of subclinical hypothyroidism.

Recommendations: We recommend a longer study may be conducted to at multiple centers to briefly address the relation between subclinical hypothyroidism and dyslipidemia with cardiovascular disease.

Author's Contribution:

Concept & Design of Study:	Syed Saif Ur Rehman
Drafting:	Saad Hameed Khan, Danish Zia
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Revisiting Critically:	Muhammad Wajad Munir
Final Approval of version:	Syed Saif Ur Rehman

Conflict of Interest: The study has no conflict of interest to declare by any author.

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