



**A STUDY ON PREVALENCE OF ATHEROSCLEROSIS IN YOUNG ADULTS OF
PUNJAB: WITH SPECIAL REFERENCE TO ITS INDICATORS AND RISK FACTORS**

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ABSTRACT

Objectives: Atherosclerosis, the build-up of plaque in arteries is typically associated with older age due to several cumulating risk factors. However, it can also affect young adults due to various reasons. The present study was planned with the objectives to investigate the prevalence of atherosclerosis in the young adults of Mohali, Punjab and to study the determinants affecting on it. **Methods:** A total number of 100 young adults with atherosclerosis age ranged 35 years to 55 years were collected randomly from the Sohana Hospital, Mohali, Punjab, and Lipid panel components, e.g., total cholesterol, LDL, HDL and triglycerides were estimated for the present study. **Results:** For cholesterol, the frequency of the category “normal” was the maximum (69.0%), followed by the category “low” (18.0%) and the least in the category “high” (13.0%). For LDL, the frequency of the category “normal” was the maximum (77.0%), followed by the category “low” (14.0%) and the least in the category “high” (9.0%). For HDL, the frequency of the category “normal” was the maximum (72.0%), followed by the category “high” (19.0%) and the least in the category “low” (9.0%). For triglycerides, the maximum frequency was found in the category “normal” (70.0%), followed by the category “high” (18.0%) and the least in the category “low” (12.0%). Chi-square value showed statistically significant association ($p < 0.05$) between the parameters of lipid profile and their categories. **Conclusion:** The development of atherosclerosis in younger populations can be influenced by genetic predisposition, smoking, hypertension, and diabetes. Early detection through screening and adoption of healthy lifestyle choices are crucial in mitigating the risk of cardiovascular events later in life.

KEYWORDS: Atherosclerosis, Young adults, Cholesterol, LDL, HDL, Triglycerides.

INTRODUCTION

Cardiovascular disease (CVD) is the most common form of heart disease and atherosclerosis is one of the main causes of CVD. It occurs when the arteries supplying blood to the heart narrow or harden from the build-up is also known as atherosclerosis. The site of the plaque determines the type of heart disease: coronary artery disease is the build-up of plaque in the arteries supplying blood to the heart, peripheral artery disease to the arms and legs, and carotid artery disease to the brain (Stone et al., 2022). The decrease in blood flow due to plaque build-up can lead to chest pain, also called angina or progress to a heart attack. The five most common symptoms of a heart attack are: chest pressure or pain, shortness of breath, pain or discomfort in the arms or shoulder, pain or discomfort in the jaw, neck or back, and feeling weak, lightheaded, or nauseous (Reese et al., 2022).

So far the signs and symptoms of atherosclerosis in young adults are concerned, these include: high blood pressure - elevated blood pressure can indicate stress on the arteries, potentially leading to plaque formation, high cholesterol - high levels of LDL cholesterol and low levels of HDL cholesterol can contribute to plaque build-up, obesity - excess weight, especially abdominal obesity, is linked to increased risk of atherosclerosis, diabetes - poorly controlled diabetes can damage blood vessels and accelerate atherosclerosis, family history - a family history of premature cardiovascular disease increases the risk of young adults, smoking - tobacco use damages blood vessel walls and accelerates atherosclerosis, sedentary lifestyle - lack of physical activity contributes to obesity and worsens cardiovascular health, poor diet - diets high in saturated fats, trans fats, and processed foods can raise cholesterol levels and contribute to atherosclerosis, stress - chronic

stress may contribute to high pressure and other cardiovascular risk factors, symptoms - although rare in young adults, symptoms like chest pain, shortness of breath, or leg pain during physical activity may indicate advanced atherosclerosis (Ekker *et al.*, 2023; Alearazet *et al.*, 2021; Vos *et al.*, 2003, Devesa *et al.*, 2023). As the literature related to the prevalence of atherosclerosis in young adults of Punjab is scanty, the present study was planned with the objectives to investigate the patients' status regarding the occurrence of atherosclerosis and to study the determinants affecting on the developing of atherosclerosis in young adults of Punjab.

MATERIAL AND METHOD

Participants

A total number of 100 young adults (50 male and 50 female) age ranged 35 years to 55 years were collected randomly from the Sohana Hospital, Mohali, Punjab during January to July, 2024. The age of the subjects was confirmed from the hospital record. A written consent was taken from each participant. The study was approved by Institutional Ethical Committee (IEC).

Blood Sample Collection

Blood samples were collected intravenously in fasting condition following standard procedure.

Biomarkers: Lipid profile: - lipid panel components (e.g., total cholesterol, LDL, HDL and triglycerides were estimated following standard haematological procedure.

Statistical Analysis

Data analyses were performed using SPSS version 20.0. Percentage of the lipid profile components was calculated and the Chi-square test was used to observe the association of these components and their categories. The significance level was set at $p < 0.05$.

RESULTS

Table 1 showed the distribution of atherosclerosis risks in young adults of Mohali. For cholesterol, the maximum frequency (69.0%) was noted in the category "normal", followed by the category "low" (18.0%) and the least in the category "high" (13.0%). For LDL, the maximum frequency (77.0%) was found in the category "normal", followed by the category "low" (14.0%) and the least in the category "high" (9.0%). For HDL, the maximum frequency (72.0%) was observed in the category "normal", followed by the category "high" (19.0%) and the least in the category "low" (9.0%). For triglycerides, the maximum frequency (70.0%) in the category "normal", followed by the category "high" (18.0%) and the least in the category "low" (12.0%). Chi-square value showed statistically significant association ($p < 0.05$) between the parameters of lipid profile and their categories.

Table 1: Distribution of atherosclerosis risk in young adults of Mohali.

Category	Cholesterol		LDL		HDL		Triglycerides	
	Abs. No	%age	Abs. No	%age	Abs. No	%age	Abs. No	%age
Normal	69	69.0	77	77.0	72	72.0	70	70.0
High	13	13.0	09	09.0	19	19.0	18	18.0
Low	18	18.0	14	14.0	09	09.0	12	12.0

$$X^2 = 12.832; p < 0.05$$

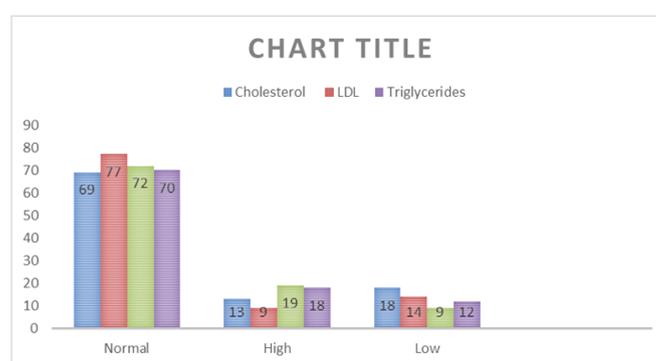


Figure 1: Distribution of the lipid profile components in the young adults of Mohali.

DISCUSSION

The Atherosclerosis Risk in Young Adults (ARYA) study was specifically designed to evaluate 1) whether it is possible to predict cardiovascular risk at young adulthood by routinely measured adolescent data, and 2) evaluating the role of birth characteristics and adolescent characteristics to the development of vascular damage at young adulthood. In addition, the ARYA study enables

studies on genetic traits as determinants of cardiovascular risk, assessed by measurement of risk factors and vascular damage.

In the ARYA study we are not able to use clinical events as outcome, since these subjects will not suffer from events for a long time. Therefore, we choose several types of outcomes, which are assumed to be

markers of cardiovascular risk, i.e., surrogate outcomes. These include absolute risk factor levels, dichotomized risk factors using a cut-off point at a certain percentile or clinically standardized cut off levels, a 10-years risk of coronary heart disease using the Framingham risk score, and the CIMT and PWV as indicators of vascular damage.

In the present study, a statistically significant ($p < 0.05$) association was found between the four lipid profile components (i.e. cholesterol, LDL, HDL and triglycerides) and their categories (i.e. normal, high and low) in the young adults of Mohali. The findings of the study followed the line of Vos *et al.* (2003), Stone *et al.* (2022), Reese *et al.* (2022), Devesa *et al.* (2023) and Raitakari *et al.* (2024).

Atherosclerosis, typically considered a disease of older adults, is increasingly recognized as a concern for young adults due to several factors: risk factors - young adults can develop atherosclerosis due to traditional risk factors such as high blood pressure, high cholesterol levels (especially LDL cholesterol), smoking, obesity, and lack of physical activity, early development - atherosclerosis can start in childhood and progress silently for years before symptoms appear. This early development can lead to significant arterial narrowing and plaque formation by young adulthood, metabolic disorders - conditions like diabetes mellitus and metabolic syndrome, which are becoming more prevalent in younger populations, significantly increase the risk of atherosclerosis, inflammatory conditions - chronic inflammatory conditions like rheumatoid arthritis, lupus, and inflammatory bowel disease can accelerate the development of atherosclerosis, dietary factors - poor dietary habits, such as high intake of saturated and trans fats, along with low intake of fruits, vegetables, and fiber, contribute to atherosclerosis risk, genetic predisposition - family history of premature cardiovascular disease can also predispose young adults to atherosclerosis, impact of lifestyle - sedentary lifestyle and stress contribute to increased risk, as they can lead to hypertension and dyslipidemia (Oren *et al.*, 2003; Rosai, 1996). So far prevention and management are concerned, some aspects should be taken care: lifestyle modifications - encouraging healthy eating habits, regular physical activity, smoking cessation, and stress management are crucial, screening - early identification of risk factors through regular check-ups can help in implementing preventive measures, and medical management - in some cases, medications like statins may be prescribed to manage cholesterol levels effectively.

Awareness and education-increasing awareness among young adults about the long-term consequences of unhealthy habits and the importance of early intervention can help mitigate the risk of developing atherosclerosis at a young age (Raitakari *et al.*, 2024; Pettersson-Pablo *et al.*, 2020).

Atherosclerosis, typically considered a disease of older adults, is increasingly recognized as a concern in young adults due to rising rates of obesity, poor diet, sedentary lifestyle, and other risk factors. This condition involves the accumulation of plaque in arteries, leading to narrowing and potential blockages that can cause serious cardiovascular events like heart attacks and strokes (Stone *et al.*, 2022).

In young adults, risk factors such as high cholesterol levels, high blood pressure, smoking, diabetes, and a family history of cardiovascular disease play significant roles. Lifestyle factors such as a diet high in saturated fats, lack of physical activity, and excessive alcohol intake also contribute (Reese *et al.*, 2022).

Early detection and management are crucial to prevent long-term complications. Screening for risk factors and promoting healthy behaviour are key strategies. Treatment may involve lifestyle changes (diet, exercise), medications to control cholesterol and blood pressure, and sometimes interventions like angioplasty or stenting in severe cases (Ekker *et al.*, 2023; Pettersson-Pablo *et al.*, 2024).

CONCLUSIONS

Atherosclerosis, traditionally associated with older age, is increasingly recognized as a concern for young adults due to rising rates of obesity, sedentary lifestyles, and poor dietary habits. The development of atherosclerosis in younger populations can be influenced by genetic predisposition, smoking, hypertension, and diabetes. Early detection through screening and adoption of healthy lifestyle choices are crucial in mitigating the risk of cardiovascular events later in life.

Declaration by Authors

The authors hereby declared that it was their original piece of research and had not been sent to any other journal for publication.

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