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Association of Hypertension and Dyslipidemia in Young Adults

G. A Augustine Raj[1], Syam Sundar Reddy[2]

[1]Assistant Professor, Department of General Medicine, Narayana Medical College, Nellore, Andhra Pradesh, India.

[2]Associate Professor, Department of General Medicine, Narayana Medical College, Nellore, Andhra Pradesh, India.

Abstract

Background: Dyslipidemia, characterized by abnormal levels of lipids in the blood, poses a significant public health concern worldwide due to its association with increased risk of cardiovascular diseases (CVDs). While dyslipidemia is commonly studied in older populations, its prevalence and impact among young adults have garnered increasing attention in recent years. Young adults with dyslipidemia often exhibit diverse lipid profiles, including elevated levels of low-density lipoprotein cholesterol (LDL-C), triglycerides (TG), and decreased levels of high-density lipoprotein cholesterol (HDL-C). Such variations may be influenced by genetic predispositions, lifestyle factors, and underlying health conditions. **Subjects and Methods:** This prospective study was conducted in the Department of General Medicine, Narayana Medical College, Nellore. Young individuals with a diagnosis of dyslipidaemia and receiving treatment of dyslipidaemia and/or diabetes and/or hypertension, attending to hospitals and clinics in India. The inclusion criteria were patients of either sex, aged within the range of 18 - 45 years, with a confirmed diagnosis of dyslipidaemia and receiving treatment for dyslipidaemia and/or diabetes mellitus and/or hypertension. Patients aged >45 years were excluded. **Results:** In our study, we observed mean age as 37.23 years and mean weight of patients as 69.08 kg and mean height to be 165.35 cm, mean waist circumference as 84.06 cm and mean BMI to be 25.23 among studied cohort. We observed in our study that 189 (94.7%) patients were euthyroid while only 11 (5.3%) were hypothyroid. There was no significant correlation of PTCA among hypothyroid and euthyroid patients in this study seen. There was significant correlation of PTCA among patients with and without endothelial dysfunction in this study seen. There was significant correlation of PTCA among patients with and without statin use as inclusive factor in this study. **Conclusion:** In conclusion, this study provides valuable insights into the complex interplay of dyslipidemia, its risk factors, associated comorbidities, and cardiovascular manifestations in young adults. By examining the patterns of dyslipidemia and its relationship with various factors, including genetic predispositions, lifestyle habits, and medical conditions, we have gained a deeper understanding of the multifaceted nature of this condition in the younger population.

Keywords: Hypertension, Dyslipidemia, Cardiovascular diseases.

Corresponding Author: Dr. Syam Sundar Reddy, Associate Professor, Department of General Medicine, Narayana Medical College, Nellore, Andhra Pradesh, India.

Email: syamsundarreddy@gmail.com

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Introduction

Dyslipidemia, characterized by abnormal levels of lipids in the blood, poses a significant public health concern worldwide due to its association with increased risk of cardiovascular diseases (CVDs). While dyslipidemia is commonly studied in older populations, its prevalence and impact among young adults have garnered increasing attention in recent years.[1]

Abnormalities of various cholesterol lipoprotein lipids such as high total cholesterol, low density lipoprotein (LDL) cholesterol, very low density lipoprotein (VLDL) cholesterol and triglycerides and low high density lipoprotein (HDL) cholesterol are important coronary heart disease (CHD) risk factors.[2] There is a strong pathophysiological association of raised LDL cholesterol with initiation and progression of coronary atherosclerosis.[3] Robust data are available that shows that lowering its levels can regress and stabilize atherosclerotic vascular disease. Similar, though not as robust, data are also available for raised triglycerides and low HDL cholesterol.[4]

Cardiovascular diseases, especially coronary heart disease, are important public health problems in India and many developing countries.[5] There is evidence that the diseases are increasing in these countries in contrast to developed nations of Europe and North America where the incidence has decreased.[6] Societal changes as well as individual lifestyle factors are important in driving this cardiovascular epidemic.[7] These changes influence the proximate determinants of atherosclerosis which include smoking and tobacco use, high total and low density lipoprotein (LDL) cholesterol, low high density lipoprotein (HDL) cholesterol, high blood pressure, diabetes and the metabolic syndrome.[8] Trends of these risk factors have been well studied in developed countries and show significant correlation with rise and fall of the coronary heart disease epidemic.[9]

Young adults with dyslipidemia often exhibit diverse lipid profiles, including elevated levels of low-density lipoprotein

cholesterol (LDL-C), triglycerides (TG), and decreased levels of high-density lipoprotein cholesterol (HDL-C). Such variations may be influenced by genetic predispositions, lifestyle factors, and underlying health conditions.[10]

Various factors contribute to dyslipidemia in young adults, including genetic predisposition, unhealthy dietary habits, sedentary lifestyle, obesity, smoking, and certain medical conditions such as diabetes mellitus and hypothyroidism. Additionally, socioeconomic factors and environmental influences may exacerbate the risk.[11]

Therefore, the present study aimed to determine patterns of dyslipidaemia, risk factors and comorbidities using data from a carefully conducted cross-sectional study among young individuals with dyslipidaemia attending hospitals and clinics in India

Subjects and Methods

This is a prospective study was conducted in the Department of General Medicine, Narayana Medical College, Nellore. Young individuals with a diagnosis of dyslipidaemia and receiving treatment of dyslipidaemia and/or diabetes and/or hypertension, attending to hospitals and clinics in India.

The inclusion criteria were patients of either sex, aged within the range of 18 - 45 years, with a confirmed diagnosis of dyslipidaemia and receiving treatment for dyslipidaemia and/or diabetes mellitus and/or hypertension. Patients aged >45 years were excluded.

The selection of these cases was based on the integrity and completeness of the available data sets. Consent from patients for retrospective samples was not obtained, in view of the difficulty in tracking patients. Data were collected through paper-based case record forms at a single visit. These included demographic and clinical details mentioned in the questionnaire. Demographic details included age, sex, smoking habit, alcohol consumption, sedentary lifestyle, family history of dyslipidaemia, diabetes mellitus and hypertension, anthropometric measurements (height, weight, waist circumference, and BMI calculations), blood pressure, fasting and postprandial blood glucose levels, and glycated hemoglobin (HbA1c) in patients with diabetes mellitus. Lipid profile included triglycerides (TG), total cholesterol (TC), low-density lipoproteins cholesterol (LDL-C), and HDL-C.

Statistical Analyses

Data were analyzed using Statistical Package for The Social Sciences (SPSS) software, version 23.0. Qualitative data were presented as number and percentages, while quantitative data were presented as mean (standard deviation (SD)) or median (interquartile range (IQR)), depending on the normal or skewed distribution of data. $P < 0.05$ was considered statistically significant.

Results

Table 1: Demographic profile of studied patients

Parameters	Mean	SD
AGE (years)	37.23	5.78
GENDER	**FREQUENCY**	**PERCENTAGE**
MALE	131	65.5
FEMALE	69	34.5

In our study, we observed mean age as 37.23 years and mean weight of patients as 69.08 kg and mean height to be 165.35 cm, mean waist circumference as 84.06 cm and mean BMI to be 25.23 among studied cohort. [Table 1 and figure 1]

Table 2: tabulation of patients with thyroid disorder

THYROID	FREQUENCY	PERCENTAGE
HYPOTHYROID	11	5.31
NORMAL	189	94.7

We observed in our study that 189 (94.7%) patients were euthyroid while only 11 (5.3%) were hypothyroid. [Table 7, Figure7]

Table 3: Tabulation of comorbidity

Co-morbidity	FREQUENCY (N=150)	PERCENTAGE
AN	8	5.33
N	41	27.3
OBESITY	19	12.67
OW	66	44.0
PCOD	15	10.0
PO	1	0.67

Table. 4: Tabulation of stress factor

STRESS	FREQUENCY	PERCENTAGE
NO	117	58.5
YES	83	41.5

Table 5: Tabulation of Family history of CVS disorder

Family history	FREQUENCY	PERCENTAGE
NO	123	61.5
YES	77	38.5

Table 6: Thyriod ptca1, r col exact chi2

THYROID	PTCA-NO	PTCA-YES	TOTAL
HYPOTHYROID	6	5	11
EUTHYROID	79	110	189
TOTAL	85	115	200

Fisher's exact test, p value = 0.53

There was no significant correlation of PTCA among hypothyroid and euthyroid patients in this study seen.

Table 7: Endothelial dysfunction ptca1, r col exact chi2

Endothelial Dysfunction	PTCA-NO	PTCA-YES	TOTAL
NO	71	60	131
YES	14	55	69
TOTAL	85	115	200

Fisher's exact test, p value = < 0.0001

There was significant correlation of PTCA among patients with and without endothelial dysfunction in this study seen.

There was significant correlation of PTCA among patients with and without statin use as inclusive factor in this study.

Discussion

The present study retrospectively determined the patterns of dyslipidaemia, risk factors and comorbidities in this study that included young Indian cohort diagnosed with dyslipidaemia. Current evidence highlights the grave status quo of the alarming rise in the prevalence of lipid abnormalities in the Indian population aged ≤45 years.[12] The major attributable risk factors include a sedentary lifestyle, lack of physical activity, increased intake of junk food, smoking/tobacco use, alcohol consumption, mental stress, etc., However, there is a lot of variation in the reported prevalence of dyslipidaemia in young Indians with a higher proportion of affected men.[13]

Rise and fall of cholesterol and other lipoproteins associated with changing cardiovascular mortality and coronary heart disease incidence has been well documented in many developed countries.[14] There is paucity of similar data from developing countries. Data of the present study has significant healthcare policy and pharmacoeconomic implications because more than 40% of the world's population is in India and China. As economies of these countries boom.[15] and individual buying capacity increases the lifestyle changes shall lead to massive increase in lipid levels fuelling cardiovascular epidemic as observed in the present study in an Indian urban population.[16]

In a small prospective observational study, 502 patients with pre-existing CHD were evaluated for long-term cardiovascular mortality.[17] The study was performed in the pre-statin era with limited availability of cholesterol lowering medications. It was observed that there was a linear relationship of increasing total cholesterol levels with increasing mortality in various age-groups. A borderline high total cholesterol (200–239 mg/dl) as well as high total cholesterol (>240 mg/dl) was associated with a greater hazard of mortality at a mean of 5 years of follow-up.

Therefore, overall screening of these four lipid abnormalities in young Indian adults may aid in early diagnosis of dyslipidaemia thereby attenuating the risk of premature CVDs. In this study, we observed that need of PTCA was among 115 (58%) patients with significant CAG findings.[18]

Several limitations of this study should be considered and observations should be interpreted cautiously. This study did not record the socioeconomic and educational status of the patients which could have added valuable data while inferring the observations. However, these observations need to be vigilantly interpreted as factors such as unawareness of symptoms, an unhealthy lifestyle, ignorance toward behavioral habits (smoking, alcohol consumption) in very young age (<45 years) may contribute to these findings.

Conclusion

In conclusion, this study provides valuable insights into the complex interplay of dyslipidemia, its risk factors, associated comorbidities, and cardiovascular manifestations in young adults. By examining the patterns of dyslipidemia and its relationship with various factors, including genetic predispositions, lifestyle habits, and medical conditions, we have gained a deeper understanding of the multifaceted nature of this condition in the younger population.

Our findings underscore the importance of early detection and intervention strategies tailored to young adults with dyslipidemia. Addressing modifiable risk factors such as unhealthy dietary habits, sedentary lifestyle, and obesity is paramount in mitigating the long-term cardiovascular risks associated with dyslipidemia. Additionally, the identification and management of associated comorbidities such as metabolic syndrome, insulin resistance, and hypertension are essential for comprehensive patient care and improved outcomes.

Furthermore, our study highlights the critical need for interdisciplinary collaboration among healthcare providers, researchers, policymakers, and public health professionals

to develop targeted interventions and guidelines aimed at reducing the burden of dyslipidemia-related cardiovascular diseases in young adults. By implementing evidence-based strategies for prevention, screening, and treatment, we can effectively curb the rising tide of cardiovascular morbidity and mortality in this vulnerable population.

In summary, the findings of this study underscore the urgency of prioritizing dyslipidemia management in young adults and emphasize the significant impact of early intervention on long-term cardiovascular health outcomes. Through continued research, education, and advocacy efforts, we can work towards promoting cardiovascular wellness and reducing the burden of dyslipidemia-related diseases in young adults worldwide.

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