Study of Prevalence of Dyslipidemia in Shimla

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Abstract
Background and Objectives: Dyslipidemia is a major risk factor for cardiovascular disease. It includes high levels of triglyceride (TG), total cholesterol (T-cholesterol), low density lipoprotein cholesterol (LDL-c) and low level of high density lipoprotein cholesterol (HDL-c). Therefore it is important to know the lipid levels of community for early intervention and prevention of cardiovascular disease. The present study investigated the lipid levels of urban population of Shimla

Methods: A descriptive cross sectional study was conducted in a health centre at Shimla. 132 samples were tested in the individuals above 18 years of age. Blood samples following overnight fast was collected for determination of serum TG, T-cholesterol, LDL-c and HDL-c. According to the criteria of the National Cholesterol Education Program- Adult treatment Panel III (NCEP-ATP III), Dyslipidemia was classified into (a) Hyperlipidemia-TC >200mg/dl, TG>150mg/dl, (b)Hypercholestrolemia TC>200mg/dl (c) Hypertriglyceridemia TG>150mg/dl, (d) Atherogenic dyslipidemia TG>150 , LDLC>165

Results: A total number of 132 adult individuals were enrolled of which 80 (61%) and 52 (39%) were male and female respectively. Study found 32% hyperlipidemia, 30% atherogenic dyslipidemia,8% hypercholesterolemia and 30% hypertriglyceridemia. 35.60% had low HDL. 7.58% had high LDL. BMI was higher among females as compared to males.(p=<0.01)

Conclusion: Prevalence of atherogenic dyslipidemia and hyperlipidemia are common and female dyslipidemic patients are susceptible to develop higher BMI. Which calls for urgent lifestyle intervention strategies to prevent and manage this.

Keywords: Dyslipidemia, Hypercholestrolemia, hypertriglyceridemia.

Introduction
Elevated levels of cholesterol is an important risk factor in cardiovascular disease. Increased consumption of fast food and decrease in physical activity are associated with adverse changes in the lipid profile. Economic prosperity has also led to prevalence of lifestyle related diseases. The atherosclerotic CHD has been reported as a leading cause of death and disability not only in countries with high socioeconomic development but also in developing countries. Pathogenic character of cholesterol is determined not only by its blood levels but also its distribution in lipoproteins. Low density lipoprotein (LDL) carried cholesterol is potentially pathogenic and high density lipoprotein (HDL) carried one is index of a shielding role of lipoproteins against atherosclerosis.(3) The imbalance status of one or more types of lipoproteins in blood is known as dyslipidemia(4) and considered as an established independent major risk factor for CHD. It might even be a prerequisite occurring before other
major risk factors come into play. Low concentration of HDL-C and high concentration of TGs have been implicated as possible independent predictors of CHD\(^5\) and combinations of these two conditions have been defined as atherogenic dyslipidemia (AD)\(^6\).

The atherosclerotic CHD has been reported as a leading cause of death and disability not only in countries with a high socio-economic development but also in developing countries\(^14\). Because of the largest population group, the Asians are suffering from the major part of the global burden of CHD. In addition, since Asians have many different ethnic groups of population who may have different lipid profiles\(^15\). The INTERHEART investigators reported a higher prevalence of dyslipidemia among study participants living in five South Asian countries (India, Pakistan, Bangladesh, Sri Lanka and Nepal). Based on this scenario a specific assessment of the pattern of dyslipidemia is important to design and plan for health services need and preventive measures to reduce the mortality and morbidity rates.

Effective control of blood lipid levels reduced cardiovascular morbidity and mortality. In this context the present study was designed to determine lipid levels and prevalence of dyslipidemia in urban community of Shimla.

Objective of study was to determine the fasting lipid profile in the Shimla urban population with selected socio demographic factors such as age, sex, socio-economic status etc.

**Material and Methods**

The study was designed to assess the lipid levels in urban population of Shimla.

**Study Design:** Descriptive cross sectional study.

**Study Area:** Health centre at Indian Institute of Advanced Study Shimla.

**Study Population:** Adults ≥ 18 years of age.

**Study Tools:** Interview schedule, anthropometry, fasting sugar, urea, creatinine, uric acid and lipid profile.

**Sample Size:** 132 Subjects.

**Laboratory, anthropometric and clinical data collection**

Face to face interview was conducted by using a pre-tested structured questionnaire to collect the data. Body mass index (BMI) was calculated from height and weight measured by a height weight scale following standard operating procedure (SOP). 5 ml fasting venous blood was collected between 8AM – 9AM.

According to the criteria of National Cholesterol Education Program-Adult Treatment Panel 111(NCEP-ATP111), dyslipidemia was diagnosed and classified into four phenotypes, (a) Hyperlipidemia: TC>200mg/dl, TG>150mg/dl, (b) Hypercholesterolemia: TC>200 mg/dl, (c) Hypertriglyceridemia: TG>150 mg/dl, (d) Atherogenic-dyslipidemia: TG>150mg/dl, LDLC>165 mg/dl.(7.16) Underweight, Normal weight, Overweight and Obesity were determined according to World Health Organization guideline. Fasting blood glucose levels >6.1 mmol/L was referred to diabetic.

**Statistical Analysis**

\(t\)-test was performed to see the gender variation among dyslipidemic subjects. A’ p’ value =0.05 was considered as statistically significant.

**Results**

Of 132 participants, 61% (n=80) were male and rest of them were female. The proportion of dyslipidemia was higher among the 46 to 76 years age group 39.4% (n=52) compared to 36 to 45 years 29.5%(n=39) and 18 to 35 years 31.1% (n=41) age groups. The highest proportion of dyslipidemia was reported among the overweight and obese 40.9% (n=54).

The pattern of dyslipidemia is summarized in Table 2. Out of 132 participants, 38%(n=50) had hyperlipidemia (TC≥200 mg/dl, TG ≥150mg/dl) 38% (n=50) had atherogenic dyslipidemia (TG≥150 mg/dl, LDLC≥165 mg/dl),(7.16) had hypercholesterolemia (TC≥200 mg/dl) and 30% (n=40) had hypertriglyceridemia (TG≥150).
Table 1. Baseline characteristics of the study participants

| Characteristics      | Frequency (n) | Percentage(%) |
|----------------------|---------------|---------------|
| Gender               |               |               |
| Male                 | 80            | 61            |
| Female               | 52            | 39            |
| Age Group            |               |               |
| 18 to 35 years       | 41            | 31            |
| 36 to 45 years       | 39            | 30            |
| 46 to 76 years       | 52            | 39            |
| Education            |               |               |
| Under Matric         | 52            | 39            |
| Graduate             | 30            | 23            |
| Post Graduate        | 50            | 38            |
| Socioeconomic Status |               |               |
| Low Income           | 43            | 33            |
| Middle Income        | 44            | 33            |
| High Income          | 45            | 34            |
| BMI Status           |               |               |
| Under Weight         | 7             | 5             |
| Normal Weight        | 71            | 53.7          |
| Overweight and Obese | 54           | 40.9          |
| Glycemic Status      |               |               |
| Diabetic             | 13            | 9.8           |
| Non-Diabetic         | 119           | 90            |

Table 2. Pattern of dyslipidemia

| Type of Dyslipidemia | Frequency(n) | Percentage |
|----------------------|--------------|------------|
| Hyperlipidemia       | 42           | 32         |
| Atherogenic          | 40           | 30         |
| Hypercholesterolemia | 10           | 8          |
| Hypertriglyceridemia | 40           | 30         |

Table 4. Comparison of FBS among the study subjects with different dyslipidemia types

| Dyslipidemia Type | FBS  |
|-------------------|------|
| HL (n=49)         | 6    |
| HC (n=14)         | 1    |
| HT (n=35)         | 6    |
| AD (n=35)         | 6    |
| Status of BMI     | Glycemic Status |
| UW (n=7)          | 87.7 |
| NW(n=71)          | 86.51|
| OW and OB(n=54)   | 95.33|

For lipid profile and FBS, a significant difference was found among different gender groups. Table 3 shows that among the dyslipidemic subjects, FBS, TC, LDL-C and TG of female were significantly higher than the male patient. FBS was higher among hyperlipidemia group compared to hypercholesterolemia group

Table 3. Comparison of different parameters according to gender among dyslipidemic subjects

| Parameter | Gender |               |               |
|-----------|--------|---------------|---------------|
|           | Male   | Female        |               |
| BMI       | 25.157 | 25.048        |               |
| TC        | 168.71 | 170           |               |
| HDL-C     | 45.82  | 45.22         |               |
| LDL-C     | 96     | 98.24         |               |
| TG        | 140.34 | 142.58        |               |
| FBS       | 86.96  | 92.86         |               |

Comparison of Glycemic status among the participants with different BMI status shows that the serum mean level of FBS was significantly higher among the overweight and obese group compared to the normal weight as well as underweight group.

Discussion

This study was carried out at the outpatient department (OPD) of Health Centre at Shimla to assess the pattern and factors associated with dyslipidemia among adult population. Our results found that the proportion of dyslipidemia was a bit higher among the 46 to 76 years age group in comparison to the other groups.

In terms of income we have found that majority of the dyslipidemic patients were middle or higher income group. It might be due to less physical activity.

In our study most common type of dyslipidemia was hyperlipidemia (32.0%). The level of TC and TG were found higher among female compared to male.

Our study findings show that increase in BMI was significantly associated with the FBS level.

Conclusion

This study concludes that Hyperlipidemia and Atherogenic dyslipidemia are more common types of dyslipidemia among adult population in Shimla. Female dyslipidemic patients are more susceptible to develop higher FBS, TC, LDL-C, and TG. Hyperlipidemic adults have higher chance of increased level of FBS as compared to the hypercholesterolemic group. We would like to
recommend urban women to maintain their FBS and Lipid profile within normal range for prevention of dyslipidemia.

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