

Study on Urban North Indians Incidence of Dyslipidemia among Different Age Groups

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Abstract

Background: Coronary artery disease is a known entity of morbidity and mortality in industrialised countries. It is a major public health problem around the world. Coronary artery disease increase incidence in Indian population at least 10 years before in age than other ethnic groups. There are a numbers of factors associated with atherosclerosis the most important one is dyslipidemia. Recent studies suggest that over the span of 20 years, the total amount of triglycerides, cholesterol and Low Density Lipoproteins (LDL) levels is usually increased in young urban populations. So, a study was performed out to know the prevalence of dyslipidemia in urban North Indians among different set of age groups. **Methods:** This is a descriptive cross-sectional study which was carried out on patients visiting to the blood collection centre of the Department of Pathology. Patients were divided into 3 groups with age 18 year to 40 year, 41 year to 60 year and >60 year by involving 1989 subjects of whom 532 were between 18 year to 40 year, 522 were between 41year to 60 year and 935 were > 60 year of age. This study included measurement of fasting serum lipid profile comprising of, Low Density Lipoprotein (LDL), High Density Lipoproteins (HDL), Triglycerides and total cholesterol. **Results:** Number of subjects studied, the prevalence of dyslipidemia was higher in <60 years age population. A remarkable difference in mean was observed statistically with the levels of triglycerides, LDL and total cholesterol of this age group ranging from 18- 40 years and for those who are >60 years. A remarkable difference for the levels of HDL was not found in age group between 18 – 40 years and > 40 years to 60 years. Mean cholesterol level was observed to be elevated between the age group 18 – 40 years. The mean peak triglycerides were observed in age group between 41-60 years. This elevated mean HDL levels were noticed in the age group who are > 60 years of age. **Conclusions:** Elevated percentage of dyslipidemia was observed in less than 60yrs age groups. Large population study is required to substantiate the results of this study. It is necessary to plan out comprehensive strategies for the screening and awareness in all ages on periodic basis.

Keywords: Dyslipidemia, Total Cholesterol, Low Density Lipoproteins & Triglyceride.

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BACKGROUND

The established and known risk factor for cardiovascular diseases are elevated blood lipid levels. Globally, 4.5% of the total deaths are observed in population suffering from high total cholesterol levels [1-4]. In the occurrence of major heart diseases dyslipidemia plays a major contributing determinant

like ischemic heart disease. National cholesterol education programme (NCEP) defined as dyslipidemia is hypertriglyceridemia (serum triglyceride > 150mg/dl), hypercholesterolemia (serum cholesterol >200 mg/dl), and high LDL cholesterol (LDL cholesterol > 130mg/dl). India is expected to have 60% of the world's cardiovascular disease patient burden, many studies documented by year 2020 [5].

Indians have unique model of dyslipidemia associated with increased Triglyceride levels, lower high-density lipoprotein (HDL-C), and increase level of small dense low-density lipoprotein (LDL-C), there are no high level of representative studies on dyslipidemia to evaluate the immensity of the problem existing in India. In the adults above 20 years of age, the estimate of prevalence of Coronary Heart Disease (CHD) varies from 3-4% in the rural population and 8 -10% in urban population and 3-4% in rural population, representing a 2 folds rise in the rural population and six time more in urban population between the years 1960 and 2000. Lifestyle including physical inactivity, sedentary lifestyle, no exercise and increased consumption of saturated fat, which are associated with urbanization, are associated with adverse change in the lipid profile. Dyslipidemia having potential risk factor of pathophysiology of cardiovascular disease and it is a modifiable risk factor for the coronary artery disease [6-8].

National cholesterol education programme (NCEP), hence framed objective for the diagnosis, monitoring and curability of increased blood cholesterol in adults population. Effective control of the blood lipid levels reduces cardiovascular morbidity and mortality. The critical part of management of Chronic heart disease and people at risk of CHD involves knowledge, knowledge regarding the lipid profile and the significance of each parameter [9, 10].

The purpose of present study was to find out the prevalence of dyslipidemia in urban north Indian population the age range between 18 to >60 years of age to ensure correct arrangement of health care measure for both primary (1^o) and secondary(2^o) prevention of cardiovascular diseases [6].

METHODS

A descriptive cross sectional study targeting urban north Indian population was conducted by the department of Pathology on 1989 patients, ≥ 18 years of age in both the sex, patients who volunteered to participate and give fasting blood sample for this study who visited to the blood collection centre of Pathology department. The population under study was divided into 3 groups. Group 1 consisted of members the age group between 18 to 40 years, Group 2 consisted of members the age group between 41 to 60 years and Group 3 consisted of age group >60 years of age. Exclusion criteria consisted of patients with <18 years of age and patient who have history of coronary heart diseases, patients who are critically ill, patients agony with acute or chronic illness or are on hypolipidemic drugs.

After a fasting period of 8–12 hours for lipid profile analysis, 5ml of venous blood samples were collected from the median cubital vein in the morning

with all aseptic precautions taken, after obtaining informed consent from all the subjects as part of health screening and Ethical clearance was obtained prior to starting the study started from the Institutional ethics committee.

Estimation of fasting lipid profile

The samples so drawn from the median cubital vein after taking all aseptic precaution, at room temperature blood clot. Serum was obtained by 3000 rpm centrifugation for 10 minutes by laboratory centrifuge machine. The serum sample obtained was investigated by cholesterol oxidase - peroxidase (CHOD- POD, End Point) for Total cholesterol, Enzymatic glycerine phosphate oxidase peroxidase (GPO-PAP) for Triglycerides. High Density Lipoprotein Cholesterol and Low Density Lipoprotein cholesterol were evaluated within one hour of collection by using autoanalyzer by Homogenous Method and Direct Measurement. SPSS software version 22 was used for Data collection statistically. Each group were determined by Mean, standard deviation, and standard error by using Pearson Chi-square test and Univariate analysis was implemented. Students and p- value was calculated by Comparison of differences in mean of these groups. t-test considered significant when P-value was <0.05.

RESULTS

Through the results so obtained, we estimated the fasting lipid profile in urban North Indian population among different age groups. 1989 persons were enrolled for participating in this study. The subjects under this study were further divided into 3 groups. Group 1 between the age group of 18 - 40 years, group 2 were age group between 41-60 years and group 3 with the age of >60 years. Out of 1989, 532 were 18 to 40 years of age, 522 were 41 to 60 years of age and 935 were >60 years.

The socio-demographic profile data of the study participant were collected. 70% male participant were found in this study subjects. Fasting lipid assay of all study participant included total cholesterol, HDL cholesterol, LDL cholesterol, & triglycerides.

The results of all 3 groups were tabulated with cholesterol <200 & >200mg/dl, HDL >45 & <45 mg/dl, triglycerides <150 & >150 mg/dl, LDL < 100 & >100 mg/dl.

In mean cholesterol, LDL Cholesterol and triglycerides between age groups of <40 & >60 years statistically significant difference was found. Between the age group <40 year and 41 to 60 years, no statistically significant difference was found (Table 1).

Among all 3 groups elevated mean serum cholesterol was observed in age group between 18 - 40

years. In > 60 years age group mean HDL was elevated. The age group between 41 to 60 years elevated mean

triglyceride level 146.21 was found and age group between 18 - 40 years.

Table 1: Lipid Profile Differences in Age group between 18 to 40 Years & more than 60 Years

Lipid Profile	Age Group	N	Mean ± SD	'p' Value
Total Cholesterol	1	532	181.48 ± 41.31	
	3	520	153.81 ± 40.2	0.00
LDL Cholesterol	1	532	116.45 ± 34.6	
	3	522	89.53 ± 13.3	0.00
Triglyceride	1	532	145.85 ± 32.3	
	3	521	123.36 ± 15.2	0.00
HDL Cholesterol	1	532	36.85 ± 9.5	
	3	522	37.82 ± 11.0	0.123
statistically significant p value is ≤ 0.05				
Difference in mean Group-1 age <40 Years & Group-3 age > 60 Years				

DISCUSSION

Assessment of Lipid profile includes TG, TC, HDL-C and LDL-C allows an estimation of risk of cardiovascular diseases. Many recent studies indicates that high concentrations of total cholesterol, triglycerides, low-density lipoprotein and decreased high-density lipoprotein increases the risk of atherosclerotic plaques [11-13].

In present study we observed the prevalence of high LDL(>130mg/dl), hypercholesterolemia (> 200mg/dl), were observed in age group between <40yrs and hypertriglyceridemia (>150mg/dl) was observed in age group between 41 to 60 yrs. Lower high-density lipoprotein < 40 mg/dl was observed in age group < 60 years.

Total cholesterol and low-density lipoprotein levels increases in age of young or middle-aged population studied cross-sectionally. However, cross-sectional studies of participants who are ≥65 years of age have reported that total cholesterol and low-density lipoprotein levels decrease with age. Although High Density Lipoprotein levels does not change with age in majority of the cross-sectional studies, levels decreased with age in both male and female in most of the prospective studies [14-19] is in accordance to this study.

The former study suggested that reduced capacity of the liver indicates that low density lipoprotein increase with age and also there is secondary to reduced hepatic low density lipoprotein receptor expression &/or cholesterol intestinal immersion increase. Over-mentioned studies show that cholesterol situations on the effect of age provided mixed results. The importance of negative correlation between total cholesterol and that low density lipoprotein with age demonstrated by senior Japanese-American men of Honolulu Heart Program. There is a positive correlation between LDL-cholesterol and age explained by Framingham Offspring Study. In each study indicate result difference can incompletely

explained by the age range of the participants. Honolulu Heart Program study age varies between 71 & 93 times while <60 years of age population are mostly seen in the periods of those studied in the Framingham Offspring Study [21-24]. Our study included age group of more than 60 years to appraise the outline of change in lipid profile estimation in elderly population and to evaluate if these changes would deviate them towards the risk of cardiovascular diseases [25].

High density lipoprotein levels vary with age not suggested by majority of cross-sectional studies [16, 26] but a recent research from the Cardiovascular Health Study [27] suggested that High density lipoprotein levels appeared to increase with age in male but not in female, which is almost similar to the results of this study which indicted increased High density lipoprotein in > 60 years age in contrast to other age groups population.

There is a difference between plasma lipid level in rural and urban population found in Sabir, A. A, *et al.*, study and Hausa-Fulani found dyslipidemia in North-Western Nigeria population, demonstrated that the mean serum Total cholesterol was remarkably elevated in rural and urban population. Mean serum Triglycerides and low density lipoprotein concentrations were elevated in the urban than rural population but the difference was not statistically significant. Abnormally low high density lipoprotein-Cholesterol was the most frequent dyslipidemia found in the urban participants than in rural participants [28].

Study Limitations

Primary limitation of this study was that it is cross-sectional observational in nature. The present study was not able to include an involvement of diet, physical activity, genetic profiling and other factors that might affect with the blood lipid levels in the participants studied. More possible factors and larger population groups are needed to verify our result in Future studies.

CONCLUSIONS

Our study concluded that dyslipidemia was highest among population with age group less than 60 years. The most important sedentary lifestyle factors which affect the serum Cholesterol are physical inactivity, saturated fat full diet, and high body mass index. Efforts to motivate the population to do more physical work, exercise and eat healthy food which will lead to reduce the risk of cardio-vascular diseases, not just physical activity but screening the population, by the early detection and intervention we can prevent young population by morbidity and mortality which caused by coronary artery disease.

Conflict of Interest: The authors declare that there are no conflicts of interest.

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