

**STUDY OF LIPID PROFILE IN PATIENTS WITH SUBCLINICAL HYPOTHYROIDISM**Ranjith Kumar G. K<sup>1</sup>**HOW TO CITE THIS ARTICLE:**

Ranjith Kumar G. K. "Study of Lipid Profile in Patients with Subclinical Hypothyroidism". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 38, May 11; Page: 6582-6589, DOI: 10.14260/jemds/2015/954.

**ABSTRACT:** A prospective case control study of lipid profile abnormalities in patients with subclinical hypothyroidism in J. L. N Hospital Ajmer. **METHODS:** 25 cases and 25 controls were included into the study. Cases had TSH > 5.0 μIU/ml with normal T3 and T4 values. Controls were euthyroid patients. A detailed history, clinical examination, investigations like complete blood counts, fasting blood sugars, fasting thyroid profile and fasting lipid profile were done for all cases and controls. **RESULTS:** The mean TSH level in subclinical hypothyroidism cases (n=25) was 10.01±3.87 mIU/L, when compared to euthyroid controls (n=25), it was 2.69±1.52 mIU/L. The mean LDL cholesterol level in subclinical hypothyroidism cases (n=25) was 93.9±16.6 mg/dl, when compared to controls, it was 84.7±11.6 mg/dl. **CONCLUSION:** The present study showed a higher prevalence of subclinical hypothyroidism among females of reproductive age group. significantly higher levels of total cholesterol, Triglyceride and VLDL cholesterol in patient with subclinical hypothyroidism, though elevation in LDL cholesterol level was found to be statistically significant, but it remained well within the upper limit of normal, hence it is clinically significant and there was no statistically significant relation found between HDL cholesterol and subclinical hypothyroidism.

**KEYWORDS:** Lipid profile, sub clinical hypothyroidism, LDL cholesterol, HDL cholesterol, triglycerides, euthyroid, TSH, T3, T4.

**INTRODUCTION:** Sub clinical hypothyroidism can be best defined as a high serum TSH concentration and normal serum total/ free thyroxine (T4), triiodothyronine (T3) concentrations associated with few or no symptoms/signs of hypothyroidism.<sup>1</sup> however few authorities consider that patient should not have any classical signs/symptoms of hypothyroidism to label him/her as having sub clinical hypothyroidism.

Hence, subclinical hypothyroidism is essentially a laboratory diagnosis. It is referred to as a state of mild thyroid failure.

The importance of studying subclinical hypothyroidism is that it is much more common than overt hypothyroidism, and hence early diagnosis & treatment may prevent the onset of overt hypothyroidism and its associated effects.

Subclinical hypothyroidism may be associated with increased risk of coronary artery disease, peripheral vascular disease, and various biochemical abnormalities, including increased LDL-C levels, increased total cholesterol and serum triglyceride values. The correlation between lipid profile changes & overt hypothyroidism is well established. However, lipid profile alterations in subclinical hypothyroidism are controversial; some studies showing positive correlation & prompt reversal of changes following treatment, and few studies refusing any correlation between the two. Further, there are only few Indian studies about lipid profile changes in subclinical hypothyroidism. Hence this study is undertaken.

**AIMS AND OBJECTIVE OF THE STUDY:**

- To study T3, T4, TSH level to diagnose subclinical hypothyroidism in suspected patients.
- To study the serum lipid abnormalities in patients diagnosed to have subclinical hypothyroidism.

**MATERIALS AND METHODS:** A case control study of lipid profile abnormalities in patients with subclinical hypothyroidism in J. L. N Hospital Ajmer. This Study included patients who visited outpatient and inpatient departments in JLN MEDICAL COLLEGE hospital, AJMER. All cases are diagnosed to have subclinical hypothyroidism with TSH  $>5.0\mu\text{IU/ml}$  and normal T3, T4 Levels. Age and sex matched euthyroid controls were taken. This study was a case-control study over a period of 12 months from July 2012 to June 2013. Patient's informed consent taken, a detailed history and clinical examination is done with a special reference to certain parameters like body mass index, blood pressure & thyroid swelling. Laboratory data included complete blood counts, urine routine, fasting blood sugars, fasting thyroid profile (T3, T4, TSH) and Fasting lipid profile. Other additional investigations were done wherever indicated.

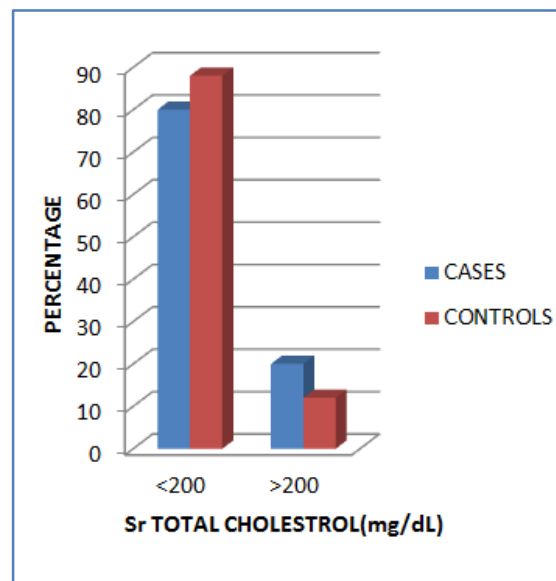
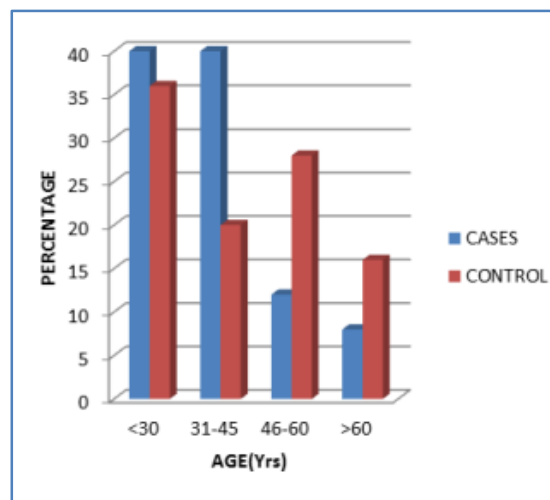
Controls are selected from patients visiting outpatient departments of JLN MEDICAL COLLEGE hospital, AJMER. Informed consent was taken. A detailed history and clinical examination is done. All the above set of investigations was done for controls. Immulite kit (Chemiluminescent immuno assay) was used for thyroid hormone estimation, Chi-square test and Fisher Exact test has been used to find the significance of study characteristics (Frequency) between cases and controls Student t test has been used to find the significance of study parameters between cases and controls. The Statistical software namely SPSS 11.0, Stata 8.0, Systat 11.0, Medcalc 9. 0.1 And Effect Size calculator were used for the analysis of the data and Microsoft word and Excel have been used to generate graphs, tables etc.

**RESULTS:**

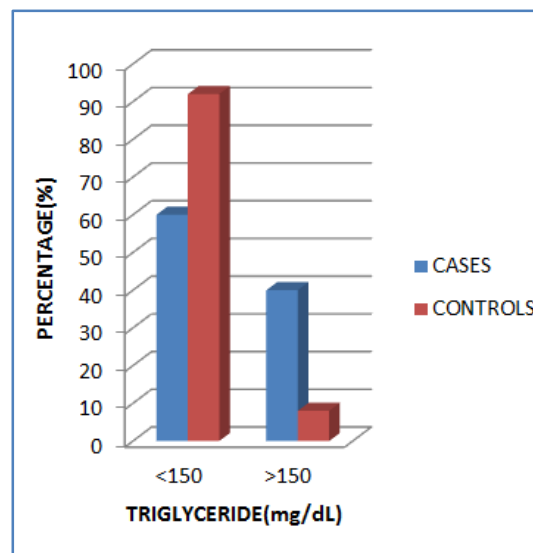
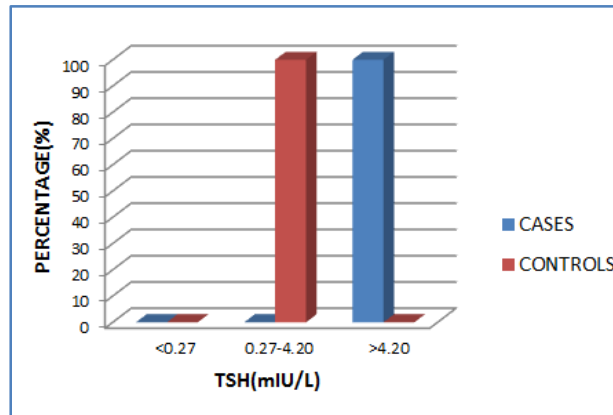
- In the present study among cases 96% were females when compared to 64% in controls ( $p=0.013$ ).
- It was observed that 80% of the cases were below 45 years of age as compared to 56% in controls ( $p=0.33$ ).
- In the present study, the mean TSH level in subclinical hypothyroidism cases ( $n=25$ ) was  $10.01\pm 3.87\text{miIU/L}$ , when compared to euthyroid controls ( $n=25$ ), it was  $2.69\pm 1.52\text{miIU/L}$ .
- The mean Total T3 level in subclinical hypothyroidism cases ( $n=25$ ) in the present study was  $118\text{ng/ml}$ , when compared to  $126.36\text{ng/ml}$  in euthyroid controls ( $n=25$ ).
- The mean total T4 level in subclinical hypothyroidism cases ( $n=25$ ) was  $7.05\text{mig/dl}$ , when compared to  $8.69\text{mig/dl}$  in euthyroid controls ( $n=25$ ).
- The mean total cholesterol level in subclinical hypothyroidism cases ( $n=25$ ) cases was  $164\pm 37.5\text{mg/dl}$ , when compared to euthyroid controls ( $n=25$ ), it was  $132\pm 21.5\text{mg/dl}$ .
- The mean LDL cholesterol level in subclinical hypothyroidism cases ( $n=25$ ) was  $93.9\pm 16.6\text{mg/dl}$ , when compared to controls, it was  $84.7\pm 11.6\text{mg/dl}$ .
- The mean triglyceride level in subclinical hypothyroidism cases ( $n=25$ ) was  $151.28\pm 35.5\text{mg/dl}$ , when compared to euthyroid controls ( $n=25$ ), it was  $124.68\pm 11.6\text{mg/dl}$ .

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- The mean HDL cholesterol level in subclinical hypothyroidism cases (n=25) was  $46.8 \pm 8.52$  mg/dl, when compared to euthyroid controls (n=25), it was  $47.4 \pm 7.4$  mg/dl.
- The mean VLDL cholesterol level in subclinical hypothyroidism cases (n=25) was  $29.96 \pm 7.17$  mg/dl, when compared to euthyroid controls (n=25), it was  $24.4 \pm 4.42$  mg/dl.
- Among the cases, 20% had high cholesterol, 44% had high triglycerides and 44% had high LDL. The lower HDL was recorded in 24% of cases. The present study showed significantly higher levels of total cholesterol, Triglyceride, VLDL cholesterol in patient with subclinical hypothyroidism.
- Though elevation in LDL cholesterol level was found to be statistically significant in present study, but it remained well within the upper limit of normal, hence it is clinically significant and there was no statistically significant relation found between HDL cholesterol and subclinical hypothyroidism.



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**DISCUSSION:** In the present study, it was observed that the mean age of the subclinical hypothyroidism cases (n=25) were  $39.12 \pm 12.65$  years and that in the euthyroid controls (n=25) were  $41.37 \pm 15.37$  years. (p value 0.33 ) which was statistically insignificant.

In the study conducted by Zoe Efstathiadou et al,<sup>2</sup> where it was observed that the mean age of the subclinical hypothyroidism cases (n=66) were  $47.6 \pm 13$  years and that of the euthyroid controls (n=75) were  $48 \pm 12$  years. (p value 0.38) which was statistically insignificant.

This concludes that the prevalence of subclinical hypothyroidism was common in reproductive age group.

In the present study it was observed that among the subclinical hypothyroidism cases (n=25) 96% were females and 4% were male when compared to 64% where female and 36% were male in euthyroid controls (n=25). The (p value was 0.013) which was statistically significant.

In the study conducted by Zoe Efstathiadou et al,<sup>2</sup> it was observed that female constituted 92.42% and male constituted 8.58% of the subclinical hypothyroidism cases, and in the euthyroid controls the female and male constituted 88% and 12% respectively. (The p value was <0.05) which was statistically significant.

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This concludes that the prevalence of subclinical hypothyroidism was common in female than compared to male.

In the present study, it was observed that the mean TSH level in subclinical hypothyroidism cases (n=25) was  $10.01 \pm 3.87$  miU/L, when compared to euthyroid controls (n=25), it was  $2.69 \pm 1.52$  miU/L which was statistically significant (p value  $P < 0.0001$ ).

In the study conducted by Karthick et al,<sup>3</sup> it was observed that the mean TSH level in the subclinical hypothyroidism cases (n=30) was  $5.6 \pm 1.5$  Kg/m<sup>2</sup> and in the euthyroid controls (n=30) was  $1.7 \pm 0.8$  Kg/m<sup>2</sup>. The (p value was  $< 0.001$ ) which was statistically significant.

This concludes similar to the definition of subclinical hypothyroidism that there will be increase in TSH level in patient of subclinical hypothyroidism.

In the present study, it was observed that all the cases of subclinical hypothyroidism and euthyroid controls had normal T3 levels as defined by inclusion criteria. The mean Total T3 level in subclinical hypothyroidism cases (n=25) in the present study was 118ng/ml, when compared to 126.36ng/ml in euthyroid controls (n=25) which is statistically insignificant (p=0.3).

In the study conducted by Guntaka M et al,<sup>4</sup> subclinical hypothyroidism cases (n=30) had a mean total T3 value of  $107.13 \pm 35.26$  ng/ml when compared to  $115.03 \pm 28.22$  ng/ml in euthyroid controls (n=30) which is statistically insignificant (p=0.34).

T3 levels between cases & controls of both present study and the study conducted by Guntaka M et al,<sup>4</sup> were statistically similar.

This concludes in patient with subclinical hypothyroidism T3 level will be within normal limit.

In the present study, it was observed that the mean total T4 level in subclinical hypothyroidism cases (n=25) was 7.05mg/dL when compared to 8.69 mg/dL in euthyroid controls (n=25) which was statistically significant (p=0.0029). Cases had lower T<sub>4</sub> level when compared to controls but all were within the normal limits. This concludes that even though Cases had lower T<sub>4</sub> level when compared to controls but all were within the normal limits. In patient with subclinical hypothyroidism T4 level will be within normal limit.

In the present study, it was observed that the mean total cholesterol level in subclinical hypothyroidism cases (n=25) cases was  $164 \pm 37.5$  mg/dl, when compared to euthyroid controls (n=25), it was  $132 \pm 21.5$  mg/dl. The (p value was 0.0006) which was statistically significant.

In the study conducted by Zoe Efstathiadou et al,<sup>2</sup> it was observed that the mean total cholesterol level in subclinical hypothyroidism cases (n=66) cases was  $222 \pm 45$  mg/dl, when compared to controls euthyroid controls (n=75), it was  $190 \pm 32$  mg/dl. The (p value was  $< 0.05$ ) which was statistically significant. In the present study and the study conducted by Zoe Efstathiadou et al,<sup>2</sup> the mean total cholesterol level in the subclinical hypothyroidism cases and euthyroid controls was similar and statistically significant.

This concludes there will be significant higher total cholesterol level in patient with subclinical hypothyroidism.

In the present study, it was observed that the mean LDL cholesterol level in subclinical hypothyroidism cases (n=25) was  $93.9 \pm 16.6$  mg/dl, when compared to controls, it was  $84.7 \pm 11.6$  mg/dl. The (p value was 0.028) which was statistically significant.

In the study conducted by Dr. Pradeep Sharma et al,<sup>5</sup> it was observed that the mean LDL cholesterol level in subclinical hypothyroidism cases (n=30) was  $99.10 \pm 27.43$  mg/dl, when compared

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to euthyroid controls (n=30), it was  $66.06 \pm 23.29$  mg/dl. The (p value was  $<0.001$ ) which was statistically significant.

In the present study and the study conducted by Dr. Pradeep Sharma et al<sup>5</sup>, the mean LDL cholesterol level in the subclinical hypothyroidism cases and euthyroid controls was similar and statistically significant.

This concludes, though elevation in LDL cholesterol level was found to be statistically significant, but it remained well within the upper limit of normal, hence it is clinically significant.

In the present study, it was observed that the mean triglyceride level in subclinical hypothyroidism cases (n=25) was  $151.28 \pm 35.5$  mg/dl, when compared to euthyroid controls (n=25), it was  $124.68 \pm 11.6$  mg/dl. The (p value was 0.0022) which was statistically significant.

In the study conducted by William J et al,<sup>6</sup> it was observed that the mean triglyceride level in subclinical hypothyroidism cases (n=215) was  $178.1 \pm 99.7$  mg/dl, when compared to euthyroid controls (n=8013), it was  $157.5 \pm 114.7$  mg/dl. The (p value was 0.01) which was statistically significant.

In the present study and the study conducted by William J et al<sup>6</sup>, the mean Triglyceride level in the subclinical hypothyroidism cases and euthyroid controls was similar and statistically significant.

This concludes there will be significant higher total Triglyceride level in patient with subclinical hypothyroidism.

In the present study, it was observed that the mean HDL cholesterol level in subclinical hypothyroidism cases (n=25) was  $46.8 \pm 8.52$  mg/dl, when compared to euthyroid controls (n=25), it was  $47.4 \pm 7.4$  mg/dl. The (p value was 0.69) which was statistically insignificant.

In the study conducted by Zoe Efstathiadou et al,<sup>2</sup> it was observed that the mean HDL cholesterol level in subclinical hypothyroidism cases (n=66) was  $57 \pm 16$  mg/dl, when compared to euthyroid controls (n=75), it was  $55 \pm 12$  mg/dl. The (p value was 0.6) which was statistically insignificant.

In the present study and the study conducted by Zoe Efstathiadou et al,<sup>2</sup> the mean HDL cholesterol level in the subclinical hypothyroidism cases and euthyroid controls was similar and statistically insignificant.

This concludes there was no statistically significant relation found between HDL cholesterol and subclinical hypothyroidism.

In the present study, it was observed that the mean VLDL cholesterol level in subclinical hypothyroidism cases (n=25) was  $29.96 \pm 7.17$  mg/dl, when compared to euthyroid controls (n=25), it was  $24.4 \pm 4.42$  mg/dl. The (p value was 0.002) which was statistically significant.

In the study conducted by William J et al,<sup>6</sup> it was observed that the mean VLDL cholesterol level in subclinical hypothyroidism cases (n=215) was  $33.6 \pm 19.6$  mg/dl, when compared to euthyroid controls (n=8013), it was  $31.5 \pm 21.9$  mg/dl. The (p value was  $<0.05$ ) which was statistically significant. In the present study and the study conducted by William J et al,<sup>6</sup> the mean VLDL cholesterol level in the subclinical hypothyroidism cases and euthyroid controls was similar and statistically significant.

This concludes there will be significant higher VLDL cholesterol level in patient with subclinical hypothyroidism.

**CONCLUSION:**

- The present study was aimed to determine lipid abnormalities in patients with subclinical hypothyroidism and its interpretation.
- The present case control study was conducted in the Department of Medicine, J. L. N. MEDICAL COLLEGE, AJMER. A total of 50 patients (25 cases with subclinical hypothyroidism and 25 euthyroid controls) were studied. Fasting blood sample was collected. Immulite kit (Chemiluminescent immuno assay) will be used for thyroid hormone Estimation. The thyroid profile was assessed by estimating TSH, T3 and T4 and fasting lipid profile was done in both cases and controls.
- Among the cases, 20% had high cholesterol, 44% had high triglycerides and 44% had high LDL. The lower HDL was recorded in 24% of cases.
- The present study showed a higher prevalence of subclinical hypothyroidism among females of reproductive age group.
- The present study showed significantly higher levels of total cholesterol, Triglyceride and VLDL cholesterol in patient with subclinical hypothyroidism, though elevation in LDL cholesterol level was found to be statistically significant, but it remained well within the upper limit of normal, hence it is clinically significant.
- The present study also showed there was no statistically significant relation found between HDL cholesterol and subclinical hypothyroidism.

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**COMPETING INTERESTS:** None

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